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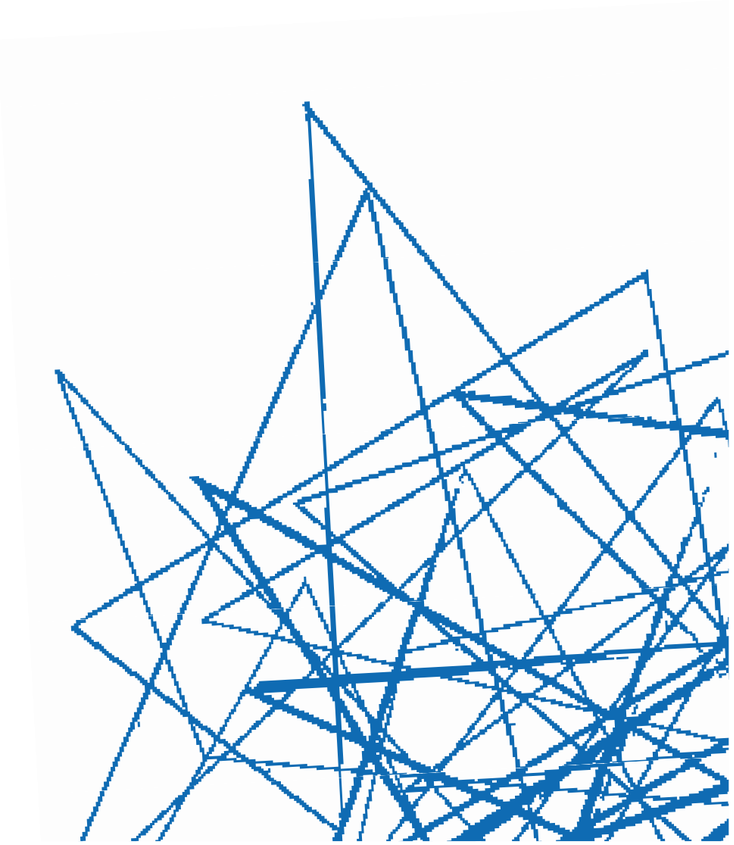

GOVERNING INTERDISCIPLINARITY. STAKES AND TRANSLATIONS OF INTERDISCIPLINARITY IN DANISH HIGH SCHOOL EDUCATION

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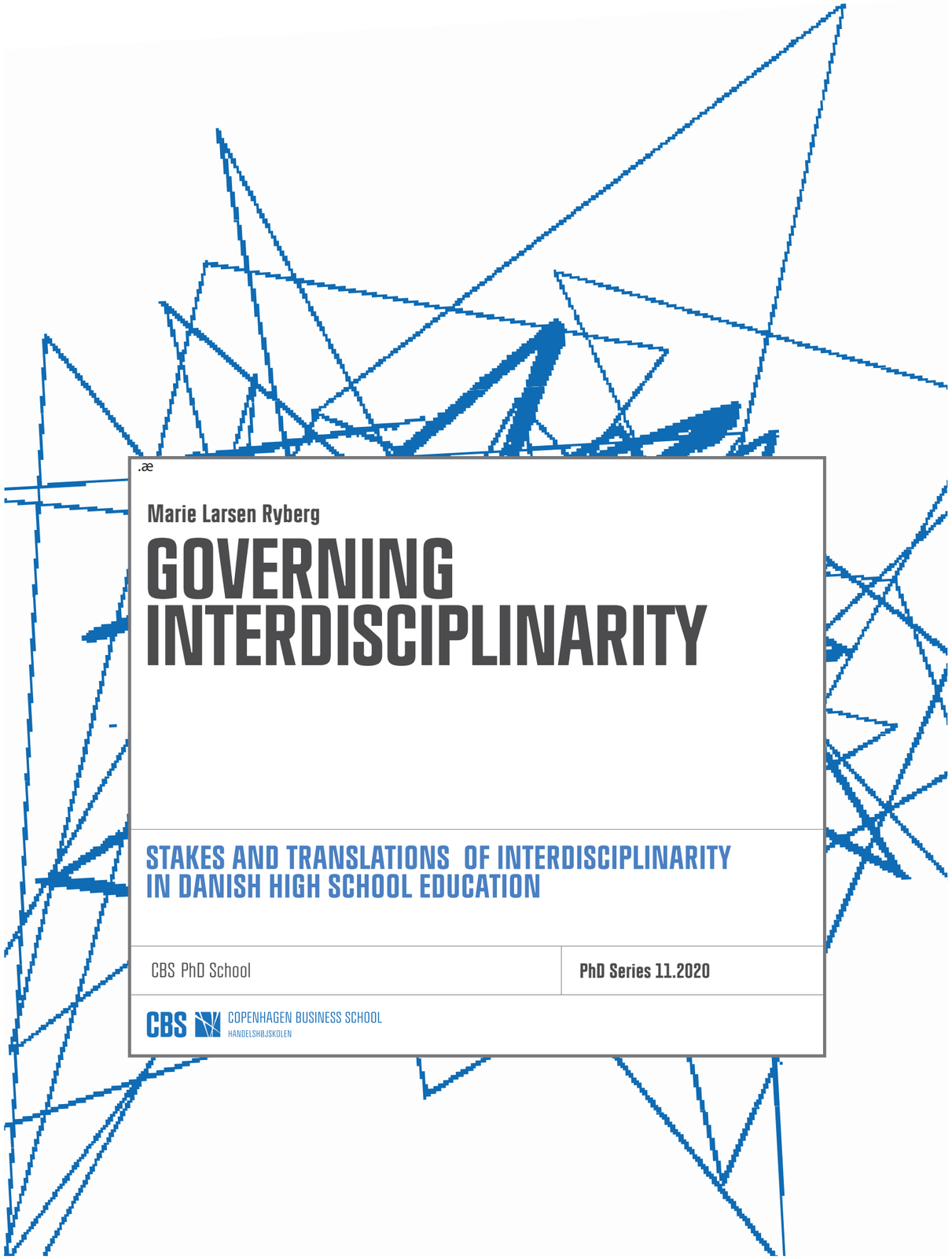

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Marie Larsen Ryberg

GOVERNING INTERDISCIPLINARITY

STAKES AND TRANSLATIONS OF INTERDISCIPLINARITY IN DANISH HIGH SCHOOL EDUCATION

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Governing Interdisciplinarity

Stakes and translations of interdisciplinarity in Danish high school education

Marie Larsen Ryberg

Supervisor: Niels Åkerstrøm Andersen
CBS PhD School
Copenhagen Business School

Marie Larsen Ryberg
Governing Interdisciplinarity
Stakes and translations of interdisciplinarity in Danish high school education

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Preface

This thesis is about the governing of interdisciplinarity in Danish gymnasium education, a type of Danish high school education geared towards academic learning. The questions the thesis raises, however, do not concern how best to organize interdisciplinarity or what its prospects are. Instead, they underpin an empirically driven study examining the specific configuration of interdisciplinarity in the Danish high school, focusing on the stakes and transformations of the sticky practical arrangements involved in governing such interdisciplinarity.

My interest in interdisciplinarity in this context springs from a heavily debated education reform enacted in 2005. This reform introduced interdisciplinarity as a central principle in the Danish high school, thus tying the principle to visions of transcending existing knowledge forms, of addressing complexity and of fostering a kind of flexibility, innovation and entrepreneurship said to required in a global knowledge economy.

Yet, since this introduction of interdisciplinarity, its practical governance has been the subject of controversy, spurring accusations that the overwhelming coordination it was requiring had created a bureaucratic monster. Having worked with the so-called "monster committee" on research and development projects for the Danish Ministry of Education since 2009, I found myself in the midst of this clash between the prospects of interdisciplinarity and the extensive rearrangements and forms of coordination it entailed in practice.

To investigate this predicament, I conducted four months of ethnographic fieldwork at a Greater Copenhagen high school from the fall of 2012 to spring 2013, focusing on the new elements of the reform program that specifically concerned the interplay of disciplines – which was the formal name for interdisciplinarity at the time. I studied how managers and teachers worked with these elements on a daily basis and what discourses, practical arrangements, techniques and materials this work involved. During my fieldwork, however I found that interdisciplinarity was being touted not only in my field of study but also in my department at the business university where I was getting my degree. What was more, the branches of science and technology studies (STS) that I was drawing on for conceptual and methodological inspiration also emphasized interdisciplinarity in their arguments and self-descriptions. This pervasiveness of interdisciplinarity – in theory and in practice, in academia and in education policy – compelled me to wonder, whether

these currents were somehow connected and how to grasp their similarities or differences.

In response to this pervasive interdisciplinarity, I embarked on a meticulous process of tracing the trajectories of those discourses, techniques and practical arrangements I found to be dominating the everyday governing of interdisciplinarity in Danish high school education. I wanted to learn what characterized how this kind of interdisciplinarity was described and practically arranged, but also to understand how it related to current preoccupations with interdisciplinarity more broadly. These inquiries form the basis of this thesis and its arguments.

This thesis thus studies the governing of interdisciplinarity in Danish high school education after the 2005 reform by making historical and ethnographic inquiries into the stakes and translations of the particular configuration of interdisciplinarity at this time. On the one hand, the thesis uncovers the history of interdisciplinarity in Danish high school education. It pursues the specific legacy of interdisciplinarity in a Danish high school context, but also pays close attention to the translations – or transformations – of the problems and solutions, ideas and techniques that have accompanied the notion and defined its actualization since its emergence in the 1950s. On the other hand, the thesis also offers ethnographic analyses that examine the sticky practical arrangements, prevailing ideas and techniques through which interdisciplinarity was governed after 2005. Through these analyses, the thesis points to how progressive ideas of education have become entangled with current discourses on innovation and new measurement techniques, at times happening on some surprising implications. The thesis thus argues that the governing of interdisciplinarity in Danish high school education today entangles ideas and techniques historically at odds, and that current preoccupations with industrial innovation, economic growth and, indeed, performance measurements have, in fact, been the very objects of critique in earlier preoccupations with interdisciplinarity.

Through these analyses, I strive to arrive at a more profound understanding of the governing of interdisciplinarity in the high school and beyond – one that neither exclusively attends to the promising guises of interdisciplinarity nor rejects it altogether, but that acknowledges the predicaments of its current configuration and is mindful of how interdisciplinarity depends on highly specific practical arrangements.

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I have been so fortunate as to conduct my study in the vibrant environment of the Department of Management, Politics and Philosophy at Copenhagen Business School (CBS), to whom I am truly grateful for funding my studies. I would also like to thank my inspiring colleagues, many of whom have read this text at various stages of its completion and whose suggestions, criticisms and even misunderstandings have guided me, pushing me to clarify my writing.

In particular, I want to thank Dorthe Pedersen, whose great overview of Danish educational and governmental policies I have profited from and whose generous support I have been lucky to receive. Two research projects I did with Dorthe Pedersen and Sverri Hammer led me to realize that interdisciplinarity might be an interesting topic through which to explore the politics of mundane educational management, and it was through our conversations that I started to grasp the historical and political underpinnings of interdisciplinarity in Danish science and education.

I am further indebted to my supervisor, Niels Åkerstrøm Andersen, whose continuous support and critique have kept me going. I am also very grateful to several other people involved as secondary supervisors at various stages of the process. They include Signe Vikkelsø, Casper Bruun Jensen and Ursula Plesner.

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At the IT University of Copenhagen, I wish to thank those employees and visitors related to the Technologies in Practice group, whose works at the intersection of anthropology and STS as well as comments at seminars and PhD courses I feel very lucky to have benefitted from. These individuals include Marisa Cohn, Christopher Gad, Marie Ertner, Rachel Douglas Jones, James McGuire, Lucy Suchman, Louise Thorntoft, Anne

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Although I could never have completed this thesis without all these people and environments, none of them are to blame for any of its eventual weaknesses.

Introduction

Governing interdisciplinarity in Danish high school education

I. What are we doing?

> A built system like that of the high school reform rests consciously or unconsciously on a series of sociological assumptions about the world. It could hardly be otherwise. Yet, I believe that the architects have sinned against fundamental sociological learning. Whether the patient is healthy and well or ill can be discussed, whether the category [of diagnosis] is adequate at all *should* be discussed, but the *postmodern* was unquestionably meant as a diagnosis. Not as a request. (Møller 2009, emphasis in original)[1]

The above excerpt is taken from a column entitled "What are we doing?" and written by a teacher at one of Denmark's 142 *gymnasiums,* a type of high school geared towards academic learning and attended by about 30% of Denmark's young people.[2] The teacher poses this question four years after a 2005 reform that introduced interdisciplinarity as a central principle for organizing the gymnasium education. The question is polemical, as the teacher argues that this interdisciplinary reform is a sociological misconception, building on what he describes as a set of "sociological assumptions" that he sees as "postmodern" and as inadequate for governing education. Postmodernism, he asserts, was intended as a means of diagnosis – an analytics for characterizing the present – not something to be translated into an interdisciplinary reform.

Over the last 20 years, interdisciplinarity has (re-)emerged as a key political preoccupation in the governing of science and education (Barry et al. 2008:23, Chettiparamb 2007:1, Jacobs & Frickel 2009:44; Weingart 2000:27, Strathern 2006:192). As such, this development has put interdisciplinary research on the agendas of the European Research Council and the Global Research Council (Allmendinger 2015, Gleed 2016), and ensured that the idea of interdisciplinary collaboration frames the policies of national research councils in countries like the UK, the Netherlands and Denmark (Strathern 2004a:554, Det Strategiske Forskningsråd 2009). Moreover, the intergovernmental Organization for Economic Co-operation and Development (OECD) has

made interdisciplinarity a central theme in discussions on higher education management and the development of so-called 21st-century skills (Fadel 2012, OECD 2011, OECD 2019).[3] In any given science and education context, the concepts of interdisciplinarity, multi-disciplinarity or transdisciplinarity are presented as promising ways of reforming the organization of science and education and thus of meeting the challenges arising from an increasingly complex and rapidly changing world.

In Denmark, this growing preoccupation with interdisciplinarity has reached beyond university research and higher education,[4] becoming similarly pivotal to high school reform. In 2005 the government enacted an extensive and contested reform, introducing interdisciplinarity as a main organizing principle for the high school programs.[5] The reform primarily targeted the *gymnasium,*[6] which had the largest uptake of students and taught subjects paralleling university disciplines.[7] This enactment followed a major education reform bill passed in Danish parliament in 2003 and declaring that gymnasium education was organized in a way that "isolated" each of the various school subjects from the others, thus preventing them from "collaborating" (Undervisningsministeriet 2003:28).[8] The bill was aimed to change the gymnasium organization, establishing more collaboration "across subjects and subject areas" and replacing the original elective structure, which entailed two overall tracks – a mathematic and a linguistic – and a series of electives (Undervisningsministeriet 2004:§2 stk. 2, cf. Zeuner et al. 2006:9). The bill declared that the reform constituted a necessary response to the "far-reaching and rapid changes" brought on by the "knowledge society" and to the need for an educational system with "a perspective towards innovation and entrepreneurial culture" (Undervisningsministeriet 2003:10-11).[9] To achieve these objectives, the 2005 reform program described a range of techniques and practical arrangements, including interdisciplinary study programs, interdisciplinary problem-oriented project assignments and an interdisciplinary ad hoc course construction called "general study preparation" intended to figure alongside existing disciplines to enable their interplay (Undervisningsministeriet 2004, cf. Wissing 2003).

However, the actual day-to-day governance of this new interdisciplinary high school education became the subject of public controversy. While the 2003 bill had enjoyed wide political support in the Danish parliament, the reform was bombarded with criticism from teachers, managers and politicians alike when enacted in the 2005 school year. They

blamed the reform for creating a Kafkaesque "administrative monster" that demanded too much coordination and documentation. This led the Ministry of Education, the high school teachers' union and the organization for high school rectors to initiate a process aimed at simplifying these onerous requirements (cf. Frøberg 2007; Villesen 2007, Wissing 2007, Gymnasieskolernes Lærerforening et al. 2007a, 2007b, 2008, 2009). Moreover, the recently appointed Minister of Education, Bertel Haarder, a member of the Liberal Party (Venstre), repeatedly declared that he had "inherited" this reform from his predecessor (Villesen 2005). The minister's greatest concern was that the "exotic" – as he put it – interdisciplinary study programs [*studieretninger*] would undermine teaching in basic disciplines like Danish and English (Christensen & Gram 2005). While introducing interdisciplinarity in the Danish gymnasium *(hereafter high school)* had seemed like an auspicious development, its practical governing caused something of a predicament.

With this thesis, I take that predicament as an entry point for examining how interdisciplinarity in Danish high school education has been governed in the wake of the reform. My objective is to understand what about the specific arrangements of interdisciplinarity at the time sparked such controversies, leading the reform to be described either as a bureaucratic monster or critiqued as echoing postmodern ideas.

Like the teacher who asked "what are we doing?" above, I am curious as to what kinds of ideas and practices were joined together and affected this sticky situation. To satisfy this curiosity, I approach the governing of interdisciplinarity from the very simple question: *How is interdisciplinarity configured in the Danish high school after 2005*? In particular, I am interested in obtaining a view of the *stakes* involved in the arrangements of interdisciplinarity at this time, that is, of the discourses, techniques and practical arrangements involved in the governance, regulation and realization of interdisciplinarity. However, I also want to see how these ideas and techniques were translated from other times and places and thus eventually came to play a specific role in the current configuration of interdisciplinarity.

I suspect that by examining the governing of interdisciplinarity in the Danish high school through the lens of the stakes and translations involved in its specific configuration, one can begin to see interdisciplinarity as something very different from what it promises to be – as something, in fact, contingent on certain ideas, techniques and practical arrangements, the specific entanglements of which will reveal a great deal about Danish

high school education today as well as shed new light on the present-day preoccupation with interdisciplinarity occurring across the fields of science and education.

II. The stakes of interdisciplinarity

I am not the first to study the introduction of interdisciplinarity in Danish high school reform. A host of Danish education scholars have also offered analyses on *fagligt samspil*, in English "the interplay of disciplines", as it has formally been dubbed in the policy programs. Sociologist of education Lilli Zeuner and her colleagues affiliated with the high school teacher program at the University of Southern Denmark have done four extensive research reports and a series of articles scrutinizing the assumptions on which the reform policies are based, as well as analyzed interviews with teachers and managers to determine how the reform has been received in high schools (Zeuner et al. 2006, 2007, 2008, 2010). [10] These studies were reflecting a commitment to enhancing our understanding of a political reform whose presuppositions were as yet uncharted, but which were radically transforming the Danish high school education and the work of teachers.

The central theme in these reform studies' discussion of interdisciplinarity pertains to how the identity and work of the professionals involved has transformed (Cf. Beck & Frederiksen 2008, Krogh 2009:19, Raae 2008:61, Zeuner et al. 2006:135). Zeuner herself has argued that introducing interdisciplinarity in the Danish high school has made the expectations put on teachers more complex, as they had to perform interdisciplinary arrangements alongside their teaching in the usual subjects: "it is no longer enough with one's own disciplinary expertise; you also have to think in supra-expertise" (Zeuner 2007:240, cf. Zeuner et al. 2006:38). She has further argued that the emphasis on interdisciplinarity has actualized a shift from what she calls "reproductive" to "productive learning" (Zeuner et al. 2006:170). "*Reproductive learning"* values "knowledge that has been developed through generations," stressing the "report [of] theories and methods of the disciplines" and the adaptation of "existing sciences" ways of thinking, whereas "*productive learning"* emphasizes students' ability to "problematize existing forms of thinking" and "develop new forms of thinking" (ibid.). Her argument rests on the assumption that "the structures of the sciences are not durable" and therefore "students

should learn to think through changing structures" (Zeuner et al. 2006:141, cf. Zeuner 2010:471). Others have similarly shown this emphasis on the ability to think through changing structures in analyses concerning the new teacher ideals the reform implied. The ideal high school teacher, such scholars have argued is a person "who transgresses existing attitudes in relation to methods and […] forms of practice" (Beck & Paulsen 2010:32).

Education scholar Peter Henrik Raae has described the introduction of interdisciplinarity more critically, saying that disciplines based on assumptions about the knowledge economy were being destabilized. "The discourse of the knowledge economy is destabilizing the previously so stable disciplinary identity […] – now the criteria for the disciplines should be grounded in a productive interplay of the disciplines," he has noted (Raae 2008:61). He has also pointed out the similarities between the reform program and the discourse of the confederation of Danish industry, when it came to their mutual emphasis on adaptability and innovation, arguing that "the market economy dictated the new reform" (Raae in Wivel 2010:5).

Most observers have agreed that the increasing demand in the wake of the new organization of high school education has posed challenges to teachers' collaboration (Zeuner 2007:242, see also Hjort 2008, Danmarks Evalueringsinstitut 2012, Beck & Frederiksen 2008:7, Bøje 2008:93). Zeuner has pointed to the risk that such collaboration could marginalize some disciplines, while pushing others to the fore. In her view Danish and social science are subjects particularly suitable for collaboration (Zeuner 2007:245). Moreover, she has directed attention to the teaching standardization that interdisciplinarity could foster, as teachers and managers could be prone to introduce a common language and methodology that facilitate collaboration – to the extent that "the role of the teacher loses its creative and spontaneous dimension" (Zeuner 2007:242).

On the whole, these reform studies have carefully analyzed both the assumptions underlying the stipulation of interdisciplinarity in this reform program and its initial implications. The observations springing from this analytical commitment have revealed an emerging motif of adaptability and flexibility echoed in many other analyses of the Danish public sector around the millennium. Indeed, as political sociologists Andersen and Pors have argued, the emergent discourse regarding Danish public-sector governance in those years thus idealized flexible and adaptable institutions and employees that could react "rapidly and smoothly to the changeability, which characterizes society today"

(Andersen & Pors 2014:92, citing the Undervisningsministeriet 2003:9). This emphasis on flexibility and adaptability appears to resonate with discursive changes related to the concept of the knowledge economy also reported outside the Nordic welfare states (cf. Barry 2001:3, Boltanski and Chiapello 2005:76, Graff 2015:2).

However, more than this new discursive form emphasizing flexibility and adaptability in institutions and individuals has been at work when it comes to governing interdisciplinarity in the Danish high school. Flagrant ideas of transgressing existing fields of knowledge, collaboration, innovation and entrepreneurship in the high school reform have co-existed with the rise of new systems of governing measurement and performance in Danish education (cf. Blossing et al. 2015, cf. Hjort 2008, cf. Wright & Ørberg 2008).[11] In relation to the high school reform, educational scholar Katrin Hjort has argued that this political program has implied an increasing focus on accountability and evaluation. This new orientation, she contends, has both called for teachers to engage in greater academic reflection, but also shifted attention to the effectiveness of teachers' work, thus implying that external actors are becoming increasingly authorized to define and control the premises of teaching (Hjort 2007:97, cf. Bøje et al. 2006).[12]

Yet, given the emphasis on these new ideals and governance arrangements at stake in this reform, intriguingly little scholarly examination has been conducted into the concrete technical and practical arrangements at the heart of shaping interdisciplinarity in the Danish high school. The introduction of interdisciplinarity has primarily been studied through the lens of new tendencies in political discourse rather than of the more obscure practicalities and techniques through which interdisciplinarity has been governed. While attending to the immanent assumptions of political discourses and written reform programs might be vital to understanding governmental efforts,[13] such assumptions only tell part of the story of their consequences (cf. Gilliam 2016:59). A focus on efforts surrounding formal regulation tells us less about what has characterized interdisciplinarity in its sticky practical arrangements, as a whole range of phenomena, delicate regulatory techniques and rationales have all affected how interdisciplinarity is governed in practice.

In this thesis I suggest that we go down a different avenue of inquiry into interdisciplinarity at this juncture in Danish high school education – an avenue that is not only more practical and technical, but also more historical. My aim is to trace and unfold

what characterizes the ways in which interdisciplinarity has been governed, regulated and turned into action in the Danish high school in the time since 2005. To this end, I will provide a historical and ethnographic analysis of the stakes and translations of its specific arrangement – of how interdisciplinarity has been configured.

In line with the above reform studies, I consider these stakes as relating to specific rationales of competition in a knowledge society and as having profound impacts on the work of teachers; yet, I am not addressing the governance of interdisciplinarity as purely an instance of new ideas about flexibility, new forms of accountability or, say, the spread of neoliberalism. As several critics point out, such tendencies to name things risk generalizing terms and therefore possibly obscuring a variety of processes (Barry & Born 2013:4, cf. Le Galés 2016:518, Dean 2014:153). I am thus opting to examine what characterizes the governing of interdisciplinarity through a series of careful historical and ethnographic studies exploring the interwoven practical and technical arrangements, discourses, rationales and actions that go into regulating and configuring interdisciplinarity in particular ways.

Indeed, taking a closer look at the stakes of interdisciplinarity gives new depth to the argument that introducing interdisciplinarity in high school education encapsulates a vision of the knowledge economy, or of new forms of accountability. As I shall show, the very name the "interplay of disciplines" was in fact the wording for another reform program enacted in 1960 and formally introducing interdisciplinarity in Danish high school education. This program drew on progressive discussions of the relationship between education and democracy, primarily inspired by American philosopher John Dewey (Undervisningsministeriet 1960:24). What is more, a key technique of organizing interdisciplinary assignments after the 2005 reform, "problem-oriented project work", stemmed from the period around 1968 when students critiqued disciplines in a political commitment to more participatory and emancipatory ways of organizing education (Illeris 1974:168, Berthelsen et al. 1977:21). The reappearance of these ideas and techniques, however, does not mean they have stayed the same. Rather they have been translated from different times and places to eventually be empracticed in particular ways in the specific configuration of interdisciplinarity found in Danish high school education after 2005.

My point is that if we trace the stakes and translations of interdisciplinarity as it has been specifically configured in Danish high school education since 2005, we might begin to

understand the governing of interdisciplinarity as something much more complicated than one can grasp by studying a reform program's assumptions or gazing through the lens of an analytical concept. Indeed, examining the historical changes of interdisciplinarity and those specific ideas and techniques involved in its day-to-day practical arrangements, enables us to see how critical engagements with the politics of education in previous times have been translated and transformed into arrangements that serve the opposite purposes of those initially intended. As I will show, such an examination will allow us to grasp the particular character of the governing of interdisciplinarity in Danish high school education.

III. A historical and ethnographic approach to the governing of interdisciplinarity

My project began as an ethnographic inquiry into the everyday management of interdisciplinarity. After some years as a research assistant on projects studying management and planning practices following the high school reform, I wanted to do an ethnographic study on how teachers and administrators, once called rectors and inspectors but now designated "managers," worked day to day to realize the reform aims of interdisciplinarity.[14] I wanted to come to grips with why this practical management was causing such controversy.

Ethnography is a method and mode of inquiry traditionally deployed by social anthropologists to understand, describe and explain forms of knowledge, ways of relating and the social action of groups, organizations or communities (cf. Gobo 2008, Bateson 1987 [1942]:168). In keeping with this tradition, I based my inquiry on the premise that I should treat interdisciplinarity as an ethnographic artifact (Riles 2006:16), that is, as a discursive device or category to be studied by including all that happens under its banner. So, rather than approaching interdisciplinarity as a well-defined mechanism, I instead approached it as a potentially messy and contingent phenomenon potentially rife with contradictory forces and elements, actors, techniques, discourses, organizations, modes of relating, forms of reasoning and ways of doing (cf. Strathern 2005:128). I have used "interdisciplinarity" as a heading for these diverse actions and arrangements and even for

variations in their conceptual expressions, such as the "interplay of disciplines" or "transgressing disciplinary boundaries."

I conducted ethnographic fieldwork for an intense short-term period running from 2012 to 2013 at a high school in the Greater Copenhagen area (Pink & Morgan 2013). I focused this fieldwork on the new elements of the reform program that specifically concerned the interplay of disciplines, studying how managers and teachers worked with these elements on a daily basis and what discourses, practical arrangements, techniques and materials this work involved. I had become well acquainted with these new elements in my research assistant work on projects funded by the Danish Ministry of Education (Pedersen & Ryberg 2009, 2012, 2013).

During my ethnographic fieldwork it became obvious how the status of the reform's visionary discourses changed in the teachers' and managers' daily work. In the reform program interdisciplinary was envisioned to provide pupils with specific innovation or entrepreneurship competencies that could potentially boost the knowledge economy. Yet, in the day-to-day practices, these ideas were side-lined by other more technical and practical matters, as interdisciplinarity was being carried out in rather routinized and technical arrangements, connected to timetables, curriculum plans, didactical techniques, managerial documents, progression plans, textbooks and specific ways of framing questions. What appeared as means and ends in the policy programs manifestly changed when translated into daily practices.

Teachers and managers also commented on the differences between political discourse and everyday practice. They would often tell me about what they saw as the ambitious or even impossible aims of the reform, or note how there was "a lot of discourse in all of this," speculating about where the peculiar and often challenging demands that structured much of their everyday work originated.[15] These field discussions generated questions regarding the trajectory and transformation of the ideas and techniques affecting the everyday governance of interdisciplinarity. In search of answers, I began sketching out how interdisciplinarity had historically developed in Danish high school education as well as how parallel debates on interdisciplinarity had unfolded in the social sciences and education in the USA and in French-speaking regions.

However, my questions were also informed by a more recent discussion of interdisciplinarity. In the fields of anthropology, science and technology studies (STS) and

philosophy, a number of scholars were seeking to understand the character of a rising preoccupation with interdisciplinarity in the sciences, with its specific tenets and various manifestations (Strathern 2004b, Barry & Born 2013, Osborne 2015). These scholars approached interdisciplinarity, not as a much-needed response to an increasingly complex and rapidly changing world, but rather as a circulation of certain ideas that informed research policies and local initiatives aimed at transforming educational programs and research practices (Strathern 2004b:8, Barry & Born 2013:4, Osborne 2015:12).

Political geographer Andrew Barry and anthropologist Georgina Born have edited a volume called *Interdisciplinarity: Reconfigurations of the Social and Natural Sciences*, in which they propose that interdisciplinarity be approached as a *configuration* of programmatic statements, interventions and practices (Barry & Born 2013:5, *following Foucault 1972:59*).[16] Recognizing, however, that interdisciplinarity can be manifested in a multiplicity of guises, they also call for a careful consideration of "the specificity of their trajectory," proposing a "genealogy of particular interdisciplinary practices and fields" that attends "to its path-dependency and historicity of the distinctive style in which it is empractised" (Barry & Born 2013:5, 18).

In keeping with this approach to interdisciplinarity as a configuration whose specific history and distinctive style must be carefully considered, I examine the governing of interdisciplinarity in Danish high school education after 2005 through two lines of inquiry. The first is genealogical and thus draws on historical documents to pursue a richer understanding of the predominant rationalities, ways of posing problems and practical arrangements involved in the specific configuration of interdisciplinarity after 2005. My analytical aim here is to examine how interdisciplinarity has been configured in different ways in Danish high school education since the first formal institutionalization back in 1960 and thus to gain a better view of what characterizes its current configuration. As such, these analyses draw on Michel Foucault's approach to history as a way of interrogating the present order of things (cf. Foucault 1984a). Yet, as I will discuss more fully towards the end of this introduction, I approach the configuration of interdisciplinarity in a rather technical and localized manner, mobilizing Bruno Latour's associative and translational sociology, also termed actor-network theory (ANT), and its emphasis on the detailed, technical and micro-social space of action, entanglement and processes of translation (Latour 1986a:267, 1988a:11, 2001:137, 2005:9).

While the first line of inquiry, the genealogy, is intended to elucidate the specific stakes and space of possibility for governing interdisciplinarity after 2005, the second line of inquiry draws on my ethnographic study to illuminate those sticky practical arrangements and techniques through which interdisciplinarity has been governed since 2005 as well as its implications in everyday practice.

Through these two lines of inquiry, my goal is to enable us to appreciate new facets of interdisciplinarity in Danish high school education that have come into effect since 2005 – and indeed of the predicaments in terms of governing, these facets have raised. Tracing the stakes and translations of the particular ways in which interdisciplinarity was configured in 2005, the historical and ethnographic analyses conducted here offer a window into the politics of Danish high school education since World War II during a pivotal period in the making of the Danish welfare state. They also, and perhaps more interestingly, cast fresh light on the interrelations between preoccupations with interdisciplinarity in the social sciences and the politics of education. In other words, I draw on a broad range of educational and technical programs, policy papers and institutional as well as social practices surrounding interdisciplinarity in Danish high school education as a lens through which to ask more fundamental questions about how concepts, techniques and theories are transformed as they move and become incorporated into new arrangements. In the introduction to Part I and to Part II, I discuss the conditions and methods applied for these two lines of inquiry in greater detail. Before embarking on these analyses, however, I would first like to explain how the rising preoccupation with interdisciplinarity in Danish education of the late 1990s was not an isolated phenomenon.

IV. The current preoccupation with interdisciplinarity in science and education

In the late 1990s, interdisciplinarity re-emerged as a political preoccupation in both university research and education, and has remained so ever since (Barry et al. 2008:22, Osborne 2015:6, Jacobs & Frickel 2009:44, Strathern 2004b:4, Strober 2011:6, Weingart & Stehr 2000:xi). The vast number of reviews, handbooks and whitepapers based on notions of interdisciplinarity, multi-disciplinarity or transdisciplinarity written in the last 20 years attest to the extensive attention interdisciplinarity has received among administrators,

politicians and academics (cf. Augsberg & Henry 2009, Bernstein 2015, Callard & Fitzgerald 2015, Chettiparamb 2007, Frodeman et al. 2009, Gibbs 2015, Hadorn et al. 2008). Sociologists Jerry A. Jacobs and Scott Frickel have shown that in 2007 the number of academic articles published on the topic of interdisciplinarity approached 400, and this was not even counting books or related works on multi- or transdisciplinarity (Jacobs & Frickel 2009:46). The sheer scale of such publications could reflect a changing dynamic in what might be called mass research, but it also speaks to the salience of interdisciplinarity as a model for restructuring research environments and reforming education in Western Europe and the USA during this period.

Most of this literature treats interdisciplinarity as a prospect for effecting change or meeting a concern for improvement. A report on "facilitating interdisciplinary research" sponsored by the US National Academy of Sciences, for example, argues that interdisciplinary research is:

> a mode of discovery and education, has delivered much already and promises more – sustainable environment, healthier and more prosperous lives, new discoveries and technologies to inspire young minds, and deeper understanding of our place in space and time. (National Academy of Sciences 2005:1)

These prospects involve not only research but also education, and the report argues that undergraduates should

> …seek out interdisciplinary experience, such as courses at the interfaces of traditional disciplines that address basic research problems, interdisciplinary courses that address societal problems, and research experiences that span more than one traditional discipline. (National Academy of Sciences 2005:4)

In higher education, interdisciplinarity has become a cornerstone of educational policies and scholarly debates alike. Particularly in the USA, interdisciplinarity is a now a popular idea espoused by presidents, provosts and deans as a means of restructuring higher education (Jacobs 2014:1). A leading professor in interdisciplinarity and integrative studies, Julie Thompson Klein, has noted that the word has become the "mantra du jour" in discussions of American higher education (2010a:153). Interdisciplinarity in the UK is similarly encouraged both through the Higher Education Academy and the Research

Councils (Chettiparamb 2007:1), and in Finland a recent reform aiming to restructure the entire primary educational system around principles of interdisciplinarity has gained attention worldwide (Li & Dervin 2014:14). The current preoccupation with interdisciplinarity, in other words, is entrenched in both research and education governance in much of the Western world.

A recurring argument in this sweeping preoccupation with interdisciplinarity is that it offers a promising way of organizing knowledge and education in an increasingly complex and changing world. Discussions of interdisciplinarity and transdisciplinarity in relation to research in environmental issues, for example, point to "the compartmentalization of scientific and professional knowledge [and] to the sectorial division of responsibilities in contemporary society" as unsuitable for embracing "the complexity of the natural and human-made environment" (Lawrence & Despret 2004:397-98, cf. Hadorn et al. 2006, Jäger 2008:vii).[17] This line of thinking inherently contains a more or less explicit problematization of the incongruities between the complex conditions and problems in the real world and the compartmentalized arrangement of disciplines. As political scientist Garry D. Brewer has written in a much-quoted phrase: "The world has problems, but universities have departments" (Brewer 1999:328).

This critique of existing arrangements in disciplines also appears in arguments about the prospects of interdisciplinarity in promoting innovation.[18] A dominant strand of the literature rather bluntly presents inter- or transdisciplinary problem-solving in conjunction with an expectation of boosting industrial innovation and economic growth (cf. Klein et al. 2001, Nowotny et al. 2001:19, Hadorn et al. 2010). Central to this strand of thought is the idea that disciplines in and of themselves cannot create "new" or "robust" knowledge, which rather comes when disciplinary boundaries are transgressed (cf. Gibbons et al. 1994:5; Nowotny et al. 2001:69, 166).[19] While this critique relies on an assumption that disciplines are narrowly focused with little internal differentiation or variation, it does not reject disciplinary specialization as such. Rather, specialized disciplinary knowledge is presented as one among many productive viewpoints through which fresh and innovative solutions can be collaboratively reached (Strathern 2004b:80).

Thus, much current writing on interdisciplinarity is fairly instrumental in scope. Numerous articles and books offer recommendations for interdisciplinary collaboration, discuss ways of overcoming obstacles related to interdisciplinarity or offer classifications

that might serve as models for improvement (cf. Brewer 1999, Callard & Fitzgerald 2015, MacLeod 2018, Mansilla & Gardner 2003, Wickson et al. 2006, Klein 2010b). A common distinction is that between *multi-disciplinarity*, described as the collaboration between several disciplines where disciplines continue to work with disciplinary norms; *interdisciplinarity,* in which the emphasis is said to be on integrating or synthesizing several disciplines; and finally *transdisciplinarity*, which is taken to involve a transgression of established disciplinary modes of inquiry (Barry & Born 2013:9, Gibbs 2015:2, Klein 2010b:16, Latucca 2001:78, UNESCO 1998:iii). Here, the important difference is the character of the relation between disciplines.

Professor of interdisciplinarity Julie Thompson Klein has been a key exponent in circulating these distinctions and defining interdisciplinarity as a concept emphasizing the importance of the character the relation between disciplines has. In her widely cited book *Interdisciplinarity: History, Theory, and Practice*, which considers engagements with interdisciplinarity across research and higher education in the USA, Klein noted that the "'bulk of literature [on interdisciplinarity] consists of case studies and anecdotal wisdom, but very little empirical analysis and even less epistemological reflection" (Klein 1990:109). Her own work reflects a careful interrogation of the conceptual differences in regard to interdisciplinarity, and she presents ways of considering and improving interdisciplinarity: "It is synthesis that distinguishes 'disciplinary' and 'multidisciplinary' education from 'interdisciplinary' education," Klein argued in the 1990s, pointing to "synthesis" as the vehicle for genuine interdisciplinary transformation (Klein 1990:166). More recently, however, Klein's widely circulated discussions of a taxonomy of interdisciplinarity point to the value of transdisciplinarity over interdisciplinarity as an avenue for advancing collaboration (Klein 2010b:16).[20]

Approaching interdisciplinarity as a question of the character of disciplinary relations has the advantage of creating a basis for interpreting a situation and evaluating actions for the purpose of regulating or improving them. Yet, such conceptual distinctions also assume that disciplines are coherent and stable entities whose relation is defined almost solely by such abstract factors as "degree" of integration or "transgression" of disciplinary boundaries. One gets the sense that interdisciplinarity is something universal, something that stands apart from the social world in which it is formulated or where it is supposed to take place.

Interestingly, the very engagement with distinguishing between various disciplinary relations is itself a reflection of specific institutional and historical interventions, although the various category definitions have changed over time.[21] The notion of transdisciplinarity, for example, first appeared at an OECD conference in the early 1970s, where it was connected to visions of establishing more complex and abstract syntheses of disciplines (Jantsch 1972:106) and of a "higher stage succeeding interdisciplinary relationships" (Piaget 1972:138). Conversely, more recent conceptualizations of transdisciplinarity tend to envisage its entailing an act that transgresses – or even destroys – disciplines' existing institutional structures, a viewpoint that sometimes echoes economist Joseph Schumpeter's terminology of "creative destruction," a notion that has dominated writing on entrepreneurship. A volume based on a 2001 UNESCO conference on transdisciplinarity clearly states this newfound sense of transdisciplinarity as a matter of creative destruction:

> We need a new kind of knowledge, a new awareness that can bring about the creative destruction of certainties. Old ideas, dogmas, and outdated paradigms must be destroyed in order to build new knowledge of a type that is more socially robust, more scientifically reliable, stable and above all better able to express our needs, values and dreams." (Klein et al. 2001:i)

In other words, these definitions and taxonomies are not ubiquitous categories, but may connect to different sets of assumptions regarding the problems to be addressed and assume different prospects for change.[22] Indeed, the promises ascribed to transdisciplinarity, as expressed in this much-cited UNESCO publication, embrace a terminology of economic theorizing on entrepreneurship and envision a more "socially robust" form of knowledge production achieved through problem-solving that transgresses disciplines (cf. Nowotny et al. 2001:69, 166). So, while the definitions of multi-, inter- and transdisciplinarity may be vital models for action and reflection, the concepts are not detached from specific historical circumstances and institutional interventions. Rather than seeing these concepts and definitions as universal classifications from which to conceive of interdisciplinarity, I take them to be contingent historical products that reflect different engagements with interdisciplinarity. Thus, instead of putting too much weight on these distinctions of terminology, which tends to emphasize the character of the relation between two disciplines, I propose we look more

carefully at what assumptions, problems and solutions and, indeed, practical actions are implied in any call for interdisciplinarity.

Now, while much current writing about interdisciplinarity tends to critique existing disciplinary arrangements or points to the degree or character of the relation between disciplines as an avenue for improvement, one can trace another tendency in recent debates to present interdisciplinarity as concerning a specific attitude, a certain way of relating or a change of thought. Such an approach to interdisciplinarity as a matter of a persons' attitude, rather than, say, as an organizing matter, spans various bodies of literature. This way of seeing interdisciplinarity as a form of critical thinking is perhaps clearest in a branch of humanities-based interdisciplinarity literature that often draws on continental philosophic discussions of the relation between knowledge and power (e.g. Moran 2010:45ff., Osborne 2015, e.g. Balibar 2015, Nicolescu 2010). Literary scholar Joe Moran in his book *Interdisciplinarity*, for example, is concerned with interdisciplinarity as a "radical questioning of the nature of knowledge itself and our attempts to organize and communicate it" (Moran 2010:15). Moran argues that the advantages of interdisciplinary approaches lie in the ways

> …they can challenge ossified, outmoded systems of thought and produce new innovative theories and methodologies which open up the existing disciplines to new perspectives; and they can help people think more creatively about the relationship between their own subject and other ways of doing things. (Moran 2010:165)

While in Moran's case this emphasis on the creative potential of interdisciplinarity for "other ways of doing things" seems to be based on a specific emancipatory agenda, interdisciplinarity's potential to foster creative thinking or alternative ways of doing things also appears in writing concerned with industrial innovation and problem-solving. Take, for example, the proposal that "wicked problems" be tackled through a "transdisciplinary imagination" (Lawrence 2010).

In education, other champions of interdisciplinarity have similarly indicated the potential of interdisciplinarity as a means of fostering specific attitudes or orientations in an individual. The recent concern with promoting 21st-century skills, for example, reflects a preoccupation with one's cultivating non-content-based knowledge by integrating disciplines in order to enhance collaborative skills, critical thinking, problem-solving and

innovation, skills deemed here as key to a successful life (cf. OECD 2019, Scott 2015, Centre for Curriculum Redesign and OECD 2012). This agenda of stimulating 21st-century skills through interdisciplinarity seems to have replaced previous framings of interdisciplinarity as a way of advancing "general education" that also concerned promoting certain attitudes or personal skills rather than teaching the exact content of the curriculum (cf. D'hainaut 1986:3, Miller 1988). In other words, the potentials of fostering certain attitudes through interdisciplinarity have been mobilized for different agendas.

The understanding of interdisciplinarity as a skill or attitude also appears in discussions of higher education. Educational scholar David Guile, for example, describes how teachers currently operate under conditions where "inter-professional" working and learning are gaining prominence (2012). This, Guile argues, calls for people to be skilled in what he calls "recontextualizing knowledge', that is, in appreciating "why and how the forms of knowledge change in subtle but significant ways because of a new purpose" (Guile 2012:93). Here, "inter-professionalism" is presented as a condition that engenders a need for professionals capable of transfiguring their knowledge as well as of recognizing when such transfigurations occur. As I will later show, this idea that interdisciplinarity can foster a specific critical form of thinking has a long history, dating back to when the term first appeared in the initial decades of the 20th century.

Guile's work, however, also seems to suggest that interdisciplinarity is somehow inherent to an ongoing transformation entailing the restructuring of professional work and, indeed, of the university. This understanding echoes a branch of sociological debates that have addressed interdisciplinarity as a reflection of current changes in how knowledge institutions are organized. As sociologists Peter Weingart and Nico Stehr put it, "something quite fundamental is happening to the established order of knowledge as it has emerged with the modern universities in the nineteenth century: the organizational matrix of disciplines is beginning to dissolve" (Weingart & Stehr 2000:xi). Sociologists Charles Camic and Hans Joas also seem to operate on this premise when they discuss the new roles sociology plays in what they call a "postdisciplinary age" (2004). Although such post-disciplinary conditions or even tendencies to dissolve the organization of university disciplines may be emerging with new urgency, this diagnosis that the arrangement and status of knowledge are changing does not appear entirely unprecedented. If anything, such an analysis resembles French philosopher Jean-Francois Lyotard's famous essay

describing a postmodern condition characterized by the splintering of the old "faculties" "in[to] institutes and foundations of all kinds, and the universities los[ing] their function of speculative legitimation" (Lyotard 1984 [1979]:39). Lyotard was writing in the context of the university rearrangements of France after 1968, which were characterized by new disciplines and interdisciplinarity universities, as they were called. As Weingart has remarked, however, seen from the 1990s, the university transformations did not necessarily mean a dissolution of disciplines, but rather involved the rise of highly specialized research topics, putting a new set of disciplinary structures in place of the existing ones (Weingart 2000:36).

Perhaps the most influential proponents of interdisciplinarity in the last 20 years have been Helga Nowotny and Michael Gibbons and their colleagues, who co-authored two books, *The New Production of Knowledge* and *Rethinking Science* (Gibbons et al. 1994, Nowotny et al. 2001). The argument applied in these books both analyses an ongoing change in the existing organization of knowledge and envisions a new set of prospects for change. Their key point was that a shift towards a new mode of knowledge production was taking place, which involved replacing and transforming established institutions, disciplines, practices and policies. This shift from what they called Mode 1 to Mode 2 was seen as entailing the transgression of lay and expert knowledge and as engendering more "reflexivity," "transdisciplinarity" and "heterogeneity" (1994:4-8).

Through these books, as well as the authors' other activities, an idea gained ground, namely that this shift could succeed in producing a new kind of knowledge that would "add fresh elements of uncertainty and instability" (Nowotny et al. 2001:2). In addition, a "more socially robust knowledge, which comes from transgressing disciplinary and institutional boundaries" could be envisioned (Gibbons & Nowotny 2001:69, cf. Nowotny et al. 2001:89, cf. Nowotny 2004).[23] Thus, in arguing for a move towards Mode 2 knowledge, they also implied a critique of the established institutions and existing ordering of disciplines as involving a rigid, partial or backward mode of disciplining and knowledge production. Emphasizing "the emergence of loose organizational structures, flat hierarchies, and open-ended chains of command" of Mode 2, these analyses showed that "universities are precisely the opposite type of such organizations. For the most part they are still highly hierarchical, fixed towards disciplinary structures" (Gibbons & Nowotny 2001:69).

Nowotny and Gibbon's analyses have gained wide influence, both giving new impetus to scholarly debates on interdisciplinarity and affecting research policies (Barry & Born 2013:1, Strathern 2004b:8).[24] Critics have argued that their works reflect a "moral enthusiasm" and oscillate "between empirical and normative statements" (Weingart 2000:36); that the works have been insufficiently historicized and assume a teleological account of a progressive decline in the importance of disciplines (Barry & Born 2013:4); that they engage in a performative discourse, thus participating in its realization (Godin 1998); and, finally, that they have treated knowledge "as a thing and as a product" (Mirowski & Sent 2008:685). Nevertheless, Nowotny and Gibbons' works continue to inspire writing on interdisciplinarity and transdisciplinarity (Osborne 2015:12). Indeed, as Andrew Barry and Georgina Born have argued, this idea of a shift from Mode 1 to Mode 2 has become performative (Barry & Born 2013:4) in that the notion circulates as a taken-for-granted model that informs everyday perceptions and actions. However, as anthropologist Marilyn Strathern has argued, such circulation is not neutral (Strathern 2004a); what is circulated is not only a vision of the prospects of interdisciplinarity in another arrangement of knowledge production, but also a specific rationality of governance that envisions loose organizational structures and industrial innovation, not unlike a neoliberal political and antiregulatory agenda (cf. Strathern 2005b:468).

In other words, the recent resurgence of interest in interdisciplinarity could catch scholars of science and of education off guard. Although interdisciplinarity as being concerned with combining two or more disciplines or as fostering a particular attitude might seem attractive in a world of accelerating change and complexity, this view tends to overlook how entangled interdisciplinarity is with other rationalities or values. Neither does such a view fully contend with what happens when interdisciplinarity meets reality, with those often complex practical arrangements and techniques on which a specific manifestation of interdisciplinarity also depends. In short, the stakes and the translations involved in the governing of interdisciplinarity are easily relegated to the shadows.

In recent years, social theorists have advanced important critiques of the preoccupation with interdisciplinarity. Recently, for instance, historians of science Johan Heilbron and Yves Gingras have pointed to the resilience of disciplines in what they otherwise describe as an "omnipresent and magic discourse of interdisciplinarity" (2015:5). Others defend disciplines against the ongoing restructuring of research

environments and educational programs occurring under the rubric of interdisciplinarity. In the conclusion to his recent book on interdisciplinarity in American higher education, Jerry Jacobs states:

> Disciplines are not bad; they are good. They are not isolated silos but rather nodes in a remarkably vibrant web of scholarship… Disciplines are broad, not narrow: they are dynamic, not static. (Jacob 2014:224)

Anthropologist Marilyn Strathern has similarly argued that disciplines constitute a "community of critics" (Strathern 2006). She warns against what she calls "a bureaucratic form of interdisciplinarity," which she sees as "reframing the ways society is imagined and drawn into the scientific enterprise" (2005c:11). At the same time, Strathern reminds us that the prevailing disciplinary arrangements also condition what interdisciplinarity becomes:

> … while the idea of interdisciplinarity ubiquitously signals hope for forms of collaboration that will create new combinations from established expertise, modes of extra-disciplinary endeavour will vary across disciplines. (Strathern 2007:123)

All in all, these critiques of interdisciplinarity come in response to the last 20 years' massive preoccupation with interdisciplinarity. The gist of such critiques is that this preoccupation should not be premised on the potential afforded by interdisciplinarity, as the specific tenets and local practical effects of any such preoccupation must first be considered. As more research is done in this area, it is becoming increasingly clear that an approach to interdisciplinarity as a ubiquitous method fails to appreciate the specific institutional circumstances and practical implications of differing engagements with interdisciplinarity (cf. Latucca 2001:254, Lamont et al. 2006, Lamont 2009:205).

Moreover, recent studies on how ideas of interdisciplinarity and transdisciplinarity are circulated also suggest that the conventional separation between scholarly debates and more instrumental and practical approaches to interdisciplinarity fail to do justice to the phenomena at hand. Instead, they indicate that specific ideas and techniques of interdisciplinarity traverse academic journals, policy programs and local initiatives, in the process changing shape as they become incorporated in different circumstances. This also has implications for the study of interdisciplinarity. As political geographer Andrew Barry

and anthropologist Georgina Born argue, interdisciplinary practices "cannot be grasped merely in the terms of epistemology, as though they were separate from the world with which they engage" (Barry & Born 2013:14). Rather, they maintain that a study of interdisciplinarity should include the "particular nature of the rationales and techniques governing the contemporary development of interdisciplinarity", suggesting that interdisciplinarity be approached as an assemblage whose "heterogeneous practico-material and discursive expression" is contingent on specific historical and practical contexts (Barry & Born 2013:14).

From this perspective, simple arguments for or against interdisciplinarity, or for more or less integration or transgression may miss the mark. Rather, if we accept that interdisciplinarity is contingent on specific historical and practical circumstances, we must also be open to how other, unanticipated factors may play a vital role in its specific manifestation.

Drawing on these insights, my aim in this thesis is not centered on addressing whether the governing of interdisciplinarity is good or bad, or, for that matter, which models or techniques optimally facilitate its management. In fact, this thesis is premised on the notion that such questions neglect the most interesting and perhaps most important issues to understand about interdisciplinarity: what characterizes its specific configurations, its practical arrangements, tenets and specific techniques, and how this reflects the ways knowledge-making and educational systems are organized today. In short, I suggest that directing attention to the stakes and translations of the practical arrangements, discourses and techniques through which interdisciplinarity takes effect will better equip us to understand its predicaments of governing and answer the question teachers have raised after the introduction of the interdisciplinary reform in Danish high schools: "what are we doing?" To reach a fuller understanding of what such an approach to interdisciplinarity entails in this study, one must first take a closer look at the central analytical concepts I am mobilizing, as well as at their propositions and implications.

V. Governing interdisciplinarity

"Disciplines discipline disciples" Andrew Barry, Georgina Born and Gisa Weszkalnys have written in an article on the current preoccupation with interdisciplinarity in the sciences

(2008:20, cf. Barry & Born 2013:1). Their statement not only pinpoints the etymological roots of "discipline" but also highlights the act of disciplining as a constitutive feature of "discipline." Indeed, as historian of science Simon Schaffer points out, the Latin word "disciplina" refers to the organization of knowledge as well as to the exercise of power (Schaffer 2013:57). This emphasis on disciplining and the exercise of power as intrinsic to the workings of disciplines flushes out a central characteristic that I will argue interdisciplinarity shares: a concern with questions not only regarding how knowledge in fields or subjects is arranged, but also involving the governance implied in such arrangements – i.e., the order they impose on our minds and bodies.

I base this argument on the notion that something is at stake when someone calls for interdisciplinarity; that proclaiming the need for interdisciplinarity is intended to point towards a specific direction in which things are to be organized and practiced. Marilyn Strathern illustrates this point in a paper on the emergence of interdisciplinarity in the UK's changing university landscape. She argues that the primary characteristic of interdisciplinarity is its assumed difference from our general aptitude for mixing knowledge: "it is the way we make extra training explicit to ourselves which separates a self-conscious interdisciplinarity off from the routine and everyday ability to mix knowledges," Strathern asserts (Strathern 2004b:37).[25] Strathern's point is that we often intermingle different kinds of knowledge in our daily practices, without necessarily calling this mixing interdisciplinarity. Labeling something as interdisciplinary thus marks a self-conscious act of setting this kind of mixing apart from the usual ways we daily blend knowledge. Now, what this self-conscious categorizing implies is the interesting part.

Engagements with proclaiming interdisciplinarity have a long and rich history. As education scholar Lisa Latucca notes in her book *Creating Interdisciplinarity: Interdisciplinary Research and Teaching Among College and University Faculty*: "attempts to define interdisciplinary work began in the 1930s, but reached a peak during the 1970s and 1980s" (Latucca 2001:8). This plethora of engagements with defining interdisciplinarity goes to show the wide variations in its conception. In a book on the history of interdisciplinarity, professor Julie Thompson Klein affiliates the emergence of the term with what she calls the "progressive views" of John Dewey and Alfred North Whitehead and the forming of the Social Science Research Council in the USA in the 1920s (Klein 1990:24, cf. Fallace 2016:177). Literary scholar Roberta Frank locates the emergence of a

preoccupation with interdisciplinarity back to 1912 when George Ellery Hale, who became the US National Research Council's first president in 1916, argued that the US National Academy of Sciences should encourage interest in "subjects lying between the old-established divisions of science," and later in 1914 when Hale urged a concern with "the interrelationship of the sciences" (Hale cited in Frank 1988:92).[26]

A closer look into these descriptions indicates that more was at stake than inventing a new concept. These self-conscious endeavors to name "interdisciplinarity" or the "interrelationship of disciplines" reflect a desire not only to coin words but also to engage with doing things otherwise. These efforts were made in specific milieus and among certain individuals who were problematizing prevailing disciplinary arrangements and setting a specific course for interdisciplinarity as an alternative. In Chapter 1, I more fully show how, over the last century, the notion of interdisciplinarity has emerged and been incorporated in different engagements with critiquing prevailing disciplinary arrangements and formulating alternatives.

When confronted with empirical accounts of historical preoccupations with interdisciplinarity, one can more clearly see the need to extend the view of interdisciplinarity beyond a focus on its specific conceptual expression or as primarily concerning the relation between two or more disciplines. I thus want to direct attention instead to the more or less explicit critique of an existing disciplinary organization and the transformative potential that engagements with interdisciplinarity imply.

In this vein, I propose that interdisciplinarity be considered related to what Michel Foucault has described as "problematization." Foucault described problematization as "the development of a given into a question, this transformation of a group of obstacles and difficulties into problems to which the diverse solutions will attempt to produce a response" (Foucault 1998[1984]:389). His point was that the process of problematizing something means no longer taking it as given. Such a process both involves shaping different obstacles into problems and entails the modeling of different solutions to this problem. In this view, self-conscious proclamations of interdisciplinarity are never merely a matter of finding new prospects and a new solution. Rather, such proclamations are conditioned on a certain practical arrangement that they are turning into an object for contemplation and critique. Moreover, the process of problematization for Foucault is not necessarily primarily a verbal undertaking, but also a practical endeavor comprising a "set

of discursive and nondiscursive practices" (Foucault 1996[1984]:456). Conceiving of interdisciplinarity as related to a process of problematization, then, involves focusing on the construction of both problem and solution in its discursive as well as nondiscursive expressions.

Disciplines occupied a central place in Foucault's own problematizing endeavors. For him, a discipline was more than a branch of knowledge; it was also a set of practical norms that imposed order on the mind and body and regulated what could count as true and normal in society (1972[1971]:222-24). In other words, for Foucault discipline embodied a mechanism of both knowledge and power. In his book *Discipline and Punish*, Foucault offers an interesting analysis of discipline as just such a mechanism, analyzing the place of discipline in modern society (1995[1975]). Tracing a genealogy of disciplining methods in institutions of the military, the prison and education, Foucault draws parallels between the methods used to discipline the body in such institutions and the scientific techniques for ordering knowledge, such as classification and tabulation (ibid. 156).

While Foucault shows that the rationality of disciplining in the military and education involves creating automatic docility (137) and organizing "profitable durations" (157), he also shows how this way of organizing creates "an analytical space" (143). He argues that the compartmentalization characterizing the modern prison – Jeremy Bentham's famous panopticon – resembles how the taxonomies of the natural sciences are compartmentalized: "Even if the compartments it assigns become purely ideal, the disciplinary space is always, basically cellular," Foucault maintained (143). In other words, Foucault approached discipline not merely as a way of organizing knowledge in the modern university, but rather as epitomizing a specific mode of governing. For Foucault disciplines constituted a way of regulating thought and action that he found to be pervasive in modern state institutions.

In this thesis, my concern with the governing of interdisciplinarity reflects Foucault's understanding of disciplines as a way of arranging knowledge as well as a mechanism of regulating thought and action that imposes a set of practical norms on the mind and body. As the following chapters will show, scholars over the last century have engaged with interdisciplinarity by critiquing and questioning the arrangement of knowledge in disciplines as well as the regulatory implications of such arrangements, that is, the specific order that prevailing arrangements in disciplines impose on the mind and body. With this

attention to the process of problematization and with this double aspect of the arrangement of knowledge and its governmental implications in mind, I suggest that interdisciplinarity be defined as an *engagement with problematizing prevailing disciplinary arrangements.*

My interest lies in what is at stake in situations of problematization when individuals or collectives point to interdisciplinarity as an alternative solution. Just as Foucault emphasizes the practical aspects of disciplining, I do not take the stakes of the problematization of a given set of disciplinary arrangements to be exclusively found in theories and justifications of interdisciplinarity – in what one could call the epistemological expressions of interdisciplinarity. Instead I view such stakes as also being *ontological*. This is because engagements with transforming a group of obstacles into problems and solutions related to interdisciplinarity are conditioned on concrete practical, technical and material arrangements and actions, just as they may intervene in them.

My emphasis on the ontological stakes in approaching the governing of interdisciplinarity alludes to two different, albeit related, articulations of a concern with ontology. The first is what Michel Foucault called – at least on one occasion – a "critical and historical ontology of the present" (Foucault 1984:11).[27] Foucault introduced this notion in one of his last essays, where he contemplated a specific type of philosophical interrogation, a mode of reflective relation to the present that he took to be rooted in the Enlightenment, but which he also proposed as a "philosophical ethos" that encapsulated his own style of critical interrogation. This philosophical ethos, Foucault argued, consisted of "a critique of what we are saying, thinking and doing through a historical ontology of ourselves" (Foucault 1984b:45). This approach should be practiced as "a historical investigation into the events that have led us to constitute ourselves and to recognize ourselves as subjects of what we are doing, thinking, saying" (ibid. 46). Archaeological in its method and genealogical in its design, this "historico-critical attitude" reflected Foucault's departure from the traditional philosophical search for origins and formal structures with universal value. This approach had a liberating scope, as it was intended to "separate out, from the contingency that has made us what we are, the possibility of no longer being, doing, or thinking what we are, do, or think" (46). Using this notion of a critical ontology of the present, Foucault was thus suggesting a mode of critical inquiry into the conditions of the present social order and forms of thought that would point to the

"limits imposed on us," as "an experiment with the possibility of going beyond them" (50.). Although it is not clear-cut whether moving beyond the "limits imposed upon us" actually follows from any such historico-critical work, this mode of reflective relation to the present nevertheless shows the impetus that can be gained from a simple inquiry into how it might be that things are one way and not another. I base my investigations into the specific configuration of interdisciplinarity after 2005 on this historico-critical ambition. Thus, pursuing a genealogy of the stakes and translations involved in governing interdisciplinarity in Danish high school education at this time, I aim to foster a mode of reflective relation to the present.

If the late Foucault's genealogical method and its historico-critical reflection on the ontology of the present is valuable for directing attention to the broad tendencies in the relation between truth and power, Foucault's analyses tend to be less concerned with small-scale translations and the ways in which divergent arrangements and disparate rationalities may be entangled in spaces of interaction. To attain such a sensibility to translations and entanglement, I take inspiration in another, related preoccupation with 'ontology' which is nonetheless influenced by Foucault's work, [28] namely the analytics of Bruno Latour that he developed in collaboration with Michel Callon into what they have called a 'sociology of translation,' 'sociology of associations,' or 'actor-network theory' (ANT) (Callon & Latour 1981, Callon 1986, Latour 1988a:11, Latour 2005:9).

Like Foucault, Latour strives throughout his oeuvre to demonstrate the contingencies of certain institutions, apparatuses or "dispositifs," namely those of scientific facts and technologies (cf. Latour 1988a, Latour 1999:192). Also, like Foucault, Latour is inspired by what one might call a Nietzschean view of the world as a field of force, whereby all categorizations are seen as constructed (Lee & Brown 1994:774, cf. Latour 1988a:7, Latour 2013:295). Further, Latour similarly treats the ways that the central institutions of our cultures produce truth as being contingent on a multiplicity of relations to be discerned as a network of enunciations, techniques and practical arrangements (Krarup & Blok 2011:45).[29]

Yet, unlike Foucault, who tends to focus on wide-ranging tendencies and grand ruptures by analyzing discursive formations, Latour suggests that the actions involved in the formation and effects of scientific or social facts should be more closely examined, that is, studied through their hybrid "networks," as the term actor-network theory implies. As

such, Latour departs from Foucault's interest in explaining an "episteme" or a general tendency in forms of thought or power and the mechanisms of subjectification bound to them, opting instead to describe the series of translations and associations involved in the establishment of facts or technologies and how they take effect (cf. Latour 1999:24, cf. Latour 1986a:83). [30] This rather descriptive orientation implicitly includes the programmatic principles of *irreduction* that Latour developed in his early work, and their emphasis on avoiding the temptation to explain phenomena by reducing them to singular causal-relations or to categories (1988a[1981]:153ff, 1996a[1990]:4). Indeed, phenomena were to be seen as networks of translations and "the only task of the analyst," as Latour declared in his historical studies of the rise of pasteurization in France, "is to follow the transformations that the actors convened in the stories are undergoing" (1988a:10).

Latour couples his attention to the detailed, technical and micro-social space of action, entanglement and transformation with a shift in the approach to non-human resources like things, animals or technologies. These entities are considered as having a certain degree of agency of their own. Inspired by semiotics, Latour approaches both humans and non-human resources as actors, or actants (1988a:10), actors in the sense that they do something and that this action has effects (e.g. Latour 1988a [1984]:253n13, Callon 1986).[31] Accordingly, different actors are also defined by their performances, rather than presumed to have certain properties. Thus, Latour's emphasis on ontology is related to such an orientation to the actors participating in establishing a scientific or social fact. This emphasis on his part reflects a critique of philosophies of science that tend to direct attention to epistemology, to theories of knowledge, as the source for learning about science. [32] Latour instead analyses the potential agency of all sorts of things, placing himself in a certain proximity to the action of those things in order to observe them.

Research drawing on Latour's insights has emphasized how material objects and more broadly non-human forces participate in and configure human and worldly conditions (cf. Asdal & Ween 2014, Jensen 2010, Law 2004:23, Law & Singleton 2005, Mitchell 2002; Mol 2002). The emphasis on things and materiality in these debates can give the immediate impression that Latour's attention to ontology represents a resurrection of materiality in a way that deflects the attention to epistemic questions. However, on closer examination one can see that Latour is indeed interested in questions of what we take as true and how we think. He is just approaching knowledge and truth as *a*

network of translations, as outcomes of an interrelated dynamics, of a series of associations and forces in which human beings are only elements and never wholly in control (cf. Latour 1999:93, Latour 2010a:600).[33]

The concept of *translation* figures as a central method and analytical concept throughout Latour's work (Latour & Callon 1981:279, Latour 1988a:11, Latour 2005:108, Latour 2010a:600, cf. Callon 1986). Translation, here, refers not to a conversion of one language into another, but to the careful study of a those sequences and interrelations of transformative actions, mobilizations, alliances and displacements involved in the process of establishing a fact, building a metro or making a legal judgment (e.g. Latour 1999:79, cf. Latour 2005:131, Latour 1994). As a method, translation entails an attention to how both humans and non-human resources like facts, scallops, microbes, guns or traffic lights come to act and take force, causing other things to act in particular ways (Callon 1986, Latour 1988a, Latour 1992, Latour 1994). The idea is to discern "the means by which we inscribe in a different matter features of our social order" (1994:46). In other words, translation as a method and analytical device involves detecting the specific transformation, actions, relations, modifications and displacements that have constituted a specific social order or scientific truth in one particular way as opposed to others.

It is in this action-oriented and relational sense that I am approaching the governing of interdisciplinarity. With this approach, interdisciplinarity is not assumed to be a universal or transcendent phenomenon with a number of definite characteristics. Rather, to learn about interdisciplinarity requires empirical examination of its *network of translations* – of those actions, associations and modifications that constitute interdisciplinarity in one way rather than another. With such an approach, the *governance* at stake is not assumed to reside in certain political institutions, or to be a linear process going from policy program to implementation, although it might in fact be; rather, the governing of interdisciplinarity is a process to be studied through certain enunciations, materials, practices or techniques that appear to regulate action and are associated and translated in particular ways.

In order to conceive of interdisciplinarity as such contingent and relational phenomena, whose network of translations may be described, I am putting the analytical concept of *configuration* to work. In everyday parlance configuration designates "an arrangement of parts or elements in a particular form, figure, or combination" (Oxford

Dictionary 2015). The concept of configuration, thus, pertains to the specific form a phenomenon like interdisciplinarity can take, as it is manifested in and through a certain arrangement of other elements. While the concept of configuration was also central to Foucault's work and related to his preoccupation with the transformations of discursive formations, I am interested in configuration in the sense of an actor-network, as something that describes an assemblage of relations between heterogeneous actors and the translations they have undergone. Lucy Suchman, an anthropologist writing on technologies from an STS standpoint, highlights that configuration in this view "offers a conceptual frame for recovering the heterogeneous relations that technologies fold together" (Suchman 2012a:48). As an analytical device, configuration directs the analyst to the meticulous work of unpacking and examining the elements, relational forms and activities that constitute and enable a phenomenon and imbue it with a specific character (cf. Suchman 2012b). I deploy configuration as a framework for understanding what characterizes interdisciplinarity in its different manifestations, and to acknowledge how its concrete expression and practical style is contingent on specific historical, practical and material circumstances.

In examining how interdisciplinarity is configured, I am interested in how *ideas* matter to its specific expressions and arrangements. As Latour notes in his study of the failed Parisian metro project Aramis: "in the course of a battle or a project, ideas about the way to handle battles or innovations play a performative role" (Latour 1996b:113). Likewise, ideas about education or specific societal forms might, for example, govern action and affect how interdisciplinarity is configured. Such ideas might figure in the attempt to problematize an existing arrangement of disciplines and justify interdisciplinarity as an alternative, but they can also enter into the picture through other trajectories.

I am equally concerned with *techniques* as a locus for learning about what action regulates interdisciplinarity and gives it form and effect. I take the term "technique" to include methods, systematic practices or procedures.[34] Yet, I also see techniques as a *network of translations*, and thereby as characterized by the way in which they mediate and encompass a hybrid or assembled character of action. As such, I draw on Latour's point that techniques or technical skills cannot be studied directly, but rather emerge in the zone of transaction between human and non-human actors, "they are properties of the

assembly that circulate or are redistributed among human and non-human technicians, enabling and authorizing them to act" (Latour 1994:45). This assembled character of action is what makes techniques form interesting sites of study. On the one hand, techniques potentially encapsulate certain plans or "scripts" that are telling of a certain time and place (Latour 1992:172, cf. Akrich 1994). An assessment standard, for example, can hold certain plans or scripts that lay out what counts as a better or worse performance and distribute these criteria when circulated. These plans or scripts do not necessarily refer to consciously planned human action, but can involve other forms of intentions or rationalities that are "properties of institutions, dispositifs" (Latour 1999:192, cf. 1994:46).[35] As vessels of such scripts, techniques can regulate action across different historical times and spaces. They constitute "a form of delegation" that allows for a mobilization during interactions – "moves made elsewhere, earlier, by other actants" (Latour 1994:52, cf. Latour 1995).

On the other hand, the plans or scripts of a technique are also prone to changing as techniques shift time, place and associations. To make this point, Latour resurrects what he calls the "ontological dignity" of techniques by calling attention to the folded or assembled character of techniques but also to how the means and ends of techniques can mutate:

> If we fail to recognize how much the use of a technique, however simple, has displaced, translated, modified, or inflected the initial intention, it is simply because we have *changed the end in changing the means*, and because, through a slipping of the will, we have begun to wish something quite else from what we at first desired. If you want to keep your intentions straight, your plans inflexible, your programs of action rigid, then do not pass through any form of technological life. The detour will translate, will betray, your most imperious desires. (Latour 2002:252, *italics in original*)

Latour thus argues that techniques should not be approached merely as means whose ends are given. Rather, both actions and matters can affect and alter a technique's means and ends altogether (Latour 2002:251).

In this way, techniques in Latour's sense can be considered actors that are outcomes of a process of associations and translations. This approach is akin to anthropologist Marcel Mauss's famous essay "Techniques of the Body," in which he proposes that techniques be considered as *effective*, that is, as something that works or acts, as well as

traditional, that is, as outcomes of certain historical circumstances (Mauss 1973 [1934]:75). As Mauss puts it, techniques take the form of "physio-psycho-sociological assemblages of series of actions" that are "more or less habitual and more or less ancient in the life of the individual and the history of the society" (ibid. 85).[36] However, while Latour tends to emphasize non-human actors in his studies of techniques (cf. 1994:61),[37] Mauss insisted that techniques are not dependent on an artifact: "I made," Mauss wrote, "and went on making for several years, the fundamental mistake of thinking that there is technique only when there is an instrument" (Mauss 1973:75). If Mauss is right, the study of techniques of interdisciplinarity entails examining not only the relation between humans and nonhuman artifacts but also the more or less habitual action of people that appears to regulate how interdisciplinarity takes effect.

To sum up, I am suggesting that we shift our thinking about interdisciplinarity and pursue a path that significantly departs from most contemporary literature on the issue. Rather than viewing interdisciplinarity as primarily a matter of relating two or more disciplines via a concern with how to best realize it, or conceptually refining interdisciplinarity so as to determine its best forms, I am proposing that we address interdisciplinarity with attention to the governance implied by its arrangements.

Such attention, I suggest, involves approaching interdisciplinarity as a problematization of a given disciplinary arrangement in a way that considers how problems and solutions take form, but that also takes into account the ontological stakes of its particular configuration and the translations it implicates. In particular, I propose that tracing out the ideas, techniques and effects that a configuration of interdisciplinarity brings together across time and space can help us understand its particular space of possibility and concrete implications, and indeed help us gain a sensitivity to how both means and ends may change substantially.

By the end of this inquiry, I hope to show teachers, students and others struggling with governing interdisciplinarity that the given and commonsense dimensions of their work and learning are actually doing far more than they could possibly imagine, and that, although the discourse of interdisciplinarity can resemble sociological or even postmodern forms of knowledge, its current configuration is a great deal more spectacular than appears at first sight.

VI. Re-routing interdisciplinarity

One might have noticed that this thesis is itself interdisciplinary in character. Not only am I studying the preoccupation with interdisciplinarity across the social sciences and education, I am also joining diverse traditions of historical inquiry with ethnographic studies. What is more, being rooted in STS and Latour's translational sociology in particular, the analytical frameworks used for this thesis themselves incorporate a self-conscious critique of disciplines (cf. Callon 1986:201, Latour 1993:6). Indeed, interdisciplinarity figures centrally in STS self-descriptions as an interdisciplinary field (cf. Jasanoff 2013, Shapin & Schaffer 2015:xlvii). Moreover, Bruno Latour, whose writings have significantly influenced this field, has always expressed a skepticism of pure disciplines, emphasizing a hybrid nature-culture ontology and thereby giving prominence to an a-modern, a-disciplinary concern with the "in-between" (cf. Latour 1993:6, Latour 2005:41, Jensen 2013). In fact, Latour's body of work has been recently described as a development of a "processual and ontological transdisciplinarity" (Alliez 2015).[38]

In Chapter 1, I flesh out Latour's preoccupation with interdisciplinarity in his works. For now, I simply want to highlight the somewhat perplexing circumstance that a self-conscious concern with interdisciplinarity not only emerges as the object of this study, but also figures centrally in the analytical propositions of the academic debates and insights on which I draw. I address this situation as an instance of what anthropologist Annelise Riles has called a sociality "seen twice" (Riles 2000:23), which is to say that a social formation figuring as a vibrant assumption and conceptualization for academic discussion and explanation also seems to be circulating in related, yet distinct forms in the empirical field that one sets out to study.

Such a "seen twice" situation might not be entirely unexpected. As philosopher of science Ian Hacking argues, all categorization not only describes but also creates what he calls "looping effects," as categories come to transform their target (Hacking 1995). Particularly in the field of education, such a reappearance of resources in academic fields and concrete schooling arrangements is in some ways to be anticipated, even in its sociological or philosophical branches. Classic works like Durkheim's famous book *Moral Education* (2002 [1925]) or John Dewey's programmatic *Democracy and Education* (1930[1916]) are examples of works that present a rather direct and unproblematic

relation between sociologic or philosophic conceptual discussions of education and their potential appropriations in practical schooling circumstances.

However, recent years' reappearance of analytical concepts in everyday action and policymaking seems to have become the subject of some disconcertment and scrutiny in both education and the social sciences. A number of recent studies in pedagogy and education policy have critically interrogated the role and circulation of academic knowledge, pointing to the dislocations of such predominant concerns as "character development," "entrepreneurship," "flexibility" or "reflection" in pedagogy (cf. Williamson 2017, Fendler 2001, Popkewitz & Bloch 2001, Ratner 2012).[39]

Similarly, in the social sciences, the resurgence of analytical concepts and approaches formerly thought vibrant seems to give rise to concern. In the field of political sociology, for example, political philosopher Nikolas Rose has rather antagonistically noted how the rise of a concern with governance that seeks to reduce the size of the political apparatus resembles the emergence of a "sociology of governance" that describes "the complex exchanges through which governance occurs" through such analytics as "actor networks," "self-regulatory mechanisms" and "informal obligations" (Rose 1999:17). While these endeavors differ, their similarity causes some unease. In a similar vein, sociologists Boltanski and Chiapello have argued that a new spirit of capitalism has come about, an argument built on their findings that critical sociological ideas of the 1970s have re-emerged in management literature. They show how from the 1990s onwards, works of critical sociologists, anthropologists and scientists such as Habermas, Bateson, Prigogine, Stengers, Atlan, Serres, Heisenberg – and even Bruno Latour – were referenced in management literature, and their concepts such as the "network" once destined as critique, were now tropes of a new way of organizing capitalism (Boltanski & Chiapello 2007:139-140).

The problem of this reappearance of certain concepts or approaches, one might argue, is less about their reoccurrence, but rather reflects a problem of *translation*. In other words, these repertoires of knowledge appear to be working or have become performative in ways that serve purposes other than, or even opposite to, those originally intended. As sociologists Celia Lury and Nina Wakeford (2012:5) have argued, methods and other resources of social research have always been redistributed, yet the two contend that a particular problem has nevertheless arisen, because, for example, issues of

relationality and participation, once mobilized as critical interventions, now form "dominant tropes of knowing capitalism" (ibid.). The unease with this resurgence seems to reflect a failure of critique, which is to say that some intellectuals' hopeful engagements with introducing a certain truth – and thus a certain mode of ordering into reality – have proved futile. The reappearance of these concepts and approaches, however, can also be said to reflect a failure in aesthetic terms, as anthropologists Annelise Riles and Hirokazu Miyazaki argue, saying that "the forms that define social scientific knowledge cease to produce the effects they once did" (Miyazaki & Riles 2005:327).

In STS, this predicament of the social sciences' critical interventions has similarly fostered considerations regarding the conditions for knowledge-making. Nortje Marres, for example, raises the need to consider the distribution of social scientific resources with respect to the role they play in current "(re-)organization[s] of processes of knowledge-making'" (cited in Lury & Wakeford 2012:5). Anthropologist of science and technology Lucy Suchman likewise discusses what happens when business consumes academic disciplines such as anthropology. While Suchman points out that the intricate relation between science and business is not a new phenomenon, she argues that it raises the question of how the "incorporation of academic disciplines into economic activity is assumed to require their appropriate transformation" (2013:141). In a more general proclamation, STS scholars Kristin Asdal and Ingunn Moser have pointed to the need to focus on such transformations and effects of knowledge-making, calling for a more "profound argument about the performativity of the social sciences and humanities" (Asdal & Moser 2012:300).

This thesis analytically endeavors to reflect such a concern with the performativity of the social sciences and humanities. I consider the situation of "seen twice" – that is, the reappearance of interdisciplinarity in both my object of study and my analytical resources – as exemplifying a more general predicament of the social sciences and humanities, one concerning their role in a continuous re-organization of knowledge-making. However, I am approaching this reappearance of interdisciplinarity not as a means of creating "a profound argument" about the performativity of the social sciences and humanities, as Asdal and Moser suggest, but rather as a mode of profound *inquiry.*

Tracing out the stakes, translations and sticky practical arrangements of the governing of interdisciplinarity in Danish high school education after 2005, I aim to evoke

a moment of reflection on this predicament in the case of interdisciplinarity. I wish to see what happens to our understanding of such performativity and indeed of the very category of interdisciplinarity once we re-route interdisciplinarity through its various historical manifestations and the everyday arrangements and actions through which it is supposed to take place.

My analytical interest in this is not merely guided by Latour's emphasis on tracing out and reassembling a phenomenon, as if it were a network whose specific contingent character and translations we can illuminate. My inquiry is also structured around a comparative orientation – a re-routing endeavor – which aims to unsettle and complicate our understanding of interdisciplinarity in the social sciences, including the sociology of translation that informs this very study.

This comparative orientation largely draws on the mode of inquiry employed by anthropologist Marilyn Strathern and her colleagues and students (cf. 1992, 2004c[1991]:7ff). Indeed, the notion of re-routing is what anthropologist Adam Reed uses to describe the comparative arrangement of much of Strathern's work (Reed 2011). Strathern's comparative endeavor is not a simple act of evaluating similarities or differences between two phenomena (Hirsch 2015:59, Lebner 2017:14),[40] but rather involves an analogic kind of questioning that compares a similar phenomenon across contexts, thereby elucidating one phenomenon through the other. She thus strives to create a "counterview;" [41] one that allows for a different understanding or "re-description" of a phenomenon that we take as a given (Lebner 2017).

Arranging the thesis around what I call a re-routing endeavour, I intend a mode of inquiry into interdisciplinarity, which casts new light on the governing of interdisciplinarity in the Danish gymnasium by way of a genealogical and ethnographic studies, showing the stakes and translations and using historical counterpoints to allow for a more profound understanding of its configuration after 2005. Yet, this re-routing endeavour also aims to shed new light on the very interdisciplinary endeavor of those branches of sociology and science studies that I am drawing on by showing their participation in current preoccupations with interdisciplinarity, and by exposing them to a counterview provided through my analytical descriptions of the sticky practical arrangements of interdisciplinarity in Danish high school education.

In this way, I seek both to acknowledge and to address the approach of this thesis as itself a product of a historical process – of particular forms of thought and practices in which it is also engaged in investigating. To clarify how this re-routing figures as a mode of inquiry throughout the thesis, I will frame the overview of the chapters in this mode.

VII. Chapter overview

Chapter 1, "Interdisciplinarity over the last century" offers an initial re-routing of interdisciplinarity, tracing a genealogy of the notion. The primary aim of this genealogical study is to provide a background against which to understand the emergence and subsequent translations of the ideas and techniques that came to affect the configurations of interdisciplinarity in Danish high school education. In the chapter, I argue that the writings and activities of American educational philosopher John Dewey were central to the emergence of interdisciplinarity in American education and science in the first decades of the 20th century. I describe how Dewey's problematization of disciplines involved an ideal of unity and an emphasis on self-directed learning through inquiries into a problem, a technique that he argued would develop a reflective attitude, which he saw as pivotal to a democracy. In this way, the chapter lays the ground for the following chapters, in which I show the importance of Dewey's ideas and techniques to the emergence of interdisciplinarity in the Danish high school – albeit in rather translated versions.

Written in a spirit of reflecting on the situation of "seen twice," the chapter further follows how the notion of interdisciplinarity was appropriated in France, arguing that it was linked to a motif of transgressing and breaking with disciplinary arrangements and established categories in the student riot era around 1968. This motif, I argue, is also a key ingredient in Latour's analytics of networks and their translations. The chapter concludes by pointing to the connections and displacements of this French moment of engagement with transdisciplinarity in the work of Helga Nowotny and colleagues in the 1990s. In this way, the chapter reflects a specific comparative ambition of bringing the analytical resources and the empirical field on a par, uniting them in the same historical account so as to show their common conventions as well as their translations and differences.

Part I, entitled "A history of interdisciplinarity and its reconfigurations in Danish high school education," constitutes the second re-routing endeavor, comprising a genealogic study of interdisciplinarity in the context of Danish high school education since the term was first discussed in the 1950s. This part pursues the legacy of interdisciplinarity in a Danish high school context to gain a more profound understanding of the specific space of possibility of governing interdisciplinarity after the 2005 reform. Paying close attention to the different problems and solutions, ideas and techniques that have accompanied the notion since it emerged in the 1950s, this part identifies three moments at which interdisciplinarity appears in new configurations with new aims and means, each of which is discussed respectively in chapters 2, 3 and 4.

The first of these chapters, "The new high school" (Chapter 2), describes how the notion of interdisciplinarity in Danish high school education emerged as part of a preoccupation with educational reform in the 1950s and was first institutionalized with the curriculum plans of 1960. This chapter shows how a group of progressive intellectuals and teachers promoted interdisciplinarity in connection with their preoccupation with democratizing the education system and its educational methods in the years following World War II. The chapter also shows how in this moment interdisciplinarity was associated with ideas of unity and independent thinking, and discusses the concrete arrangements through which interdisciplinarity was meant to take place, namely curriculum coordination and a book on the European history of ideas.

Chapter 3, "Interdisciplinarity and society", locates a second moment of engagement with interdisciplinarity in the years around the student riots of 1968. The chapter shows how another group of progressive teachers and intellectuals took over the interdisciplinarity agenda, building on similar progressive educational theories and democratization issues but emphasizing the experimental and participatory prospects of interdisciplinarity and relating it to visions of emancipatory and consciousness-raising pedagogy. The chapter considers the central technique through which interdisciplinarity was meant to take place at the time, namely an adapted version of Dewey's technique of self-directed work with a problem into what was termed "problem-oriented project work," now justified in a Marxist-inspired critique of disciplines for reproducing bourgeois knowledge.

Chapter 4, "Interdisciplinarity for the knowledge economy," discerns a third moment of engagements with interdisciplinarity leading to the high school reform of 2005. This chapter traces out the 1990s' preoccupation with interdisciplinarity in Danish high school education, showing how the notion was tied to ideas of innovation and competition in what was described as a global knowledge economy, but also how it coincided with the rising concerns about accountability and performance measurement sparked by the OECD's transnational comparison of educational performance through the PISA program.

Part I, thus, offers an understanding of the stakes of interdisciplinarity at the time of the 2005 reform. Routing through the different configurations of interdisciplinarity in Danish high school education, these chapters shed new light on the legacy of the notion in different progressive engagements with education as well as the interrelations between preoccupations with interdisciplinarity in the social sciences and the politics of Danish high school education. Yet, the chapters also show what has been displaced, translated, lost and added in the reconfigurations of interdisciplinarity, and how the means and ends of interdisciplinarity have changed substantially in the course of this period. As such, these chapters allows for an appreciation of the specific character of the arrangements through which interdisciplinarity was governed after the reform of 2005.

Part II, called "Governing interdisciplinarity after 2005" represents the third re-routing endeavor. These chapters approach the governing of interdisciplinarity in the wake of the 2005 reform by examining the more obscure practical arrangements that came to view during my ethnographic fieldwork at a Danish high school from 2012 to 2013. Drawing on studies of everyday interactions as well as archival work, these chapters follow a route through the stakes and translations of the practical arrangements of interdisciplinarity, bringing to light the apparatuses and sticky entanglements of its configuration at this time.

The first of these chapters, "The core of disciplines" (Chapter 5), examines the preoccupation of teachers and managers with what they called the disciplines' core in relation to governing interdisciplinarity. Following the trajectory of this notion of the core of disciplines in Danish educational debates, the chapter shows how this idea emerged ten years earlier in a political intervention intended to ensure accountability in the wake of the (re)engagement with interdisciplinarity in Danish science and education. The chapter shows how these issues of accountability were translated into teachers' and managers'

work to develop the "core of disciplines," demonstrating how this involved molding disciplinary knowledge into explicit propositions and definite methods so they could perform as a "tool" or "looking glass," as disciplines were sometimes described, in arrangements of interdisciplinarity. The chapter argues that this work with the core of disciplines is telling of the specific arrangements of interdisciplinarity at this moment, through which disciplines are enacted as applicable and thus productive perspectives. The chapter suggests that one implication of this way of governing interdisciplinarity is what some teachers describe as a sense of being the perpetual whore of another discipline.

Chapter 6, "The complex problem," examines the technique of the problem, which is key in the practical governing of interdisciplinary assignments after 2005. Dissecting the different discourses and practical arrangements surrounding the problem, the chapter sketches out three different conjunctions of means and ends that co-exist under the rubric of the problem. The chapter points to one such conjunction related to a discourse on innovation, and another related to a discourse emphasizing self-directed and critical problem formulation similar to that of the 1970s' problem-oriented project work. Yet, a third such conjunction appears in the mundane practical arrangements of project assignment supervision, where the problem is used as a device for combining two disciplines into one interdisciplinary assignment. The chapter shows how such arrangements tend to replicate certain problems that teachers find to be neither strikingly innovative nor immediately prone to self-directed or critical inquiries, but whose primary quality is that they allow two specific disciplines to be applied and combined. The chapter argues that this tendency for combinatory problems to emerge results from their entanglement in the specific arrangements of interdisciplinarity at this moment in time, arrangements through which disciplines are enacted as applicable and thus productive perspectives on a complex problem. It contends that this particular configuration of the complex problem indicates how progressive ideas of education, democracy, independent thinking or emancipation once closely connected to the idea of self-directed work with a problem have transformed, as this technique became entangled with current discourses on innovation and new performance-efficient arrangements.

Chapter 7, "Definite steps towards the unknown," similarly considers the contradictions and unexpected alliances engendered in the more obscure practical arrangements of interdisciplinarity. The chapter examines the prominence of an

assessment tool from the 1950s, Bloom's taxonomy, in the structuring of interdisciplinary project assignments in Danish high school education after 2005. Asking how an assessment tool came to figure as a key technique for governing interdisciplinarity in Danish high school education, the chapter traces the stakes and translations of this taxonomy in Danish pedagogical debates and its specific configuration after 2005. The chapter argues that the version circulating in the Danish high school after 2005 – which depicts learning as having an unknown endpoint *and* as being a tractable step-by-step process with definite stages – is indicative of the ways in which the progressive educational approaches have become entangled with arrangements of performance-governance.

Part II, thus offers an understanding of the range of phenomena, discourses, ideas and delicate regulatory techniques that went into the day-to-day arrangements of interdisciplinarity, putting on display the entanglements and contradictions characterizing its specific configuration after 2005. Indeed, these chapters allow for an understanding of the ways in which ideas and techniques, which were the very objects of critique in earlier preoccupations with interdisciplinarity, are now key to its practical arrangements.

The conclusion considers the different *re-routings* of the thesis and the re-description of the governing of interdisciplinarity in Danish high school education they allow for. It further discusses the relation between the discourse on interdisciplinarity in Danish high school education and Latour's analytics of translation as a case of the predicament in which the social sciences find themselves as regards their role in a continuous re-organization of knowledge-making. Finally, it draws on the analytical insights gained throughout the thesis to call for a rethinking of interdisciplinarity.

But before getting thus far, I will first embark on the initial re-routing endeavor, namely a genealogy of the notion of interdisciplinarity, which focuses on the interrelations between the politics of education and the fields of philosophy, science and the social sciences over the last century.

1. A century of interdisciplinarity

> We do not have a series of stratified earths, one of which is mathematical, another physical, another historical, and so on. […] We live in a world where all sides are bound together. All studies grow out of relations in the one great common world.
>
> John Dewey, *The School and Society,* 1899[42]

> Epistemology, the social sciences, the sciences of texts – all have their privileged vantage point, provided that they remain separate. If the creatures we are pursuing cross all three spaces, we are no longer understood. […] In the eyes of our critics the ozone hole above our heads, the moral law in our hearts, the autonomous text, may each be of interest, but only separately. That a delicate shuttle should have woven together the heavens, industry, texts, souls and moral law – this remains uncanny, unthinkable, unseemly.
>
> Bruno Latour, *We Have Never Been Modern,* 1993[43]

Although today's proclamations for interdisciplinarity might strike us as groundbreaking, the present preoccupation with interdisciplinarity is hardly novel. In this chapter, my aim is to pursue a genealogy of interdisciplinarity, which disavows what seems to be a quality clinging to interdisciplinarity, namely its aura of being a somewhat new and fresh endeavor. Rather than taking the newness of interdisciplinarity at face value, I want to show how interdisciplinarity has been evoked recurrently as a means of the new over the last century, or rather as part of different engagements with problematizing prevailing disciplinary arrangements of research and education. I am interested in what we might learn about interdisciplinarity and eventually about its current configuration in Danish high school education, as we follow the trajectory and translations of this notion; if we consider the circumstances for its emergence and see how it has been seized successively in different practical and intellectual contexts, where it has acquired validity, developed and matured – and indeed transformed.

However, my intention with this genealogy is not to uncover an ultimate point at which the way disciplines were arranged and divided was first problematized. Certainly, one could argue that such critiques date as far back as the works of Aristotle (Klein 1990:19-20), and that they permeate the German Enlightenment ideals of *Bildung.*[44] Neither do I wish to provide an exhaustive, encyclopedic survey of interdisciplinarity over

the last century. Instead, my inquiries are guided first and foremost by an interest in what has inspired engagements with interdisciplinarity in Danish high school education since the Second World War. In the pursuit of this understanding, my aim is to trace the specific circumstances under which some of the ideas and techniques of interdisciplinarity emerged and later resurfaced – albeit in rather transformed versions – in books, policy programs and the everyday arrangements of interdisciplinarity in Danish high school education. The present chapter thus represents a rather particular genealogy concerned with illuminating the stakes and translations of interdisciplinarity in Danish high school education. As such, this genealogy reflects a first step in the re-routing endeavor undertaken in this thesis, the aim of which is to deploy historical excavation and comparison as a means of addressing how interdisciplinarity became configured in Danish high school education after 2005. As the writings of American philosopher of education John Dewey have fundamentally inspired those engaging with interdisciplinarity in Danish high school education, his writings is an apt place to begin.

However, this chapter has a second intention that also shapes the particular route of this genealogy; that is, it also serves to address what I, following anthropologist Annelise Riles, have called a situation of "seen-twice" (Riles 2001:23). Recognizing that interdisciplinarity is both the object of this study and a central assumption in the analytical resources I am drawing on, the specific route this genealogy takes serves as an initial stride towards contemplating this commonality between the discourse on interdisciplinarity in Danish high school education and Latour's analytics of translation. The chapter thus follows a route beginning with the emergence of interdisciplinarity in the USA around the year 1900, running through the concept's emergence in France in the 1950s and then proceeding to the interdisciplinarity debates surrounding Bruno Latour's efforts to galvanize an analytical approach that has been called a "processual and ontological transdisciplinarity" (Alliez 2015). The decision to follow this specific genealogical route reflects an ambition of this thesis to consider how preoccupations with interdisciplinarity in the social sciences interrelate with the politics of education and thus create a space in which to consider the predicament of the social sciences as regards their role in a perpetual re-organization of knowledge-making. Most importantly, however, the chapter will show the fluctuating and contingent nature of interdisciplinarity, thereby providing an initial sense of the importance of attending to the specific configurations of

interdisciplinarity and the ability of interdisciplinarity to drift into arrangements and expressions that may serve different purposes than their original intention.

This approach to the history of interdisciplinarity as a routing through the various problematizations and translations of the notion into changing practical and intellectual contexts differs considerably from the few who have turned to the history of interdisciplinarity before the 1970s. In sociologist Andrew Abbott's discussion of interdisciplinarity in his book *Chaos of Disciplines* (2001), for example, Abbott approaches interdisciplinarity as a mechanism for a continuous reinvention of disciplines. He discusses interdisciplinarity as part of a critique of an understanding of the university dominated by a teleological vision of knowledge and progress. Abbot argues that the emergence of and calls for interdisciplinarity since the 1920s are part of what he instead argues to be a continuous cycle in which the disciplines reinvent fundamental concepts according to a pattern of common opposition and fractal rules (Abbott 2001:131-132).

Historian Harvey Graff's recent book *Undisciplining Knowledge: Interdisciplinarity in the Twentieth Century,* like Abbott, dates the emergence of the notion of interdisciplinarity back to the 1920s (2015:46). Unlike Abbott's depiction of interdisciplinarity as a mechanism of disciplines' continuous reinvention of fundamental concepts, however, Graff's book offers a series of case studies about interdisciplinarity in the US in such fields as sociology, biology, the humanities and communications, and general education, drawing primarily on works of historians of science within these fields (cf. 2015:20ff.). Graff's analyses appear as a response a current context of an interdisciplinary restructuring of American academia, as his interest lies in exploring why historically specific fields and groups have striven to be identified as interdisciplinary and to what extent they have failed (cf. 88). Graff's accounts of campaigners of interdisciplinarity, however, are less focused on the transformations of the problems and prospects of interdisciplinarity and their interconnections, just as he dismisses other historians' identification of a genealogy, which extends from John Dewey as simply "a need for legitimation and road mapping" (129, cf. 84).[45]

Against these discussions of the history of interdisciplinarity as a mechanism of disciplines' reproduction or as dispersed engagements with being identified as interdisciplinary, I approach interdisciplinarity as a problematisation of prevailing disciplinary arrangements of research and education; a problematisation whose specific

expression I take to be conditioned on certain circumstances, but whose interconnections through the circulation of specific ideas, techniques and practical arrangements I also wish to elucidate. This means, as I described in the introduction, that I am not only pursuing the exact notion of interdisciplinarity, but also similar terms such as inter-discipline, transdisciplinarity or the interplay of disciplines, taking all of these as different verbal expressions of a problematization of disciplines and disciplinary arrangements.

The chapter, therefore, on the one hand, relies on other historians' accounts of the history of interdisciplinarity, but it also turns to detailed inquiries into the actual actors, such as people and written documents, through which interdisciplinarity has been expressed and circulated. It is based on an archive generated through a combination of existing historical work on interdisciplinarity, searches in American and French library databases and the snowballing method, which I used to trace the references and concepts I found in the debates and justifications for interdisciplinarity in Danish high school education as well as in the works of Bruno Latour.

In particular, the chapter builds on the extensive work of American professor of interdisciplinarity Julie Thompson Klein, whose historical accounts provide a valuable overview of the miscellaneous history of interdisciplinarity in the USA since the 1920s and subsequently in European debates (1990, 1999, 2010b). In Klein's historical works on interdisciplinarity, which focus primarily on the USA and later also on international organizations like the OECD and UNESCO, she locates interdisciplinarity in what she calls the modern problem of specialization, which she argues follows the 19th-century formalization of knowledge in universities (Klein 1990:22).

Klein presents the term "interdisciplinarity" itself as a 20th-century product, affiliating its emergence with what she fleetingly calls the "progressive views" of scholars such as John Dewey and Alfred North Whitehead (ibid. 24). Yet, while Klein makes the case for a focus on epistemology, terminology or even "rhetorics" (Klein 1990:109, cf. Klein 2009a), I am more interested in interdisciplinarity as a problematizing endeavor, which I take to be not necessarily only a verbal undertaking, but also a contingent and practical endeavor comprising a "set of discursive and nondiscursive practices" (Foucault 1996:456). I thus not only direct attention to the discursive expression – for example, whether one calls it inter- or cross-discipline – but also focus on the practical arrangements through which

interdisciplinarity ostensibly takes place, as well as on the stakes that condition how it has been seized, mobilized and transformed in different practical and intellectual contexts.

The chapter consists of three parts. In the first, I describe how John Dewey problematizes prevailing disciplinary arrangements in his writings on the experimental school, the Laboratory School that he helped found at the University of Chicago in 1896. These rather detailed expositions serve to characterize the specific problematisation of disciplines in Dewey's work so as to create a basis for understanding their reappearance and translations in engagements with interdisciplinarity and educational reform in Danish high school education in the 1950s, 1960s and 1990s, not least when it comes to the emphasis on unity and coherence in the education system, the relation between education and democratic society and the problem as a technique for the training of thought.

In the second part, I depict the proliferation and translations of the problematization of the division of disciplines in the USA until the 1950s showing how the problem of the division in disciplines was seized as an agenda for the US research councils, but also created the grounds for interdisciplinary and unifying approaches and theories, such as cybernetics. The point here is to show how problematizing prevailing disciplinary arrangements became a central concern in American education and research, and how interdisciplinarity eventually became a prominent agenda circulating through international agencies like UNESCO and the OECD in the 1950s, the time when the notion – as Chapter 2 will show – also appeared in Danish high school education.

In the third part, I turn my attention to considering the emergence and translation of the notion of interdisciplinarity [interdisciplinarité] in French debates on research and education in the 1950s. I show its threads to ideas also circulating in the USA, and point to how the preoccupation with inter- and transdisciplinarity emerges as part of a new problematisation of disciplinary arrangements surrounding the events of May 1968, which is characterized by a concern with breaching with prevailing disciplines that are approached as mechanisms of modern capitalist arrangements of thought and action. The massive concern in the 1960s and 1970s with problematizing prevailing disciplinary arrangements also provides a context for understanding how scientific disciplines were problematized in the field of science and technology studies (STS) and in Latour's analytics of translation.

I. John Dewey and the problem of disciplinary arrangements in US education

In 1899 American philosopher and psychologist John Dewey held a series of lectures on what he called a "New Education" at the experimental elementary school at the University of Chicago (Dewey 1899:16). In these lectures, Dewey proposed a form of education based on the experience of the child, emphasizing the need for unity and coherence in the organization of the school by relating it "intimately to life" (ibid. 106).

While the audience of these lectures were parents and others interested in the Laboratory School, these experiments received great attention in the USA and beyond. Dewey's ideas on ways of organizing education that would get "things into connection with one another" became what has been called "the most important experimental venture in the whole history of American education" (Sidney Hook 1939:15, cited in Fallace 2009:382). The lectures soon appeared in the book *The School and Society,* but were also translated and published in a number of countries in the early 20th century, along with other books on education by Dewey, such as the treatises *My Pedagogic Creed* (1897) and *The Child and the Curriculum* (Dewey 1902). Together with Dewey's articles targeted at communities of philosophers and psychologists and his seminal works *How We Think* (1910) and *Democracy and Education* (1916), the motives of these works made an important impact on the Western world (cf. Oelkers & Rhyn 2000:1, Popkewitz 2005).

Although Dewey purportedly did not use the term "interdisciplinarity" until some 20 years later in 1923 (Fallace 2016:178), his visions for the experimental school involved a problematization of the prevailing disciplinary arrangements in US education at the time, as well as an alternative to them. Elementary education, Dewey argued in *Education and Society,* reflected an excess of disparate aims. The content of school subjects was directed at still other studies, with "so much of this study to secure this end, so much of that to secure another, until the whole becomes a sheer compromise and patchwork between contending aims and disparate studies" (Dewey 1899:82). The result, Dewey argued, was that "the unity of education is dissipated, and the studies [become] centrifugal" (ibid.).

Dewey described this division of schooling into a number of specialized studies as an outcome of a tendency in the American education system to push school subjects down from high school into primary education so that "the elementary school has crowded up and taken many subjects previously studied in the old New England grammar school"

(Dewey 1899:81). This lack of connection concerned not only how specialized studies were arranged in elementary school, but also "the isolation of the various parts of the school system" and what Dewey described as a more general "lack of unity in the aims of education" pertaining to a "lack of coherence in its studies and methods" (Dewey 1899:74). Indeed, Dewey's visions of a New Education and the exemplary role that he ascribed to the Laboratory School were of a "model for unification":

> The problem is to unify, to organize education, to bring all its various factors together, through putting it as a whole into organic union with everyday life. That which lies back of the pedagogical school of the University is the necessity of working out something to serve as a model for such unification, extending from work beginning with the four-year-old child up through the graduate work of the University. (Dewey 1899:103)

Dewey's critique of the disconnected arrangements of schooling was not oblique. In his programmatic book "My Pedagogic Creed," published the year after the Laboratory School opened, Dewey described the organization of the school into specialized studies as a violation of the child's nature:

> I believe that we violate the child's nature and render difficult the best ethical results, by introducing the child too abruptly to a number of special studies, of reading, writing, geography, etc. out of relation to this social life. (Dewey 1897:89)

Dewey's argument, on the one hand, related to his conception of children's growth and development, which he saw as marked by distinctive sequential stages (Dewey 1899:49, 1910:62). Exposing children to too abstract forms of knowledge in specialized subjects too early in their development did not correspond to the child's formative process. Yet, this point about violation also entailed a critique of the uniformity of the prevailing arrangements, which for Dewey left "next to no opportunity for adjustment to varying capacities and demands" (Dewey 1899:46). "There is a certain amount – a fixed quantity – of ready-made results and accomplishments to be acquired by all children alike in a given time," Dewey argued, pointing to its "passivity of attitude," the "mechanical massing of children", and its "uniformity of curriculum and method", which placed "the center of gravity outside the children" (Dewey 1899:47).

Moreover, Dewey argued that prevailing instruction in specialized subjects or studies risked feeding children with oblivious knowledge. Pointing to the tremendous changes occurring in society, Dewey maintained that the forms of teaching directed at existing conditions were too specific and subject-oriented and could thus soon be outdated (Dewey 1897:6): "With the advent of democracy and modern industrial conditions, it is impossible to foretell definitely just what civilization will be twenty years from now. Hence it is impossible to prepare the child for any precise set of conditions" (ibid.). Instead, Dewey argued "the only possible adjustment which we can give to the child under existing conditions, is that which arises through putting him in complete possession of all his powers" (ibid.):

> To prepare him for the future life means to give him command of himself; it means so to train him that he will have the full and ready use of all his capacities; that his eye and ear and hand may be tools ready to command, that his judgment may be capable of grasping the conditions under which it has to work, and the executive forces be trained to act economically and efficiently. (Dewey 1897:6)

In this way, Dewey's problematization of prevailing disciplinary arrangements also entailed a understanding of knowledge as indefinite and in a state of transformation, rather than as ubiquitous truths – an understanding also reflected in his concern with developing the child's judgment rather than with forming a curriculum based on separate facts, laws and information (cf. Dewey 1902:4).

The school and society

Dewey was, of course, not the first to be concerned with critiquing the arrangement of education, nor the first to emphasize the child's self-directed learning. What subjects and type of instruction were preferable had been the subject of controversy within the movement for common education in the USA since the 1840s, and in 1895 the US commissioner of education presented a plan entitled the "Correlation of Studies in the Elementary School" (nn 1840, Harris 1895:155).[46] During this time Jean-Jacques Rousseau's famous book *Émile: Or on Education* (1762) also appeared in translated, abridged and commented editions in the US (Rousseau 1884, Rousseau 1909 [1892], Lang 1893). Dewey's emphasis on the child's self-directed activities and active occupation

echoed Rousseau's problematization of students' "servile submission to authority" and emphasis on "finding relations, connecting ideas, and inventing instruments" through "laborious research" or "slow", practical "experiments" that "keep the body active" (Rousseau 1979:174).

Dewey's writings, however, were, at least in these first discussions of the experimental school, more oriented towards the school as a "social institution" than Rousseau's novelistic expositions on the education as such. Emphasizing what he called the "psychological" and "sociological" dimensions of the child's formation, Dewey contended that "the individual who is to be educated is a social individual and that society is an organic union of individuals" (Dewey 1897:6). As Dewey took education to be "a social process," he argued that "the school is simply that form of community life in which all those agencies are concentrated that will be most effective in bringing the child to share in the inherited resources of the race, and to use his own powers for social ends" (Dewey 1897:7).

Dewey's emphasis on the social ends of education also had implications for the kind of disciplining Dewey envisioned was to take place through the school's arrangements. Drawing attention to school life as something that organizes, Dewey pointed to the different "principle of school discipline or order" that characterized the experimental school (Dewey 1899:26). Such discipline was "informal" yet no less disciplining, Dewey explained, as it merely reflected that the organization and order imposed should be relative to the ends one seeks to achieve:

> If you have the end in view of forty or fifty children learning certain set lessons, to be recited to a teacher, your discipline must be devoted to securing that result. But if the end in view is the development of a spirit of social cooperation and community life, discipline must grow out of and be relative to this. (Dewey 1899:26)

Thus, Dewey's problematization of the division of disciplines, or "studies", as he called them, essentially concerned the question of disciplining. What Dewey problematized, however, was not disciplining as such, but the relation between the kind of disciplining that was taking place in the arrangements of schooling, and the spirit, or attitude one wanted to foster in the child. The emphasis on developing a "spirit of social cooperation" involved another kind of disciplining that, Dewey noted, was reflected in a less ordered

dynamic: “there is not silence; persons are not engaged in maintaining certain fixed physical postures; their arms are not folded; they are not holding their books thus and so,” Dewey contended (Dewey 1899:26). Instead, students do things “to produce results” and “out of doing these in a social and coöperative way, there is born a discipline of its own kind and type” (Dewey 1899:26-27).

Dewey’s emphasis on organizing the school in a way that fostered a social and cooperative spirit reflected his preoccupation with the relation between educational arrangements and society. Indeed, Dewey described the need to organize the school in the image of society, to render it a *miniature community* that could act as an embryonic society (1899:28). The school, Dewey argued, “has a chance to affiliate itself with life, to become the child's habitat, where he learns through directed living; instead of being only a place to learn lessons having an abstract and remote reference to some possible living to be done in the future. It gets a chance to be a miniature community, an embryonic society” (Dewey 1899:27-28).

For Dewey, then, schooling was not an end in itself, but rather a means of shaping society, and, as such, what he called “educational reform” was less a question of optimizing instruction for more effective learning, but of redefining the school as a miniature community whose aim was to foster cooperative and capable individuals.

The physical arrangements as diagrammatic for a Dewey’s New Education

The physical arrangements were pivotal to this end. They needed to embody the vision of getting school “out of its isolation and secure the organic connection with social life” (1899:89-90). The way traditional education is arranged, everything – particularly textbooks – is “made ‘for listening’,” Dewey argued, for “simply studying lessons out of a book is only another kind of listening; it marks the dependency of one mind upon another” (Dewey 1899:44). In contrast, Dewey described the rooms of the experimental school as inviting students to conduct their own inquiries into problems. In what Dewey called a “diagrammatic representation of the idea, which we want embodied in the school building,” he described the experimental school as modeled on an ideal home with workshops and a “miniature laboratory,” through which the child could come into

"immediate connection with the materials" (1899:48, 90). As such, Dewey's problematization of disciplinary arrangements involved suggesting concrete, physical alternatives to how disciplining should take place.

Dewey emphasized that these workshops or laboratories were not a matter of developing students' technical skills as carpenters or cooks (1899:90), for while there should be an "organic connection between the school and business life, it is not meant that the school is to prepare the child for any particular business" (1899:86). Instead, by being set up in ways that connected students "on the social side, with the life without" as well on the individual side, the rooms could "respond to the child's need of action, of expression, of desire to do something, to be constructive and creative, instead of simply passive and conforming" (1899:90).

The recitation room, for example, "half in the library," allowed the children to "bring the experiences, the problems, the questions, the particular facts they had found, and discuss them so that new light could be thrown upon them, particularly new light from the experience of others, the accumulated wisdom of the world—symbolized in the library" (1899:96). In this way, the recitation room reflected Dewey's vision of creating an "organic relation of theory and practice," offering a space where the child does not simply do things, but also gets an idea of what he is doing. According to Dewey, the recitation room "fixes the position of the 'book' or reading in education," thus making way for a process of "interpreting and expanding experience" but avoiding what he saw as the books' "harmful[ness] as a substitute for experience" (ibid.). "Discipline," Dewey contended, "arises in dealing with the problems involved, both theoretical and practical" (ibid. 101).

As Dewey envisioned the specific arrangements of the experimental school, discipline and disciplining were rather to be understood as a matter of developing a "spirit of inquiry" through an "attitude of inquiry" (ibid. 89). "The pupil must learn what has meaning, what enlarges his horizon, instead of mere trivialities. He must become acquainted with truths, instead of things that were regarded as such fifty years ago, or that are taken as interesting by the misunderstanding of a partially educated teacher" (ibid.).

In other words, besides emphasizing cooperation, Dewey's critique of prevailing divisions in studies and his proposal for an alternative New Education involved creating conditions for students' active occupation and for an experimental process of investigation that would foster a "spirit of inquiry."

The problem as a technique for the training of thought

In the later editions of *The School and Society* (1915), Dewey introduced the notion of "reflective attention" to describe this spirit of inquiry, stressing that the "problem" played a pivotal role in developing such reflective attention. Dewey saw this power of reflection as the very essence of being educated:

> A person who has gained the power of reflective attention, the power to hold problems, questions, before the mind, is in so far, intellectually speaking, educated. He has mental discipline – power of the mind and for the mind. Without this the mind remains at the mercy of custom and external suggestions. (Dewey 1915:149)

Dewey argued that in traditional education the conditions for what he called the "self-putting of problems" had been "neglected" to the extent "that the very idea of voluntary attention [had] been radically perverted" (1915:151). "Next to no consideration has been paid to the fundamental necessity – leading the child to realize a problem as his own, so that he is self-induced to attend in order to find out its answer" (1915:151). When the child is presented to "ready-made material (books, object-lessons, teacher's talks, etc.)" and primarily responsible "for reciting upon this ready-made material", this leaves only "accidental occasion and motif for developing reflective attention" (ibid.). "True reflective attention," on the other hand, "always involves judging, reasoning, deliberation" on a problem:

> … it means that the child has a *question of his own* and is actively engaged in seeking and selecting relevant material with which to answer it, considering the bearings and relations of this material – the kind of solution it calls for. The problem is one's own; hence also the impetus, the stimulus to attention, is one's own – it is discipline, or gain in power of control; that is a *habit* of considering problems. (Dewey 1915:151)

Dewey had developed these ideas about developing reflective attention in his book *How We Think* (1910).[47] Here, he was preoccupied with what he called "the training of thought," arguing that the "native and unspoiled attitude of childhood, marked by ardent curiosity, fertile imagination, and love of experimental inquiry, is near, very near, to the attitude of the scientific mind" (1910:iii). He also applied the notion of "reflective thinking," which he

described as something that is "always more or less troublesome because it involves overcoming the inertia that inclines one to accept suggestions at their face value; it involves willingness to endure a condition of mental unrest and disturbance. Reflective thinking, in short, means judgment suspended during further inquiry; and suspense is likely to be somewhat painful" (Dewey 1910:13).

There are clear parallels in Dewey's emphasis on the painful suspense of judgment during further inquiry as the central driver of this sometimes painful process of training thought, and the significance on the role of doubt as a central principle of knowledge in the works of pragmatist philosophers William James, Charles Sanders Peirce and Dewey's personal friend George Herbert Mead (cf. Ogien 2014:424). Indeed, Dewey argued that "the essentials of thinking" are "to maintain the state of doubt and to carry on systematic and protracted inquiry" (Dewey 1910:6, cf. 1915:150). Likewise, one can discern the pragmatist approach to experience as associative and indeterminate in Dewey's insistence that thinking is a contingent and open-ended process and in his rejection of teachers' tendency to rely on pre-fabricated transactional entities with predefined marketable or professional ends:

> Thinking is not like a sausage machine, which reduces all materials indifferently to one marketable commodity, but is a power of following up and linking together the specific suggestions that specific things arouse. Accordingly, any subject, from Greek to cooking, and from drawing to mathematics, is intellectual, if intellectual at all, not in its fixed inner structure, but in its function in its power to start and direct significant inquiry and reflection. (Dewey 1910:39)

With this analogy of the sausage machine, Dewey not only reiterated his critique of the way educational arrangements with predefined ends tended to engender uniformity, but also specified his argument regarding how one might understand intellectual capacity – thinking – not in terms of the topic one deals with, but in terms of the capacity to start and direct a significant inquiry and reflection.

In what perhaps became his most influential work, *Democracy and Education* (1916), Dewey further advanced these arguments, more strongly connecting the idea of reflective thinking to the question of developing democracy. In this instance, Dewey confronted another division in the prevailing disciplinary arrangements, namely that between "the naturalistic and humanistic sciences" (1916:334). In truth, experience knows no division

between human concerns and a purely mechanical physical world. Man's home is nature; his purposes and aims can only be executed under natural conditions, Dewey maintained, asserting that "man is continuous with nature, not an alien entering her processes from without" (1916:333).

It was Dewey's contention that "the social sciences – the studies termed history, economics, politics, sociology" used methods developed in the natural sciences to approach human problems and to study "such perplexing problems as insanity, intemperance, poverty, public sanitation, city planning, the conservation of natural resources, the constructive use of governmental agencies for furthering the public good without weakening personal initiative" (1916:333-334), for which reason he called for a still closer interdependence between the different sciences' approaches: "With respect to both humanistic and naturalistic studies, education should take its departure from this closer interdependence," rather than instituting "an artificial separation in the pupil's experience" (Dewey 1916:334). "We have before us the need of overcoming this separation in education if society is to be truly democratic," Dewey argued (1916:338). In this way, he pointed to the social sciences and their studies of social problems as an ideal approach for avoiding artificial divisions and thus allowing the reflective mode of inquiry he proposed could advance democracy.

In a later article "The Public and its Problems: An Essay in Political Inquiry", Dewey even described this mode of inquiring into problems as a method of democracy (Dewey 1946 [1927]:185ff, cf. Ogien 2014:422): "What is needed to direct and make fruitful social inquiry is a method which proceeds on the basis of the interrelation of observable acts and their results" (Dewey 1946:86), Dewey contended, understanding democracy as conditional on an articulate democratic public and the generation of democratic communities (Dewey 1946:217). Indeed, Dewey emphasized the need for ordinary citizens to acquire this reflective attention, because only then would they be capable of departing from public opinion and understanding the consequences of their decisions (1946:208-209).

In sum, Dewey's problematization of the educational tendency to assume a series of "stratified earths" was the backbone of his work on education and beyond. Throughout his oeuvre, Dewey reiterated his critique of divided disciplinary arrangements by stressing how self-directed forms of inquiry in education provided a means of fostering reflective

thinking and cooperatively minded individuals for society. Likewise, Dewey emphasized the potential of working with a problem in his later works, where such efforts became a method of democracy and a technique for grasping the interconnected character of a phenomenon. As we shall see, over the next century – and eventually in Danish high school education – this coupling, combining a critique of disciplinary separation and an emphasis on the problem as an alternative, more unifying mode of arranging research and education, was appropriated and reshaped in engagements with interdisciplinarity in both education and science. However, with the rise of mass education and research, such a coupling was not always entirely detached from the churning "sausage machine".

Above all, the problematization of disciplinary arrangements proliferated through different practical and intellectual contexts of education and research in the years first decade of the century. Although variously expressed through the notions of inter-discipline and interrelations of disciplines, this problematization became commonplace until, ultimately, the notion of interdisciplinarity circulated as a conventional way of arranging education and science.

II. The proliferation of Dewey's problematization of disciplinary arrangements

Dewey's problematization of traditional disciplinary arrangements in education gained wide influence over the next 20 years. This was largely due to Dewey's teaching activities and his large production in an accessible language, but his ideas also gained influence through his presidencies of the American Psychological Association (1899) and of the American Philosophical Association (1905) (Hickman 1999).

In the field of education, Dewey's ideas were circulated through his teaching at Columbia University's Teachers College, where he moved in 1904. There, William H. Kilpatrick and other students of Dewey taught the principles of what was called *progressive education* to thousands of teachers and school leaders over the next 50 years. Books in this field, such as Dewey's *Democracy and Education* (1916) and *Experience and Education* [1938] and Carlton Washburne's *What is Progressive Education?* (1952), continued to critique conventional arrangements of education, inspiring teachers and education philosophers to organize and describe such methods as "the project work

method" (Knoll 2014, cf. Miller 1988).[48] Moreover, Dewey's emphasis on the need for a kind of education that created the conditions for reflection and cooperation inspired the founding in 1919 of the Progressive Education Association, with the aim of "reforming the entire school system of America" (Cremin 1961:241).

Dewey's problematization of disciplinary arrangements and his emphasis on democratization also became instrumental in the field of social studies. As philosopher of education Thomas Fallace has shown, the 1916 Committee on Social Studies heavily cited Dewey's work in support of its suggested interdisciplinary courses, Community Civics and the Problems of Democracy. The committee was part of a larger body, the Commission on the Reorganization of Secondary Education (cf. Fallace 2016:182).

Mathematician and philosopher Alfred Norbert Whitehead also seized this problematization of dividing disciplines as a theme in his work. Dewey's and Whitehead's mutual admiration and influence were reflected in their laudatory reviews of one another's works, and Whitehead referred to Dewey's influence on his own works (e.g. Whitehead 1939, cf. Dewey 1984 [1929], Dewey 1937). Whitehead's discussion of the problem of disciplines in relation to education, for example, appeared in his influential collection *The Aims of Education and other essays* that he presented as being a "protest against dead knowledge, that is to say inert ideas," and as having the aim "to eradicate the fatal disconnection of subjects which kills the vitality of our modern curriculum" (Whitehead 1942 [1929]:10). Not unlike Dewey's emphasis on education as a matter of forming an organic union with everyday life, Whitehead argued that "there is only one subject-matter for education, and that is Life in all its manifestations" (ibid.). Whitehead developed and published these ideas as part of his involvement with developing the Harvard School of Business (cf. Whitehead 1933:viii, 111, Hendley 2000:181). In short, the idea that prevailing disciplinary arrangements represented a problem in education not only gained grounds in practical schooling programs through initiatives such as the project work method, but also in more philosophical expositions regarding the institutionalized aims of education.

Interdisciplinarity in American research councils

The politics of US research councils was also pivotal in the proliferation of this problematization of the disconnection of different branches of knowledge. As literary scholar Roberta Frank has shown, the interrelationship between the sciences was a central theme of American research councils in their early years (Frank 1988:92). For example, George Ellery Hale, a professor at the University of Chicago and later the first president of the National Research Council, argued that the National Academy of Sciences should encourage an interest in "subjects lying between the old-established divisions of science" in 1912, and in 1914 he urged a concern with "the interrelationship of the sciences" (Hale cited in Frank 1988:92).[49]

In the 1920s, an array of notions similar to interdisciplinarity began to circulate in relation to the organization of research. When the New School for Social Research was founded in New York in 1919 and the Yale Institute of Human Relations in 1929, numerous documents in the Social Science Research Council (SSRC) called for integrating the social sciences with industry, government and public welfare. Young rising stars like American anthropologist Margaret Mead called for the "co-operation for cross-fertilization in the social sciences."[50] Mead was among the first generation of US anthropologists trained in Columbia University with Dewey's close colleague Franz Boas. Another up-and-coming figure, political theorist Harold Laski, who helped found the New School of Social Research, similarly called for the "endless committees to co-ordinate or correlate or integrate" (op. cit. Frank 1988:93).

In the 1920s, interdisciplinarity was even seen as a duty of the Social Science Research Council (SSRC). In particular, when professor Robert Sessions Woodworth, a distinguished Columbia University psychologist and former student of William James, attended the Hanover Conference held at Dartmouth College in 1926, he argued that "there would be no other body, unless we assume the function ourselves, charged with the duty of considering where the best chances were for coordinated or interdisciplinary work" (cited in Frank 1988:92). The conference was organized by the SSRC, whose members were to devise "a Constructive Program for the SSRC." The prospect of the *new* likewise emerged as a key argument for interdisciplinarity in the research councils' politics of the 1930s. As Andrew Abbot has noted, the American SSRC emphasized the need for an "inter-

discipline or interstitial project" that would create "new insights into social phenomena, new problems, new methods leading to advances in the scientific quality of social investigation." Such an undertaking, the council argued, was unlikely to occur in the established disciplinary fields "where points of view and problems and methodology have become relatively fixed" (Social Science Research Council 1934:10, cited in Abbot 2001:132). While the agenda of making interdisciplinarity an obligatory principle in the research councils seemed to be driven by scholars affiliated with pragmatism, the prospects of the new also created a legitimate purpose continuing a politics of interdisciplinary arrangements of research.

The interdiscipline agenda, it appears, was driven by a number of people around Dewey. Lawrence K. Frank, a social science scholar, former student at Columbia University and pioneer of the child development movement being one of them (Senn 1975:9). As anthropologist Margaret Mead later described it: "Beginning in the 1930s and mainly under the stimulation provided by Lawrence K. Frank (working through several different foundations), efforts were made to break down the walls that the different social, biological or behavioral science disciplines had erected about their separate domains" (Mead 1969:7). In 1936, for example, Frank, then an acting member of the General Education Board (GEB) of the Rockefeller Foundation, persuaded the GEB to grant a generous multiyear award to neuro-psychologist Myrtle McGraw, who with John Dewey's help put together an interdisciplinary group of ten researchers (Dalton 2002:230). Margaret Mead similarly described her participation in a research project initiated by Lawrence K. Frank in 1935. During the project, "a group of people from different disciplines" met in Hanover to "develop an outline of our existing knowledge of human behavior for teaching adolescents" (Mead [1965] in Senn 1975:9). While the outline was never published, Frank's position at the GEB allowed him to distribute the materials produced by the project via the Progressive Education Association, a Commission on the Secondary School Curriculum and a Committee for the Study of Adolescence (ibid.). Frank himself later expressed how his own interdisciplinary, psychocultural approach to child development owed a great debt to Dewey and his pragmatism (Senn 1975:5).

By the end of the 1930s, then, interdisciplinarity – or similar notions – were circulating as a common way of organizing research. However, by this time interdisciplinarity was not only considered a promising arrangement, but was also presented as an impediment to

specialized research. Thus, while the SSRC report from the 1930 Hanover Conference repeated the theme of interdisciplinarity through such notions as "inter-discipline activities," the report also warned that a "concern with 'co-operative research' or 'inter-discipline problems' should not be allowed to hamper the first-rate mind" (Frank 1988:93-94). In any case, the idea of interdisciplinary arrangements was now commonplace, not only in relation to arrangements of education, but also as a motif for the scientific research funding provided by the American national research councils. Whether Dewey's writings and activities merely reflected a zeitgeist for problematizing prevailing disciplinary arrangements or indeed fuelled one, the research councils' interdisciplinarity agenda adds a new dimension to why some fields and groups began striving to be identified as interdisciplinary (cf. Graff 2015).

Unifying approaches and theories

From the 1930s, another kind of problematization of disciplinary arrangements emerged in the USA, namely a preoccupation with formulating theories and approaches presented as unifying or to be used across disciplinary divides. The Unity of Science movement played an important role in this development (Klein 1990:25), although it was preceded by German sociologist Otto Neurath's activities in the Vienna Circle in 1924. Preoccupied with challenging existing understandings of science, this collective proposed a program of logical empiricism based on Marxist critique (Carnap et al. 1973 [1929], Neurath 1938:1). Taking a "stand on the ground of simple human experience," this group emphasized the empirical sciences and rejected metaphysics (Carnap et al. 1973 [1929]:313, cf. Kourany 2010:32). For this movement, unity was a label for its alternative approach to studying scientific conceptions of the world that could "link and harmonize the achievements of individual investigators in their various fields of science" through "a neutral system of formulae," "a total system of concepts" that was "freed from the slag of historical languages" (Carnap et al. 1973 [1929]:306). In other words, this unifying endeavor involved establishing both a new object and a new universal language for analysis.

In 1938, Neurath founded the International Encyclopedia of Unified Science with Rudolf Carnap and Charles Morris at the University of Chicago, taking up the tradition of

the French encyclopedia as an arrangement able to meet the aim of unification and "synthesis" (Neurath 1938:2). For more than two decades, this encyclopedia was a vehicle for intellectual discussion within the framework of this unifying endeavor.[51] Danish physicist Niels Bohr, John Dewey and mathematician Bertrand Russell authored the first monograph to be published by the University of Chicago Press on the topic. Dewey's article, "Unity of Science as a Social Problem," contained a discussion of "The Scientific Attitude," "The Social Unity of Science" and "Education and the Unity of Science" (Dewey 1938). As such, the Unity of Science movement was tied with Dewey's work on unity, social problems and education.

As World War II approached, the interdisciplinarity agenda flourished in tandem with this new agenda of the Unity of Science movement. Indeed, the World War II years were later characterized as a time when interdisciplinary conferences, large-scale research projects and interdisciplinary educational programs became commonplace (Sherif & Sherif 1969:3). As anthropologist Gregory Bateson later recalled, it had now become "fashionable to engage in 'interdisciplinary research'" (Bateson 1987:162).

In particular, the Macy conferences held from 1942 to 1953 gave new impetus to the idea of interdisciplinary collaboration. The conferences gathered scholars from such disparate fields as technological systems, social psychology and anthropology. As vice president of the Josiah Macy Foundation from 1936 to 1942, Lawrence K. Frank was also a driving force in this exploration into the possibility of using scientific ideas as a basis for interdisciplinary alliances (Brand et al. 1976:33). Frank was also among the attendees of the first Macy meeting in 1942, and other participants of these annual gatherings included Norbert Wiener, John von Neumann, Margaret Mead, Gregory Bateson, Talcott Parsons, Warren McCulloch, Walter Pitts, Kurt Lewin, F. S. C. Northrop, Molly Harrower and Lawrence Kubie.

The theory of cybernetics was perhaps the most significant outcome of these interdisciplinary conferences. Mathematician Norbert Wiener's book *Cybernetics; or, Control and Communication in the Animal and the Machine*, published in 1948, delineated his theory developed during these interdisciplinary meetings (Wiener 1948). Interdisciplinary in character, his theory of cybernetics was based on the supposition that relations in humans and machines functioned similarly, and could thus be described in common terms as self-regulating operations and communication. As Austrian biologist

Ludwig von Bertalanffy declared some years later, there "exists general system laws, which apply to any system of a certain type, irrespective of the particular properties of the system or the elements involved" (Bertalanffy 1950:138).

Some, like mathematicians John von Neumann and Norbert Weiner, mobilized these theoretical expositions as a means of developing theories about technical systems. Others saw the interdisciplinary character of cybernetics as a promise of moving beyond national and ideological differences. In anthropologist Margaret Mead's later account, cybernetics was a "cross disciplinary communication model" "designed to provide a common language [...] for the common discussion and attempted solution for a variety of problems" (Mead 1969:10). This elimination of jargon provided a propitious opportunity for American and Soviet scientists to discuss "such matters as centralization in industry, or initiative in international relations, in terms of the location of feed-back loops instead of appeals to the comparative virtues and iniquities of socialism and free enterprise" (ibid.:11). In any case, the Macy conferences became the culmination of a longstanding concern with arranging research as interdisciplinary collaboration. Those attending these conferences took the idea of interdisciplinary collaboration in research and developed it into cogent theories of cybernetics and systems theory that pursued operations of control and communication across domains usually treated separately.

By the 1950s, the notion of interdisciplinarity was circulating in the US in innumerable practical and intellectual contexts. By this time, the problematization of disciplines was not only appearing in relation to techniques and approaches in education, or the arrangement of research, or the work with social problems, but had taken a new form through new theories and approaches in an increasing concern with unification in theory formation. Motives of interdisciplinarity figured in the unity of science movement, in cybernetics and its developments into systems theory such as Talcott Parson's to preoccupations with developing unified theories of human behavior in social psychology and the research in new fields such as the behavioral sciences (cf. Grinker 1956), in human relations (Kluckhohn & Murray 1956) and information system theories, biology, mathematics and engineering.

Likewise, in UNESCO's first survey of sociology in the United States, 1945-55, interdisciplinary research was discussed as an important trend in the social sciences (Zetterberg 1956:11). Although interdisciplinary research was said to have been "toned

down during the later years," this "guide to American sociology" also argued that "representatives of the various social sciences have learned a great deal more of each others' vocabularies and problems and that many prejudices against neighboring disciplines are less common" (ibid. 11-12). The report described a wide range of "interdisciplinary ventures," including area studies, the sociology of professions, family and marriage research, and a community mental health program. Moreover, several agencies, such as the National Opinion Research Center at the University of Chicago and the Survey Research Center and Research Center for Group dynamics at the University of Michigan, were said to be "interdisciplinary in charter" (ibid.). In other words, the UNESCO's depiction of American sociology described interdisciplinarity as an auspicious trend in the arrangements of sociological research in the USA.

Outside the USA, the division of disciplines also (re-)emerged as a problem of education in the 1950s. C. P. Snow's popular book from 1959, *The Two Cultures and the Scientific Revolution*, invigorated the question of how the natural sciences and humanistic education are related. Referring to the gulf between a scientific and a humanistic education, Snow's popular book argued for a break with the existing pattern of intense specialization (Snow 1959).

Routing onwards towards the emergence of interdisciplinarity in France, I will now show how the question of disciplinary arrangements emerged as a theme in research and education debates in the 1950's and 1960s. While this emergence was not unrelated to Dewey's ideas of education, the debates on interdisciplinarity were mainly influenced by the unifying approaches and theories represented in the unity of science movement and cybernetics.

III. The emergence and translations of interdisciplinarity in France

The same year that C.P. Snow's book (re)invigorated the problem of the natural-human sciences gulf in education, interdisciplinarity – or rather "interdisciplinarité" – was included in the French national dictionary of new words, an event that heralded the coming decades' intellectual and practical preoccupation with this and related notions (CNRTL 2019).

The dictionary attributed the first use of the term to Jean Meynaud, a professor of Political Science at the University of Lausanne Switzerland. He used the term in his lectures for an introductory course in political science addressing the need for interdisciplinary cooperation in the field. Meynaud, who also served as general secretary of UNESCO's International Political Science Association in the early 1950s (Boncourt 2015:201, AFSP nd.), was an avid commentator on American and British tendencies in political science (cf. Meynaud 1957) as well as on cybernetics (Meynaud 1959).[52] In the earlier published compilation of his introductory course lectures, Meynaud had already highlighted the need for interdisciplinary cooperation in political science. In these lectures, Meynaud argued that the "desire for interdisciplinary cooperation […] arises from the virtual impossibility for one man – or even for a team – to acquire, within a reasonable time, the knowledge of all the elements indispensable to the solution – and even to simple understanding – of a complex political problem" (Meynaud 1955:43). Meynaud suggested such interdisciplinary cooperation should take place between the different social sciences, but in an arrangement where one discipline takes charge of a problem and calls on other specialists to obtain information "in a mutual enrichment" (ibid.). The importance of interdisciplinary cooperation in political science, Meynaud maintained, should also be reflected at the teaching level, where efforts should be made to introduce political science teaching in broader ensembles of social science faculties or schools so that communication and pathways between the different fields could be arranged with ease (ibid. 44). This first call for interdisciplinarity in the French speaking areas, in other words, described the need for interdisciplinary cooperation in social science research and education as an arrangement for finding solutions to complex problems.

Meynaud's proposal for interdisciplinary teaching arrangements was not entirely unprecedented. A movement called "l'Éducation Nouvelle" [New Education] had problematized disciplinary arrangements of teaching since the first decades of the century, suggesting, for example, model schools organized as "laboratories" where one could "experiment with the new pedagogic methods" yet maintain an emphasis on "rationalism," an idea also known from Émile Durkheim's principles of moral education (Mole 2011:17, Durkheim 1925 [1902-1903]). Campaigners of this movement declared John Dewey one of its leading contributors on several occasions, for example, in 1909 in the editorial for *L'Éducation* (Schneider 2000:70, cf. Renier 2016:119). The same journal published a full

translation of Dewey's *The School and Society* between the years 1909 and 1914 (Reiner 2016:120n12). Dewey's ideas were also taken up and translated into pedagogical programs, such as Célestin Freinet's "active method" or Roger Cousinet's model for providing social education through free group work. Cousinet was also the founding editor of the journal *La Nouvelle Education* and founded the New Education association in France in 1921 (ibid. 76). In 1930 Dewey was awarded an honorary doctorate at the Sorbonne University (Schneider 2000:71). This all goes to show that, although the notion of interdisciplinarity was not directly addressed, Dewey's work was circulating as part of an engagement with problematizing disciplinary arrangements and developing alternative educational programs.

Dewey's works, however, were neither commonly acknowledged within education, nor were they unequivocally accepted outside the field of education. While Dewey's works were discussed in the *Revue Philosophique de la France et de l'Étranger* as early as 1883 (Schneider 2000:69), and the 1925 translation of *How We Think* was mentioned in the journal *L'Année Sociologique*, Dewey's problematization of disciplinary arrangements received little attention in the social sciences (Renier 2016:120n15). In 1925, however, sociologist Marcel Mauss indicated that Émile Durkheim had read Dewey and registered the importance of pragmatism (Schneider 2000:69). Yet, Mauss's account of pragmatism's importance perhaps reflected his own views more than those of Durkheim. In the posthumously published lectures from 1913-14 entitled *Pragmatisme et sociologie* (1955), Durkheim referred to pragmatism as "logical utilitarianism," asserting that it was a danger to France and its rationalist tradition (Schneider 2000:71). Similarly, albeit for different reasons, philosopher and politician of the French communist party Georges Cogniot in 1953 denounced "America's cheap intellectual rubbish, for instance the pedagogical junk of John Dewey" (Cogniot 1953:6 cited in Renier 2016:124).

Despite this rejection by both Durkheim and prominent Marxists, Dewey's critique of disciplinary arrangements of education nevertheless circulated through writings in the fields of education and psychology. The books and activities of a now largely forgotten psychologist, Guy Palmade, are interesting in this regard.[53] Palmade, who worked in contract-based consultancies in France's gas and electricity sector after World War II, was a key actor in establishing the fields called psycho-sociology and human relations in France through what has been called his important development of the relation between

science and enterprise (Meynard 2008). In the 1940s and 1950s, he published several books in the popular series *Que sais-je*, covering topics on "characterology," and "pedagogical methods" that referenced Dewey (Palmade 1968 [1953]).[54] With these works, Palmade presented concepts and methods that he would later describe in terms of a "transdisciplinary approach" (Palmade 1977:23).

In particular, Palmade's PhD thesis, *The Unity of the Human Sciences* [L'Unité des Sciences Humaines] reflected such a transdisciplinary approach (1961 [1953]). Palmade's thesis reflected a preoccupation with unifying the sciences through a system of concepts.[55] The thesis was grounded in the works of his supervisor psychologist Daniel Lagache's works on the Unity of psychology (Huguet 2008:62) and philosopher of science Gaston Bachelard, who as head of the committee, appraised the thesis at its defense in 1953 (Enriquez 2008:11). Palmade mobilized several of the concepts from the *Que sais-je* books to propose what he called a series of trans-specific concepts based on Bachelard's concept of "trans-rationalité" (Palmade 1961:4). However, Palmade also drew on the ideas of American scholars like Talcott Parsons and Margaret Mead, just as he pointed to cybernetics as a source of inspiration for his unifying endeavors (Palmade 1961:2-7, 284, 352). With these trans-specific concepts, Palmade aimed to establish a moldable method for illuminating phenomena that different disciplines might see as dissimilar yet that resembled one another sufficiently to benefit from a common approach (4). Taking "conduct" [conduit] as the basic trans-specific concept, Palmade presented a theory of a global, interconnected "assemblage" of conducts, which he argued had their "source" in other conducts (272) and, indeed, were constituted through "multiple aspects" (258), including technical and scientific operations, economics and law (195). Referring to Marx, he argued that these technical and economic operations were also to be approached as "conducteurs" – mediators that acted to regulate other kinds of conduct (235). Palmade's attempt at creating a unity of the human sciences, thus implied a theoretical framework entailing a dynamics of conducts that regulated and was regulated through what he called "translations" from, say, an economic organization into a complex "network" of a society's conducts (Palmade 1961:309-10).[56]

Although Palmade did not acquire a university chair before defending a doctoral thesis in 1975, *The Unity of the Human Sciences* did not go unnoticed after its publication in 1961. Michel Bernard, for instance, cited it extensively in a chapter he wrote on the unity

of the social sciences (sciences humaines) in the great history of philosophy directed by F. Chatelet of 1973 (Enriquez 2008:55).[57] Likewise, the fact that various criticisms were leveled at Palmade's promotion of the psycho-sociologic method in the Marxist journal *La Pensée* further indicates the wider discussion of his ideas. Palmade's work was critiqued for proclaiming a science – human relations – aimed at "capital," and for presenting "human relations," as if the notion concerned adapting people to specific technical skills (Roger 1964:83).[58] These critiques epitomized another kind of problematization of disciplines that became dominant in the 1960s' engagements with interdisciplinarity, namely the view that scientific disciplines were mechanisms of capitalism.

Although Palmade's "transdisciplinary approach" made no direct mention of the notion of interdisciplinarity, it is nevertheless indicative of the ways in which proclaimed interdisciplinary approaches and theoretical ideas from the USA, such as Dewey's pedagogical methods or cybernetics, were being seized and translated in preoccupations with unifying theoretical frameworks in France in the 1950s. Furthermore, Palmade's use of the notions of "network," "assemblage" and "translation" as part of this endeavor of developing trans-specific concepts are interesting as they seem to herald Latour's analytics of "translation."

In sum, the emergence of the notion of interdisciplinarity in France in the 1950s appears to have been largely located in environments oriented at debates about American social sciences. The notion of interdisciplinarity itself, however, soon appeared at the epicenter of a controversy over the aims of education and research.

The proliferation of interdisciplinarity in France

From the early 1960s, the notion of interdisciplinarity began to appear in a broad spectrum of public and scholarly debates in France. A variety of intellectual and practical milieus now appropriated the notion connecting it for miscellaneous purposes and ends. International agencies like UNESCO and the Organization for Economic Cooperation and Development (OECD) seem to have played a key role in in this proliferation. As anthropologist Margaret Mead remarked in the late 1960s, "in France multi-disciplinary discussions were stimulated by international conferences and by the relationship between UNESCO and the surrounding French milieu" (Mead 1969:8).

Indeed in 1961, the notion of "interdisciplinary cooperation" appeared in the title of a report published by the OECD, regarding a seminar on agricultural economic development through *the Integration of Technical Experimentation and Production Economics in Agriculture* (OECD 1961). The seminar had taken places in June 1960 as part of a project under the umbrella of the European Economic Productivity Agency of the OECD, whose headquarters were in Paris (ibid.). In 1966 "interdisciplinary research" was described in another OECD report aimed at improving "decisions and efficiency for poultry production" and "technical and economic agricultural research" (OECD 1966). In these reports, interdisciplinarity thus appeared as a means of arranging scientific experiments to achieve industrial development and economic growth.

The notion of interdisciplinarity likewise appeared in UNESCO's International Social Science Journal in 1964 (Piaget 1964). In an article entitled "The Classification of Disciplines and Interdisciplinary Connexions," developmental psychologist Jean Piaget proposed that present trends in the various social sciences be comparatively surveyed so as to raise "interest and increased material assistance in interdisciplinary research at all levels." According to Piaget, such a survey would be useful given that "everyone declares that the future belongs to interdisciplinary research, but in practice such research is often very difficult to organize," its often being carried out in "watertight compartments" (ibid. 1964:554-555). In particular, Piaget pointed to the prospects of surveying recent trends in what he called the "law-seeking disciplines" and their "connexions," including sociology, cultural anthropology, psychology, economics and econometrics, demography, linguistics, cybernetics, symbolic logic, epistemology of scientific thought and experimental pedagogy (ibid. 555). These fields represented important interdisciplinary trends, Piaget argued, in particular cybernetics, which he described as the most promising and most "polyvalent meeting-ground of all the physico-mathematical, biological and human sciences" (ibid. 561).

Piaget later headed a large UNESCO survey on the main trends in social and human science research, thus promoting the prospects of interdisciplinary arrangements (Piaget 1970). In his own contribution to the survey, Piaget proposed that "the true object of interdisciplinary research […] is to reshape or re-organize the fields of knowledge by means of exchanges which are in fact constructive recombinations," of "originally heterogeneous" fields – a process he called "hybridization" (Piaget 1970:524-525). In sum,

Piaget's initial interest in the interdisciplinary potential of what he called "law-seeking disciplines" like cybernetics was succeeded by his focus on the process of scientific transformation, and an interest in how new branches of knowledge adopt "new goals that impact upon the parent sciences and enrich them" (Piaget 1970:525). His change of interest from crystallized general rules applicable across disciplines towards a concern with hybridization and invention was telling of a broader change in the debates on interdisciplinarity throughout the 1960s.

In the 1960s' France, the notion of interdisciplinarity began to figure in a wide range of fields, including social work, psychoanalysis and archeological cartography.[59] In the bulletin of the federation of social centers, for example, a paper concerned with community development methods referred to American experiences with interdisciplinary studies, which had aided in dealing with large quantities of information and had created the best conditions for reflection (Milhaud 1961:14). Moreover, the idea of interdisciplinarity appeared in the journals produced from a psychoanalysis congress in 1963, when psychiatrist and psychoanalyst Michel Gressot of the University of Lausanne pointed to the intra-disciplinary and interdisciplinary relations between psychoanalysis and psychotherapy (Gressot 1964:65). And in 1964, at the annual national Scientific Societies congress the notion of interdisciplinarity appeared in an argument that an archaeological map cannot be made without input from a geologist, a geographer, a forester and an urbanist (Chevallier & Guy 1965:204). In all of the above fields, interdisciplinarity was presented as a promising, if not indispensable, condition for arranging research.

The idea of interdisciplinarity was also discussed in Marxist academic milieus. In 1965, for example, Georges Coignot, an editor of the journal *La Pensée*, mentioned interdisciplinarity in a critique of an educational proposal by the OECD. Coignot saw this proposal as intended to differentiate the educational system according to different sectors' needs. For Coignot, the proposal focused too strongly on technical skills and thus on a form of education directed at operating the forces of production. The better strategy, he asserted, was to respond to the need to affirm unity, the solidarity of knowledge and the aims of general studies (Coignot 1965:51). He went on to argue that the university had an interdisciplinary quality, as the different faculties reacted towards one another, guarantying the integrity of the universality of humans rather than creating uncultivated

and unarmed technicians (ibid. 51-52). In other words, Coignot associated the notion of interdisciplinarity more closely with the ideals of the disinterested enlightenment university than with the rationale of economic development expounded in the OECD's education policies.

In education, the notion of interdisciplinarity also appeared in relation to experiments, thus echoing the progressive ideas of the Nouvelle Éducation movement. In 1966, for example, a newsletter from the French national institute of pedagogy presented a national experiment aimed at integrating TV and radio in teaching. The newsletter mentioned how teachers coordinated their teaching interdisciplinarily (Retz 1966:31). This experiment centered on three concerns: 1) a concern with "democratizing the class," meaning that students must "determine themselves" and no longer depend completely on the teacher; 2) a "psychological concern" based on the idea of "non-directivity" in the learning process; and 3) a "pedagogical concern" based on the idea that using more audio-visual technologies would modify the "scholastic" sense of teaching. In this instance, the notion of interdisciplinarity was affiliated with an agenda of furthering democratic, self-determining and less scholastic forms of education in France.

However, the notion of interdisciplinarity was also used in descriptions of the need for more a flexible organization of the university and its potentials for economic growth. In 1967, for example, sociologist Monica Pinson wrote an article warning that American scientific and technological advances in higher education could pose "a threat to Europe" (Pinson 1967). Pinson argued that the lower proportion of graduates of secondary education who went to university in Western Europe compared to the United States was one of the reasons why there were not enough researchers and technicians to meet all the needs of a rapidly expanding industrial society. Moreover, she pointed to the tendency to professors holding positions for life, which she found meant that "we are far from American systems where there is a close interdisciplinary co-operation and 'rotation' in the direction of the departments" (Pinson 1967:788). In other words, the notion of interdisciplinarity in education was now both affiliated with the Enlightenment University, it was figuring as a technique of democratic, experimental arrangements of schooling, but also presented as a more flexible arrangement of university research and higher education described as vital for industrial development and economic growth.

In this very same year of 1967, philosopher Louis Althusser took what he called "the slogan of interdisciplinarity" as an example to illustrate his philosophical method of "ideology critique" in a philosophy course for scientists.[60] "I remind you:" Althusser opened the lecture, "interdisciplinarity is today a widely diffused slogan which is expected to provide the solution to all sorts of difficult problems in the exact sciences (mathematics and the natural sciences), the human sciences, and other practices" (Althusser 1990 [1967]:84). Althusser continued by suggesting that one could draw a line of demarcation between, on the one hand, what he called "the ideological pretensions of interdisciplinarity," and on the other hand, what he called "the realities of which it is the symptom." This slogan of interdisciplinarity, Althusser argued, was in fact an "illusory name for a problem entirely different to the problem it designates;" it was an example of those "false ideas about science" that reside "in the heads of scientists themselves" and "conceal real problems" (98). Althusser argued that in the arrangements of interdisciplinary "round tables" that had become fashionable, disciplines are "exterior to one another;" they are reduced to "a tool'. Yet, Althusser asked polemically: "what use is being made of mathematics in "psychology', in political economy, in sociology, in history?" (90) His answer was that the real use of disciplines in these interdisciplinary round table arrangements, was not a matter of the disciplines' concrete input to solving a problem or to create a scientific transformation. Rather, these arrangements were to be seen as a mechanism for covertly reproducing "the common theoretical ideology that silently inhabits the 'consciousness' of all these specialists." Interdisciplinary round tables, Althusser argued, were "an assembly of the ignorant," a mechanism for reproducing an existing bourgeois ideology held by scientists and of which they were themselves unaware – a mechanism that a philosophy through Althusser's program of ideology critique was to unveil and thereby provoke "theoretical effects" as well as "practical effects" (107).

In sum, while the notion of interdisciplinarity was gaining ground as a way of conceptualizing and arranging research and education – a development connected both to aims of flexibility, economic growth and the democratization of schooling – the notion was itself being problematized as a mechanism of modern capitalist arrangements, a problematization now being propagated as the paramount example of Althusser's influential program of ideology critique.

Interdisciplinarity after 1968

Despite Althusser's stern criticism, "interdisciplinarité" and its neighboring term "pluridisciplinarité" became pivotal in the student riots of May 1968, where they appeared as slogans on banners in the streets (Frank 1988:99). As literary scholar Kristin Ross has noted, students in the early 1960s had already begun to question the arbitrariness of examinations (Ross 1991:xviii). Althusser himself had played an active part in turning research and education into a question of political power, through the famous Cercle d'Ulm, which proposed that Marxism-Leninism could offer a principle for reorganizing the conceptual field (Chateigner 2014). Under the slogan "La Sorbonne aux étudiants," students questioned how university education was arranged – in terms not only of the pedagogical relation between professors and docile students, but also of how students were produced to become part of the bourgeoisie (Ross 1991:xviii). Interdisciplinarity, then, apart from being a slogan, which could be accused of enabling a covert reproduction of bourgeois knowledge, was seized as a proverb for critiquing that very mechanism: as an alternative to prevailing forms of disciplining and its reproduction of structures of power.

Following these protests, the French government enacted the Fauré laws in 1969, which established three explicitly experimental pluridisciplinary university centers: Vincennes, Marseilles-Luminy and Dauphine. Vincennes was intended to cover the humanities, social sciences and the arts; Marseille-Luminy the natural sciences; and Dauphine economics and management according to the Harvard Business School model (Dormoy-Rahramanan 2011:251). Before these plans to establish a pluridisciplinary university were made, a pluridisciplinary research center in Aix-en-Provence had allegedly already been set up from 1963 to 1964 (Chalendar 1969:648). The new universities' pluridisciplinary arrangements were aimed to create a series of new arrangements that would allow for the "co-existence of disciplines that were otherwise isolated or divided in faculties" (Chalendar 1969:650). This was to be achieved first by letting students from different disciplines jointly take certain courses on subjects common to their disciplines. Second, group work was to be arranged for small groups of students from fields such as law, economy, sociology and psychology, and to be based on "horizontal" themes to which they could all contribute. These institutions were additionally to offer electives outside the students' disciplines, and, finally, to facilitate the use of laboratories and calculators (ibid.).

Thus, the establishment of these explicitly pluridisciplinary institutions, on the one hand, responded to students' demands for more student-centred arrangements of education with a new set of pedagogical methods and more flexible structures. Yet, at the same time, this institutionalization of interdisciplinarity also involved more applied educational programs directed at industry. In other words, the institutionalization of interdisciplinary universities encompassed both ideals regarding the democratization of the educational arrangements and an agenda to create more flexible arrangements that could meet the needs of a rapidly expanding industrial society.

In the aftermath of 1968, a number of intellectuals used the notion of interdisciplinarity or engaged in different problematizations of prevailing disciplinary arrangements. For example, in 1970, Michel Foucault, who had headed the department of philosophy at the University of Vincennes for a year, devoted portions of his inaugural lecture at Collège de France to "discipline," discussing it as a prime example of how a discourse is controlled, delimited, ordered, redistributed (Foucault 1972:222ff). Disciplines, Foucault stated, were to be seen as a "principle of limitation" of what can count as true and normal (ibid.). Although Foucault's earlier work had pursued the implications of disciplinary procedures and rules as a way of examining modern thought (Foucault 2005 [1966]:268), and had even located the moment when "pure formal sciences based on logic and mathematics" were separated from "empirical sciences" (Foucault 2005:82), this lecture represented a more conscientious problematization of prevailing disciplinary arrangements as "a system of control in the production of discourse" (Foucault 1972:224). Foucault's later work *Discipline and Punish* similarly pointed to the parallels between the tabulated, taxonomic arrangements of modern scientific classification and the disciplining techniques and arrangements that were creating more docile and productive subjects (Foucault 1995 [1975]).[61] This problematization of modern disciplinary arrangements and categorization as a mechanism of both knowledge and power marked the coming years' preoccupation with interdisciplinarity science and education in France.

The widespread skepticism towards disciplines and the power mechanisms they implied was also apparent in the contributions to the *International Conference on Interdisciplinary Research and Education,* organized by the OECD in 1970 (Apostel et al. 1972). Framed by the OECD's agenda of research and innovation, this conference gathered a number of educational scholars and scientists from Europe and the USA in Nice to

present their work on interdisciplinarity in research and education. Philosopher Leo Apostel, an editor of the subsequently published volume on the conference, recalled the conference as "a time of strong enthusiasm," as 1968 was still fresh in everyone's memory (Apostel & Vanlandschool 1994:10-11).

The contributions in this volume reflected this spirit of enthusiasm. Several drew on cybernetics or systems theory as the basis for rather progressive, if not revolutionary, visions of a radically differently arranged research and education. Apostel himself took an "operational approach" to interdisciplinarity (Apostel 1972:171), proposing a "type" of interdisciplinarity in which a "socialist manager of a non-bureaucratic society [is] constantly breaking up monopolies, continually mixing social groups [by] rotating persons from production to research and from research to production" (Apostel ibid. 145). Astrophysicist Erich Jantsch took "an integrated systems view of science, education and innovation", distinguishing between multidisciplinarity, pluridisciplinarity, cross-disciplinarity, interdisciplinarity and transdisciplinarity to argue for a "transdisciplinary university structure" that, by being complexly configured, could "enhance" the "life" of the education/innovation systems and thus "the self-renewal of society" (Jantsch 1972:100, 116). Developmental psychologist Jean Piaget likewise distinguished between multidisciplinarity, interdisciplinarity and a still higher "level" of transdisciplinarity (Piaget 1972:136ff.). Unlike Jantsch and Apostel, Piaget saw transdisciplinarity as something that "would not only cover interactions or reciprocities between specialized research, but place these relationships within a total system without any firm boundaries between disciplines." "While this is still a dream," Piaget remarked, "it does not seem to be unattainable" (Piaget 1972:138).

The notion of "transdisciplinarity," allegedly coined at this conference, thus reflected the concern with proposing radically different research and education arrangements (Nicolescu 2010:20, Palmade 1977:23). It marked a preoccupation with distinguishing a groundbreaking kind of interdisciplinarity, one that differed from commonplace pluridisciplinarity or interdisciplinarity arrangements because it transgressed, breached and broke with prevailing disciplinary arrangements. Although the discussions of different interdisciplinarity modalities launched in this book were largely taken as a classifying endeavor (cf. Russo 1973:772, Palmade 1977, Klein 2009b), their formulation also essentially reflected an enthusiasm and hope for more progressive forms of

interdisciplinary arrangements of knowledge, grounded in theoretical developments of cybernetics.

This tendency of the OECD conference contributions to emphasize the prospects of more transgressive or radical forms of interdisciplinarity had parallels in other prevalent conceptualizations of interdisciplinarity occurring at the time. In 1971, philosopher and linguist Roland Barthes, for example, insisted in a subsequently much-cited quote that interdisciplinarity was not merely a matter of combining specialist branches of knowledge:

> It is indeed as though the *interdisciplinarity* which is today held up as a prime value in research cannot be accomplished by the simple confrontation of specialist branches of knowledge. Interdisciplinarity is not the calm of an easy security; it begins *effectively* (as opposed to the mere expression of a pious wish) when the solidarity of the old disciplines breaks down – perhaps even violently, via the jolts of fashion – in the interests of a new object and a new language, neither of which has a place in the field of the sciences that were brought peacefully together, this unease of classification being precisely the point from which it is possible to diagnose as certain mutation. (Barthes 1977 [1971]:155, *emphasis in the original*)

Barthes thus defined "effective" interdisciplinarity as not merely a matter of the potential synergies of interdisciplinary arrangements, but as rather involving a drive to break with the very forms of classification that disciplines represent. This definition involved a skeptical attitude, an "unease of classification" through which new objects of study and a new language for studying them could spring.

In the following years, the use of concepts such as transdisciplinarity or indisciplinary marked a similar preoccupation with describing modes of querying and arranging research and education that sought to break with prevailing categories and forms of classification in order to eschew the mechanisms of knowledge and established truths (cf. Aubin 1984, Ranciére 1991 [1987]). The problematization of the established division between nature and culture particularly marked the preoccupation with transdisciplinarity.

In 1973, for example, sociologist Edgar Morin used the notion of transdisciplinarity when naming the *Centre for Transdisciplinary Studies, Sociology, Anthropology, History* at the École Practique des Hautes Études (Nicolescu 2010:20, Morin 1974[1973]:12).[62] As Morin himself said, reading works by von Forster and Gregory Bateson with "the Group of

Ten" [le Groupe des Dix] – a discussion group established in 1968 by biologists and cyberneticians like Jacques Robin, Henri Atlan and Michel Serres – led him to "dream of a center that would allow for the exchange of research in the biological and human sciences" and to "develop and unfold a true interdisciplinary thinking" (Morin 1974:11, Chamak 1999:659). In the book *Le Paradigme Perdu*, he presented this vision of an interdisciplinary approach (1974). Problematizing what he called an "anthropologistic approach" whereby the human is defined as being different from the animal and culture as being different from nature, Morin described his hopes to create a new foundation for a new anthropology – an "anthropolitics" – that pursued questions regarding the origin of humankind and its cultures in the very interconnection of nature and culture, animal and human (Morin 1974:20, 59). If a "true interdisciplinarity" is to come about, Morin argued, there must be disciplines that are connected with and open to "complex phenomena" and, of course, an "ad hoc methodology" (ibid. 239). Morin developed this interdisciplinarity orientation through his writings on complexity, as well as by establishing an international center for transdisciplinarity (Morin 1994, cf. Montuori 2004).

These prospects of creating alliances between nature and culture also (re)emerged as an important theme in science philosophy. For example, in their influential book *Order Out of Chaos* [*La Nouvelle Alliance*], Nobel prize-winning physician Ilya Prigogine and philosopher Isabelle Stengers used the findings of Prigogine's thermodynamic studies as a motif for reformulating the possibility of creating a new alliance between the natural and social sciences (Prigogine & Stengers 1979). More specifically, the book was based on the discovery that time and matter play a role in thermodynamics, meaning that physics systems are neither closed nor stable, ever-present arrangements, but fluctuating, open, self-organizing systems that can develop into an equilibrium, an order out of chaos. In these fluctuating systems, matter was to be seen as "active," Prigogine and Stengers argued, as it leads to "irreversible processes," for example, when two different liquids are blended and cannot easily return to their original states (Prigogine & Stengers 1979:xxix). With this discussion, Prigogine and Stengers strove to bridge what they called the "striking contrast" between how the natural sciences had described the world and how people experienced it, thus drawing the two worlds "closer together" (ibid. 311-312). In other words, pointing to this new alliance entailed a vision of bringing the natural sciences and

human experience on a par, of offering a mode of thinking through which the chasm between them could be spanned.

In 1979 philosopher Jean-François Lyotard also wrote a report for the Canadian ministry of science, taking stock of the conditions of knowledge at the time. Later published as the well-known *The Postmodern Condition: A Report on Knowledge*, the report's central argument was that there was an ongoing transformation in the ways in which knowledge was legitimized (1984 [1979]). The grand narratives, which had since the Enlightenment legitimized knowledge – referring either to a philosophical "spirit" or the "emancipatory" powers of knowledge - Lyotard argued, were now increasingly being questioned (37). Instead, a postmodern "incredulity towards metanarratives" was beginning to unsettle existing ways of legitimizing knowledge (39). This shift was being manifested in a new organization of the university: "the classical dividing lines between the various fields of science," were now being replaced by "a 'flat' network of areas of inquiry, the respective frontiers of which are in constant flux", and the "old 'faculties' [were splintering] in institutes and foundations of all kinds" (39). In addition, the legitimation of science and truth that was previously the universities' task was now taken over by diverse "interlocutors involved in ethical, social, and political praxis" (40).

For Lyotard, interdisciplinarity was a conspicuous feature of the postmodern condition he was describing: "the idea of an interdisciplinary approach," Lyotard argued, was inculcating "this age of delegitimation and its hurried empiricism" (67). As he saw it, the situation called for the need to "refine our sensitivity to difference and reinforce our ability to tolerate the incommensurable"(xxv). Yet, Lyotard also warned that the transformations involved in this postmodern condition could lead to a stronger focus on performance efficiency and merchantilization – a situation of "world competition" and demands to "create skills" in higher education (48). In short, in Lyotard's analysis of the condition of knowledge in the late 1970s, the idea of interdisciplinarity had become a feature of transformation of how knowledge was arranged and legitimized, which both gave new prospects, but also undesirable repercussions of merchantilization and performance-efficiency.

In sum, the problematization of disciplinary arrangements was an important aspect of the 1968 events and the ensuing intellectual debates. Yet, the problem of disciplinary arrangements in these years was not merely described as a matter of too specialized of

knowledge to be connected for their synergetic potential. In this moment, rather, disciplines were described as mechanisms of the very forms of classification and categorization that govern human thinking and action and through which modern capitalism was seen to operate. This problematization was accompanied by a new drive to break with and transgress existing forms of classification and standard divisions in disciplines and thus engage with new objects and a new language with an alternative understanding and a new order. Moreover, while interdisciplinarity before 1968 had primarily been debated as a possibility for change, it was now also described as part of a fundamental and ongoing transformation of the institutional arrangements of knowledge. This transformation also opened up an avenue for approaching science in the STS field and, indeed, for Latour's insistence on the need to cross disciplinary divides and interrogate prevailing scientific truths.

IV. The problem of disciplines in the sociology of translation and after

The emergence of the field of Science and Technology Studies in the 1970s incarnated the preoccupation in these years with the problem of disciplines and disciplinary arrangements. Under different rubrics, scholars in the history, sociology or philosophy of science took up the task of inquiring into the formation of scientific knowledge. As science philosopher Isabelle Stengers later described it, these scholars were "challenging the ideal of pure science", "studying science as a social undertaking like any other, neither more detached from the cares of the world, nor more universal or rational than any other practice" (Stengers 2000[1993]:2). As Sheila Jasanoff later put it, the rise of STS mounted a "multi-dimensional concern" that would make "inroads into existing disciplinary formations" (Jasanoff 2013:100. cf. Bowker & Latour 1987:738).

The skeptic stance towards the division between nature, culture, science and politics took different forms for this new generation of philosophers and sociologists of science. In the British sociologist of science David Bloor's works, for example, it involved rendering the realm of science the object of sociological examination rather than relying on "existing fields of intellectual activity" (Bloor 1991 [1976]:9). In the works of historians of science Steven Shapin and Simon Schaffer, it involved showing the entanglement of science and politics by examining historically the ways in which scientific givens such as facts and

experiments became constitutive for a new political order (Shapin & Shaffer 2011 [1985]). The interdisciplinary character of their work, however, as they later put it, was more "a momentary feature of its institutional circumstances than a well-rooted preference" (Shapin & Shaffer 2011:xlv).

Well-rooted preference or not, the problematization of established disciplines and their categorical divisions also characterized Bruno Latour's analytical approach. In Latour's early work, this problematisation involved approaching science by focusing on those forces that are involved in stabilizing something as true. In one of Latour's first articles with Paolo Fabbri, for example, they drew on semiotics to examine the rhetorical devices and institutional traits that made a truth acceptable (eg. Latour & Fabbri 1977:82). In Latour's first book with Steve Woolgar *Laboratory Life*, they similarly focused on the different practical arrangements to determine how a fact came to acquire its character in the first place, rather than giving primacy to the stories scientific disciplines tell about their discoveries (Latour & Woolgar 1986 [1979]:278). And in his programmatic article *Irreductions*, Latour emphasized the relation between power and knowledge in a series of skeptic exclamations regarding the problem of relying on established categories for explanation (1988 [1984]). Indeed, the interrogations in the books *The Pasteurization of France* (1988 [1984]) and *Science in Action* (1987) of the series of actions of plural actors that were involved in establishing a fact, encapsulated Latour's rejection of relying on established categories or disciplinary knowledge as the frame for understanding what science is, and how a scientific fact comes into being.

Latour's programmatic work with Michel Callon on the method of translation and actor-network-theory can be seen as a formalization and naming of this analytical orientation (Callon & Latour 1981; Callon 1986, Callon and Latour 1992). Here, they defined the steps and principles for a method of empirically following the translation process or of tracing the network of actors affecting a stabilization process. This similarly established disciplines' self-descriptions as a starting point for inquiries into how scientific facts or technological devices were constructed (cf. Latour & Callon 1981:279). In particular, Latour and Callon's emphasis on treating non-human and human actors in similar terms – "symmetrically" – reflected their dismissal of disciplinary knowledge as a primary vehicle in the process of scientific production. Instead they saw matter and animals as potentially active actors, placing the center of gravity of scientific or

technological innovation outside a lucid thinker or a disciplinary field. As Isabelle Stengers has argued, the scandal of these works lied in the rejection of a rational subject in the process of producing a fact. Unlike precursors such as Thomas Kuhn's well-received book *The Scientific Revolution* showing how social, technical and practical matters condition the production of knowledge, these scholars described scientific facts as a result of a process of winners and losers amongst all sorts of actors, not of human reasoning (Stengers 2000[1993]:8). Like Lyotard's depiction of the postmodern incredulity towards metanarratives and splintering of university faculties, this preoccupation with studying science as a power game between different human and non-human actors transgressed established categories and shattered disciplinary divides. Indeed, Latour later used the metaphor of a "flat network" to describe the analytical strategies of ANT (Latour 2005:16,165ff).

Latour's incredulity towards disciplines is perhaps most explicit in his programmatic book *We Have Never Been Modern* (1993 [1991]). Indeed, Latour's point of departure in this book was a critique of the established division in disciplines. Asserting that such fields as "epistemology, the social sciences, the sciences of texts," take "separate and privileged vantage points," Latour argued that these vantage points taken alone did not suffice, because "the creatures we are pursuing cross all three spaces" (Latour 1993:5). Instead of taking established disciplinary fields as frames of explanation, Latour pointed to the lessons from science studies in directing attention away from what scientists say – to what they do. This shift, he contended, had succeeded in showing that although facts eventually take the form of pure knowledge about nature, the research process in practice is contingent on a messy arrangement of matters and actions, which cannot necessarily be accounted for by any one disciplinary field (ibid. 7).

Presenting what he called the Modern Constitution, Latour extended this argument to characterize a tendency in a way of ordering – of what he called "the moderns." Latour's argument was that, on the one hand, moderns tend to keep things and humans, nature and culture, science and politics separate – a tendency he named "purification." Yet, Latour argued, the moderns concomitantly create mixtures between humans and things, hybrids - in processes they seem to deny – arguing that such "hybrid" work "is invisible, unthinkable, unrepresentable" (34). Indeed, the thrust of Latour's argument was that "we have never been modern," because this process of purification is only part of the story of

how moderns constitute their world. Pointing to moderns' concomitant mechanism of purification and denied hybridization, Latour argued for an approach that would take both into account: "By deploying both dimensions at once, we may be able to accommodate the hybrids and give them a place, a name, a home, a philosophy, an ontology and, I hope, a new constitution" (51). In other words, Latour problematized the purifying tendencies of modern thought, epitomized in the division into pure disciplinary fields and pure scientific facts. He argued instead for the need to include attention to those things, practices and matters that participate in the much more messy processes of constituting modern thought and action.

In sum, Latour's analytical approach, or what has been called "transdisciplinary ontology," can be said to encapsulate a problematization of modern thought and its purifying tendencies (Alliez 2015). Rather than relying on established categories and epistemologies founded in pure disciplinary fields, this approach directs attention to those matters and practices that also participate in constituting modern knowledge, pursuing their actions and effects across disciplinary domains. As such, Latour's approach offers a new and alternative approach to the study of science and technology. Yet, at the same time, as I have indicated, this approach also relied on specific institutional circumstances to come into being and to be acceptable. Indeed, this transdisciplinary approach to science and technology as networks of translations resonates with a theoretical motif and mode of problematization that inhabited the French social and human sciences, especially after 1968 of breaching with those very categories and arrangements that govern how moderns think and act.

The new potential of transdisciplinarity

Just as Latour's transdisciplinary ontology may be seen to reflect a motif of transgressing and breaking with established disciplinary arrangements, it was also prone to the mobilization for new engagements with transdisciplinarity towards the millennium. Indeed, the problematization of disciplinary arrangements changed character in this period. While engagements with transdisciplinarity in the 1970s had evoked critiques

regarding the mechanisms of power and knowledge, in the 1990s the notion became vested with new potential for productivity and effective problem-solving.

The changing discourses on inter- and transdisciplinarity in the UNESCO are emblematic of this shift. In 1986, UNESCO published a report entitled *Interdisciplinarity in General Education,* which connected interdisciplinarity to a problem of specialization. Although "the world in which we live is a unity," the report argued, disciplines look at the world from a "particular viewpoint" (D'hainaut 1986:40). This report asserted that interdisciplinarity was necessary to counter such divided viewpoints and enable "students to see the world as a whole, and to develop a broad understanding necessary in general education" (ibid.). Thus, according to the report, the conception of interdisciplinarity reiterated the theme of general education, or *Bildung*. A broad understanding was not only needed for the development of "a person" or "a citizen" but also of "a productive worker," the report argued (ibid.).

This emphasis on the theme unity and specialization changed in the 1990s. During this time, the discourse on interdisciplinarity in the UNESCO began to concern questions of the world's *complexity,* rather than unity, emphasizing the potential of transdisciplinarity in addressing complexity. These ideas of transdisciplinarity and complexity mounted in the discourse of the UNESCO with a report from 1998. In this report from a symposium, the notion of transdisciplinarity was embraced enthusiastically describing UNESCO itself as a "transdisciplinary organization" (UNESCO 1998:3). Following the charter on transdisciplinarity of a 1994 World Congress on Transdisciplinarity in Portugal, organized by CIRET, an NGO founded among others by Edgar Morin, the report presented the notion of transdisciplinarity as entailing more profoundly integrative processes than offered by interdisciplinary or multidisciplinary arrangements (ibid. 42).

In 2000, transdisciplinarity was again the main theme of a UNESCO conference (Klein et al. 2001) and in the subsequent conference publication was described as an "Effective Way for Managing Complexity" as well as recognized for its potential for "joint problem-solving among science, technology and society". As such, throughout this period, the problematization of disciplines changed from a concern with fostering general education for a unified world into one involving how to use transdisciplinary arrangements and transgressive thinking to reach innovative and effective solutions to complex problems. Indeed, economist Joseph Schumpeter famously advanced the notion of "creative

destruction" in his theories of entrepreneurship, a notion that was now evoked to describe the need for this transgressive attitude (Klein 2001:i). In other words, the notion of transdisciplinarity had now been invested with productive potential. The motif of transgressing and breaking with disciplinary arrangements and established categories that characterized the engagements and critiques of the 1970s had now re-emerged on an agenda of industrial innovation and problem-solving. In short, the transgression of established knowledge and categories was now envisioned as something productive and coupled to the need for flexibility, adaptability, innovation and collaboration.

This trend towards the new productive potential of transdisciplinarity had a parallel in the influential books of STS scholars Michael Gibbons, Helga Nowotny and colleagues (Gibbons et al. 1994, Nowotny et al. 2001). In fact, they even contributed a paper, *The Potential of Transdisciplinarity,* to the 2000 UNESCO conference, in which they outlined the key points of their book *The New Production of Knowledge* (Nowotny & Gibbons 2001).[63] In their second book, published that same year, they also highlighted the potential of the "transgressive" character of a new production of knowledge – in what they had earlier described as transformation from a "Mode 1" society to "Mode 2":

> One of the characteristics of Mode 2 science, we claimed, was that knowledge was now being generated in the context of application [...] science could no longer be regarded as an autonomous space clearly demarcated from the "others" of society, culture and (more arguably) economy). Instead all the domains had become so "internally" heterogeneous and "externally" interdependent, even transgressive, that they had ceased to be distinctive and distinguishable (Nowotny et al. 2001:1).

Interestingly, they referred to a point made by Bruno Latour in presenting this argument (Nowotny et al. 2001:2), more specifically, that the "culture of science" was shifting towards a "culture of research" (Latour 1998). However, while Latour pointed to this shift as involving a new role of scientists as they were participating in "collective experiments" and "political" processes, this shift for Nowotny et al. was described as a move away from scientists who "saw their task as the benign reconstitution of society according to 'modern' principles" towards a science being generated in a context of application and concrete problem-solving, with an emphasis on creating "robust" knowledge (ibid. 2, 166ff).[64] In other words, the potential of transgressive knowledge presented here concerned its performative potential in concrete contexts of application. Accordingly, disciplines in this

view were no longer adhering to institutions like the university, but "increasingly distributed across more heterogeneous knowledge environments." Indeed, Nowonty et al. argued, there was a need to acknowledge that disciplines' "epistemological core is empty" (Nowotny et al. 2001:179). Disciplines in Mode-2 were distributed and shaped by mechanisms of their productive potential of application.

In sum, the preoccupation with interdisciplinarity and transdisciplinarity emerged with new force around the turn of the millennium, but in relation to a new set of problems and solutions that stressed the possibilities of transgressing established arrangements of knowledge production and education in order to foster effective industrial innovation and problem-solving. As the next chapters will show, these tendencies to focus on the need for transgression and its productive potential for industrial innovation have also characterized the configuration of interdisciplinarity in Danish high school education since 2005.

Conclusion

In tracing this genealogy of interdisciplinarity, I have sought to challenge the immediate sense that interdisciplinarity is somewhat new and fresh. Rather, it should now be clear that it has – at least – a century-long history. Routing through this history reveals that interdisciplinarity has a diverse and contingent character: The notion has been invoked in a wide range of contexts and in various problematizations of prevailing disciplinary arrangements. This chapter thus enables us to appreciate the contingent character of interdisciplinarity, and its ability to translate from one set of problems, possibilities and specific arrangements into another. My point here is that rather than assuming that interdisciplinarity can be defined and characterized once and for all, we need to acknowledge that the character of interdisciplinarity can be very different, and that in order to understand what it is doing, we need to take a closer look at its specific configurations - a task I will undertake in the case of Danish high school education in the following chapters.

On the other hand, however, this genealogy also shows that the notion of interdisciplinarity is not a blank slate, but rather a loaded concept endowed with specific qualities and dispositions. This chapter's examination of how the notion of

interdisciplinarity emerged and has been successively applied in different practical and intellectual contexts over the last century provides a clearer picture of just what has been invested in this concept, its trajectory and development, as well as the aspects that have lost their relevance. In other words, this genealogy brings to light some of the traits and attributes that have been attached to the concept of interdisciplinarity as well as the dislocations, new allies and specific institutional arrangements. As will soon be clear, one needs to be aware of how this notion has developed to understand just how interdisciplinarity emerged and was appropriated in Danish high school education and what stakes and translations were involved.

Tracing out the emergence of the notion of interdisciplinarity, I have pointed to the significance of the writings and activities of John Dewey's in making the problem of the division of disciplines a matter of concern in US education and research. Although contemporary discussions of interdisciplinarity largely disregard Dewey's works, his problematization of disciplines in relation to the Laboratory School at the University of Chicago and the proliferation of his ideas in the following years, offers a new understanding of how it might be that the agenda of interdisciplinarity emerged as a leitmotif in the newly established American research councils and proliferated as a model for the arrangement of research in the US from the 1920s. Pointing to Dewey's problematization of disciplines and his proposal for an alternative "New Education" as part of this genealogy, I am thus arguing that these events need to be included in our understanding of why the concept of interdisciplinarity emerged in this moment in the USA.

The ideas and practical arrangements that Dewey proposed as part of his problematization of disciplinary arrangements, however also serve as a backdrop for grasping how interdisciplinarity has transformed over the last century, and indeed, as we shall see, how they changed form when they were appropriated in Danish high school education.

First of all, I have shown that Dewey's problematization of disciplines involved an ideal of unity and coherence connected to his emphasis on self-directed forms of inquiry in education, as well as the aim to foster reflective thinking and cooperatively minded individuals for society. As discussed above, Dewey emphasized the need to physically arrange laboratories and study rooms to promote the different kind of disciplining. And he

pointed to the problem as a technique for a self-directed inquiry, which he later advanced as a method of democracy. It is important to note that Dewey's visions for a New Education also entailed a series of concrete critical points about the arrangement of education in schools, including not teaching young children knowledge that was too abstract, using ready-made materials, giving standardized courses that assume everyone learns at the same pace and disciplining in ways that encouraged students to conform to given norms. Dewey's metaphor of the sausage machine encapsulates this fundamental rejection of a standardized learning process with definite learning objectives and directly applicable outcomes.

While one must consider Dewey's writings and activities concerning the laboratory school in order to understand how the notion of interdisciplinarity emerged, one must also note how this notion became loaded with new meanings as it was seized and appropriated for different practical and intellectual agendas. I have argued that the Unity of Science movement played an especially important role by giving new impetus to the prospect of unifying the sciences in the 1930s. I have additionally shown how the movement crossed paths with the groups around Dewey, and pointed to the interdisciplinary arrangements of the Macy conferences that paved the way for the theory of cybernetics. These theoretical endeavors were deployed in both the natural and the social sciences, subsequently inspiring some of the French intellectual discussions on interdisciplinarity. Both these streams of thought reflected an effort to develop the languages and methods that could allow domains normally treated separately to intersect and even interconnect.

Taking this genealogy along a particular route from the USA to the engagements surrounding Latour's analytical approach, I have also pursued an interest in the interdisciplinary assumptions underlying Latour's analytics of a network of translations. This pursuit was intended to create a basis for understanding the parallels and affiliations between the analytical dispositions of the sociology of translation and the discourse on interdisciplinarity in Danish high school education. As such, the chapter represents the first step in considering how preoccupations with interdisciplinarity in the social sciences interrelate with the politics of education, creating the basis for contemplating the predicament of the social sciences as regards their role in a continuous re-organization of knowledge-making. Unlike the assumption made in some fields of social analysis, I am thus not approaching intellectual conceptualization or theory as something divorced from

practice or something whose effects can be positively foreseen. Rather, what this chapter serves to show how theories and ideas, such as interdisciplinarity, are entangled products of specific historico-practical processes, and thus also prone to being mobilized and translated into unexpected arrangements.

Following the emergence and proliferation of the notion of interdisciplinarity in France, I have shown that its surfacing was connected to ideas also circulating in the USA. Yet, in France, the notion also became part of a different problematization of disciplinary arrangements surrounding the events of May 1968. This problematization involved a discussion of disciplines as mechanisms of modern capitalist arrangements, and came to implicate a motif of breaking with prevailing disciplinary arrangements and transgressing established categories. I have suggested that Latour's approach to science and technology as networks of translations resonates with this transdisciplinary drive that inhabited the French social sciences of the time. Yet, as I have also shown, it was prone to being mobilized for rather different purposes, appearing in debates on the new productive potentials of transdisciplinarity around the turn of the millennium.

Equipped with this understanding of the emergence and translations of the notion of interdisciplinarity in the USA and France over the last century, we attain a basis on which to recognize how interdisciplinarity was be taken up and translated in Danish high school education. As we shall see, there are strong parallels between the debates on interdisciplinarity in Danish high school education and in the social sciences and education in the USA and France, but concepts, techniques and theories were also radically transformed as they moved and became incorporated into specific arrangements, where other – often unanticipated – factors were also vital to the specific configuration of interdisciplinarity. I will now proceed to the next route and trace how interdisciplinarity has emerged and been reconfigured in Danish high school education.

Part I

Reconfigurations of interdisciplinarity in Danish high school education

Reconfigurations of interdisciplinarity in Danish high school education

Introduction

> The school is itself a society *en miniature*, and therefore it is crucial that the young also in this society meet the democratic tradition and learn that their understanding of what is the truth should not be dependent on the teacher's authority, but must be grounded in their own experiments and inferences.
>
> *The New Gymnasium, Danish Ministry of Education 1960*[65]

> Comprehensive and rapid changes in technology and science create new areas of knowledge and skills that need to be included in the goals and framework for the [Danish upper-secondary] education - for the disciplines and for teaching. They increase the need for developing the ability to work independently, both individually and in teams across disciplines and subject areas. Also, increased internationalization in relation to technology, economy, science, culture and education means that a restructuring of the [upper-secondary] education, the development of a new educational standard and relevant competences that match the needs in a Knowledge Society are essential to make Denmark [a] leading [country]
>
> *Danish Ministry of Education 2003*[66]

In 2005, an extensive reform introduced interdisciplinarity as an explicit principle for organizing Danish high school education. Under the terms of a political agreement made in the Danish parliament in 2003, this reform established interdisciplinary "study programs," courses, subjects and exams. This reform introduced interdisciplinarity – or what in the policy programs was formally dubbed 'the interplay of disciplines' – as part of a call for a new educational standard directed at students' competences, and stating that innovation and an entrepreneurial outlook was a much needed response to a situation of competition in a global knowledge economy (Undervisningsministeriet 2003a:1).

The reform primarily targeted "det almene gymnasium," the general Danish high school education with subjects corresponding to university disciplines. Other preparatory programs, including business and technical educations, had already been reformed in 1995, it was argued (Undervisningsministeriet 1999:3, Undervisningsministeriet 2003a:6).

Yet, this was not the first time Danish politicians and educators had been preoccupied with interdisciplinarity in Danish high schools. Indeed, the notion of the "interplay of disciplines," as I mentioned in the introduction, had appeared in an earlier reform program enacted in 1960; a reform program which formally introduced interdisciplinarity in Danish high school education. At that time, the calls for interdisciplinarity and educational reform were drawing on the progressive ideas of American philosopher John Dewey and his emphasis on education as a means of democracy and critical thinking (Undervisningsministeriet 1960:24). Indeed, the reform program introducing interdisciplinarity was called "Det Nye Gymnasium" [*The New High School*], a thinly veiled reference to Dewey's vision of a "New Education" first described in his book *The School and Society* (Dewey 1899:16).

Dewey's ideas also played a central role after 1968 when a new movement of young educators engaged with the idea of interdisciplinarity as part of a preoccupation with re-defining the premises and organization of education (cf. Illeris 1974; Berthelsen et al. 1977). At that time, however, they associated interdisciplinarity with a critique of disciplines for reproducing bourgeois knowledge and a vision of emancipation through experimental pedagogies, epitomized in the technique called "problem-oriented project work."

In the three chapters to come, I pursue a genealogy of interdisciplinarity in Danish high school education since its first formal institutionalization in 1960. More specifically, I trace the reconfigurations of interdisciplinarity in relation to shifting problematizations of disciplinary arrangements. The aim is to elucidate the particular arrangements of its current configuration by way of historical excavation and comparison. As such, the analyses in these chapters are inspired by Michel Foucault's genealogical method as a way of interrogating the present order of things, but they also draw on Bruno Latour's emphasis on displaying the translational processes implied in a given phenomenon, in this case the configuration of interdisciplinarity around 2005.

What I am presenting, then, is a rather local genealogy of interdisciplinarity aiming to illuminate how previous engagements with interdisciplinarity created the specific conditions for the current configuration of interdisciplinarity in the Danish high school. In particular, it aims to show the path-dependency and historicity of the ideas, techniques and practical arrangements that were figuring in the configuration of interdisciplinarity in

Danish high school education after 2005. As we shall see, this allows for at better view of what has been displaced, translated, lost and added, when we move on to Part II and the day-to-day arrangements through which interdisciplinarity is governed in practice.

Thus, the next chapters represent the second *re-routing* endeavor of the thesis, aiming to complicate and compare so as to grasp a view of the particular character of the arrangements of interdisciplinarity. This route takes up the tread from chapter two, showing the influence of John Dewey on the configurations of interdisciplinarity, but also the translations of these ideas and techniques as interdisciplinarity was incorporated in new arrangements and manifested in specific ways. As we shall see, the chapters also echo what I in chapter 1 referred to as the rise of a new potential of transdisciplinarity, that is, an arrangement of interdisciplinarity that couples the drive to transgress and confront prevailing disciplinary arrangements and categories with agendas and techniques of productivity and performance efficiency. As such, they offer a view into the shifting configurations of interdisciplinarity Danish high school education in this period and the subtle translations and displacements of progressive ideas and techniques, while at the same time displaying the parallels of these with broader tendencies in knowledge-making and educational governance.

Methodologically, the chapters draw on the tradition of historical sociology (Dean 1994:1). They build on an archive spanning policy programs and reform papers, journals and pamphlets published by the Danish Ministry of Education and the union for high school teachers [Gymnasieskolernes Lærerforening], high school yearbooks with curriculum plans; debates on interdisciplinarity in educational journals and books; high school teaching materials on interdisciplinarity; and newspaper articles on interdisciplinarity and pedagogy.

This heterogeneous body of literature reflects my interest in the debates surrounding the engagements with interdisciplinarity and in the concrete techniques and practices through which interdisciplinarity was supposed to take place. The archive was developed in phases, first through a search for the different points of emergence of interdisciplinarity by focusing on how the practical techniques and semantics of interdisciplinarity had changed over time. Subsequently I attempted to recover the relations of what began to come into view as specific configurations, seeking to situate them in specific moments, places and thought collectives so as to contemplate their

conditions. I primarily used the search engine of the Danish Royal Library, which holds all material published in Denmark, but I also obtained policy papers or pamphlets from the library of the Danish central administration [Det Administrative Bibliotek] and the library of the former Danish Pedagogical University [Danmarks Lærerhøjskole] now Aarhus University.

The story begins in 1957 with a letter to the Social Democratic Congress.

2. The New High School

Unity, democracy and independent thinking in 1960

In January 1957, 79 Danish intellectuals sent a letter to the yearly congress of the Social Democratic Party about the need for a debate, which would critically consider the structure, aims, contents and methods of the Danish education system:

> We feel a need to approach you with this inquiry, as we feel unsafe about the future. We find that, despite progress in some areas, Denmark is in danger of stagnating in many other areas. The massive technical and scientific upheaval that is under way can endanger human beings if it is misused. The technical development has caused increasing production and has freed the vast majority of the population from material distress. Regardless of the general rise of democracy, however, the vast majority has a sense of powerlessness to the mighty engineering-economic-political machinery that human beings themselves have created, but which they feel they can not overcome and master. […]
>
> It is crucial to have a school debate, which is not limited to teacher organizations and parliament, but reaches the entire population. The case of education is a case for the entire society, and there is reason to draw attention to the great social and human importance that a unity school would have. Not only the structure of the school, however, but its aims, content and methods, should be subject of critical consideration. (Højby et al. 1957)[67]

Amongst the 79 signing the letter calling for a "unity school" was high school rector, member of the Social Democratic Party, Sigurd Højby, who later over a 15-year period became the director of the Ministry of Education. The list of signatures also included Mogens Pihl – a high school teacher and later professor of physics; Hal Koch – an influential theologian; and Georg Christensen - a progressive professor of pedagogy and head of Denmark's Teacher's College. These people were part of a broader collective who since World War II had been preoccupied with issues of democratization through education. In different, but significant ways, each of them had been problematizing the existing structure of education and its educational methods. Their efforts came to mark the first institutionalization of interdisciplinarity in Danish high school education.

In the year following this congress of the Social Democratic Party, a reform of the Danish high school was enacted in Parliament (Undervisningsministeriet 1960:5). The passing of the 1958 high school reform was the outcome of a long and hard political fight (Østergaard 1967:32).[68] It marked a social-democratic engagement with creating "equal access" to education, or "democratizing education" in the words of Hal Koch (cf. Ungdomskommissionen 1949:7, 1951:36).[69] This reform involved abolishing the middle-school [mellemskole], which was identified as segregating the pupils (Undervisningsministeriet 1960:15). And it followed years of discussion of the prospects of creating one integrated and less differentiated educational institution – a "unity school" – to promote equality in society through education (cf. Arvin 1945:43, Pihl 1945:12).[70]

The 1958 reform was supported by the Minister of Education from the party *Radikale Venstre*, Jørgen Jørgensen, who appointed the former head of the union for high school teachers and high school rector Sigurd Højby as officer of the high school department in the Ministry of Education. Højby, who had also been vice-mayor from the Social Democratic Party,[71] headed the board writing the recommendations for the concrete reform program (Undervisningsministeriet 1960).[72]

In 1960, Højby and his group presented a white paper with the ambitious title "The New High School" [*Det nye Gymnasium*] (Undervisningsministeriet 1960). This white paper outlined a new structure, new aims, new subjects and new curriculum plans. The new structure with lines and "branches" in the 3-year high school education represented the first restructuring of the Danish high school education since 1903 when the high school [*gymnasium*] was legally connected to the Danish public school [*Folkeskolen*] (Lov om højere Almenskoler 1903:172). This white paper also introduced the concept of interdisciplinarity for the first time in official Danish high school policies. In 1963, with the introduction of what was then called the Branch High School, this program came to apply as policy, and interdisciplinarity was now officially a part of Danish high school education (Undervisningsministeriet 1961).[73]

With this chapter, I examine the configuration of interdisciplinarity in Danish education emerging with this reform program of 1960. I am interested in what broader problematization of disciplinary arrangements this preoccupation with interdisciplinarity was part of, but also in the practical, technical and material arrangements through which interdisciplinarity was supposed to take place.

I. The problem of specialization and differentiation

Although this reform program was not revolving around the idea of interdisciplinarity, the aims, contents and methods proposed for the Branch High School reflected a problematization of prevailing disciplinary arrangements. Introducing a branch structure was itself described as a way of avoiding too early specialization and segregation of the students, and aimed to emphasize "general education" by creating "one common line" (Undervisningsministeriet 1960:21). The branch structure consisted of two lines in the first year: a humanist-language line and humanist-mathematical line, with the option of selecting different branches in the two last years. Social science was launched as a new subject,[74] and the natural sciences and the social sciences were each introduced as branches of the last two years. This structure was supposed to take into consideration the "disadvantages of a too early choice of occupation" while also taking into account that "differentiation and specialization should not occur too late" (ibid. 21).

The reform program presented specialization in high school disciplines as connected to a broader question of specialization and differentiation, which it argued to be problematic for a democratic society:

> A population composed of specialists, who consider the surrounding world from narrow academic perspectives without knowledge of and understanding for the conditions and views of the rest of the population, do not have the right preconditions to carry on society in collaboration, following democratic principles (Undervisningsministeriet 1960:16).[75]

The problem of specialization in disciplines was thus related to a wider problem of the high school's role in fostering an elite population whose "narrow academic perspectives" prevented them from understanding and collaborating with the rest of the population (ibid. 16). Moreover, too much specialization in disciplines, it was argued, did not leave sufficient time for "independent" and "personal" learning, and it hindered the realization of "a certain unity in the teaching of the high school" (Undervisningsministeriet 1960:24).

This critique of specialization was also reflected in the new definition of the aims of high school education. These aims reiterated the two aims from the founding of the high school in 1903,[76] namely, the aim of giving "students a continued higher general

education," and to offer "the necessary foundation for further education," i.e. preparing students for university education (Lov om højere Almenskoler 1903:173:§3). They were nevertheless modified in significant ways. First of all, the notion of "higher" was deleted from the aims of what was in the 1903 law called "higher general education." Secondly, specialized knowledge was now presented not as an end in itself, but rather as a "valuable contribution to general education" (Undervisningsministeriet 1960:20).[77] In this way, this redefinition of aims confronted the emphasis on acquiring detailed specialized knowledge of the human sciences that been prevalent in high school education since the first definitions of aims of the Danish grammar school, and the appraisal of 'specialized science' (Ny Collegial-Tidende 1845:721).

Moreover, the very notion of "general education" was now defined as a matter of "*general humanism*" highlighting an "overall perspective," which high school teaching was supposed to engender; a "unity" in the way of relating to the world, which makes students capable of "independent action and evaluation" (Undervisningsministeriet 1960:21).[78] The emphasis on *general humanism,* thus, underlined the need for cultivating an attitude that would foster independent action over the importance of specific subject matters:

> It is clear that the word general education does not cover a once and for all determined content. Perhaps here it would be more reasonable to talk about a general humanism, characterized by a certain understanding of unity in relation to the way in which human beings relate to cultural life and to nature. Bringing forward parts of this overall perspective is part of a process of maturing the young people so they will be capable of independent action and evaluation, and prepared to live in a world of open possibilities of development (Undervisningsministeriet 1960:21).[79]

This emphasis on *general humanism*, the reform program stated, could not avoid lowering the quality and standards of teaching: "Such a unified image of man's place in the world cannot reasonably be given to the individual student without the intellectual quality suffering," it was contended (Undervisningsministeriet 1960:21). And whilst some degree of specialization and differentiating was said to be inevitable, the point was that it was "crucial that a specialization and differentiation takes place in such a way that the student will not get the impression that limited areas are satisfactory or sufficient in understanding the human condition (ibid.).[80]

The introduction of interdisciplinarity was connected to this redefinition of the aims of high school education as a question of *general humanism*. Interdisciplinarity was described as a way of engendering "a certain unity in high school teaching" and "independent" learning (ibid. 24). Under the headline of "collaboration between the disciplines," interdisciplinarity was presented as a response to the problem of the division of teaching into specialized disciplines or subjects.

> The division of teaching in disciplines [may] have the effect that the students do not understand that there is a certain connection between the disciplines – a certain unity in the teaching of the high school. (Undervisningsministeriet 1960:24)

The reform program presented this problem of specialization as an outcome of the specialization of high school teachers, who were trained in university disciplines. These specialized teachers, it was stated, would often "apply [their] disciplinary specialization" (ibid. 24). Even though specialization was connected to an "eagerness of the teachers in achieving something excellent," and in this way "laudable," "it may also have unfortunate consequences" (ibid.). Such specialization of high school teachers was not only said to compromise the unified attitude of the student, representing the "danger that threatens the unity of high school teaching;" it was also said to risk leading to such extensive demands in all the subjects that there is not enough time for "comprehension of the material." Such comprehension, it was argued, "presupposed learning in a reasonable tempo and in an independent and personal way by the students" (ibid.).

Interdisciplinarity was one of a series of new "forms of teaching and working" arrangements proposed with this program that were described as a way of stimulating the students' active participation and independence (ibid. 155). An independent attitude, it was contended, was not encouraged through lecturing and classroom teaching, but required work forms other than ones involving the students' passive appropriation of what the teacher presents as the truth. "The teaching and work forms used in the high school should become as varied and independence-encouraging as possible," it was stated, "and the work should be organized in ways that allow the students to acquire the freedom and independence in their work that corresponds to their maturity" (Undervisningsministeriet 1960:26).[81] Indeed, the teacher "should seek to arouse a critical sense, and give the students the opportunity to discuss, so they got out of the habit of

passively appropriating what was pontificated from the teacher's desk" (ibid. 26). Other work forms described as having prospects of developing a unified and independent attitude in the students included laboratory work, source studies, excursions, common hours and group work (Undervisningsministeriet 1960:25, §19). Laboratory work, for example, was said to have "previously been carried out in the high school, especially in Physics and Natural Science where it had been "very valuable and was therefore recommended for a range of disciplines," including the "human sciences" (Undervisningsministeriet 1960:155).[82] In particular, it was suggested that schools established a "humanistic laboratory", whereby the library was "decentralised" to "bring the students closer to the books" (Undervisningsministeriet 1960:151).

In other words, the emergence of interdisciplinarity in this reform program was part of a broader problematization of prevailing disciplinary arrangements, which confronted the specialization and differentiation in education and aimed at fostering a more unified outlook – a general humanism. Interdisciplinarity was one of a series of new methods and arrangements proposed to replace authoritarian teaching arrangements and encourage students' independent thinking and evaluation.

II. Democracy and education

An important aspect of the problematization of specialization and differentiation in the reform program of The New High School was the vision of democratizing through education. This vision of democratization both involved concerns with differentiation in the educational system and the concrete content, methods and arrangements of education.

On the one hand, democracy was presented in relation to the question of giving access to education: "All the young who have the necessary abilities, whatever their social status, must be given the same opportunity to undertake a higher education," it was declared in the policies of 1960 (Undervisningsministeriet 1960:16). This related to the argument often presented at the time about evading "social discrimination," which was seen to be inevitable as long as large parts of the population were leaving the education system at the age of 14-15 (Andresen 1962:105). But it also involved an idea of economic growth following from educating larger parts of the population, referring to Swedish psychologist Torsten Husén's point about "mobilizing the reserve of talent" (Andresen

1962:105, cf. Ungdomskommissionen 1949:34).[83] This understanding of democratization involved a politics of expanding high school education through investments in new buildings, and the uptake of students in the high school, which was already increasing considerably in those years from 8,300 in 1951 to 20,000 in 1961 (Højby 1962:56).

The vision of democratization also concerned the aims and methods of education. "As everybody, according to the democratic principles, should have the same rights and obligations in society, it is a task of the school to prepare the students to understand and undertake the obligations and values and defend the rights of society," it was argued in the reform program (Undervisningsministeriet 1960:17). This was said to require the introduction of new subjects that could provide the necessary impetus for a critical consideration of public matters. While introducing social science as a separate subject had been on the agenda for proponents of progressive education since the mid 1940 (cf. Carstens 1952, and see also Mønsted et al. 1945:136ff), this was now realized through this reform. Other new disciplines followed, replacing the existing syllabus of Religion, Danish, English, German, French, Latin, Classics, History, Math (cf. Holte 1932):[84]

> The individual should be so familiarized with biology, geography, history, economy, social relations and the functions of society that they have the necessary basis to critically consider public matters and resist propaganda by understanding its real intentions (Undervisningsministeriet 1960:17).[85]

In addition, the reform program emphasized the need for a more direct effort to teach what it means to be a democratic citizen: "It is very important that the school teaches the youths to understand the value of living in a society that protects the personal freedom of the individual citizens, and that they will work in a society founded by the rule of law," it was contended, followed by the observation that "if these benefits are to be maintained, the school must seek to develop the students' interest in problems of society and their ability to critically and independently evaluate problems" (Undervisningsministeriet 1960:18).[86] Developing students' critical and independent evaluation of problems of society was thus part of educating students "in a democratic manner." (Ibid.) Such democratization was presented as entailing students' involvement "in the regulation of the life in the school and the arrangement of its activities" (Undervisningsministeriet 1960:18). "Thereby," it was argued, the students would "in practice learn to respect others'

opinions and take responsibility as well as understand that one has to deal with the consequences that follow from taking decisions" (Undervisningsministeriet 1960:18). A high school was thus presented as more than a place for teaching a number of subjects. It was a small society where important aspects of being a democratic citizen were rehearsed:

> The school in itself is a society *en miniature*, and therefore it is essential that the youths in this mini society also encounter the democratic tradition and learn that their understanding of what is true should not be based on the authority of the teacher, but rest upon their own examinations and conclusions, and that rules and directives should not inhibit but, on the contrary, ensure a free debate and a feeling of co-responsibility (Undervisningsministeriet 1960:18).[87]

The inspiration from John Dewey's writings on the school as a miniature community that could act as an embryonic society is pronounced in these recommendations (cf. Dewey 1899:28). Indeed, there were traces of Dewey's democratizing program in the new aims, contents and methods of the New High School, in the emphasis on unity, self-directed work forms such as laboratory arrangements, and not least in the duo of a critique of the division in disciplines and the emphasis on the importance of engaging with problems.

The emphasis of this reform program on democratizing through specific arrangements of education was of course not the first such engagement. Indeed, this reform cannot be seen isolated from the myriad of efforts to emphasize alternative forms of disciplining in Danish education more broadly.

In particular, these reform efforts were connected to a movement of progressive or "reformist" teachers in- and outside Danish high school education. This movement germinated in the 1920s,[88] taking inspiration in American experiments such as the Dalton Plan[89] and the Winnetka Plan, which were also drawing on ideas of John Dewey.[90] These reformists were not only inspired directly by Dewey's writings, but also taking inspiration in German, Austrian, Swedish and Norwegian progressive educators and works in the field of experimental psychology, often aligning these ideas with the nationally oriented projects of Danish theologians and educational reformists N. F. S. Grundtvig and Chresten Kold, who emphasized aims of non-instrumentality through the notion of education for life (cf. Mønsted et al. 1945:218ff). This movement had already made an impact in high school policies, for example with the introduction of principles such as "self-activity" in 1935.[91] The Second World War gave a new impetus to these pedagogical issues, and self-printed

pamphlets with messages of "creating independent, thinking and open human beings who understand the significance of cooperation" were distributed through societies such as the Free School and Society for a Liberal Minded Cultural Battle (Nordentoft 1939:3, cf. Kolstrup 2002).

Sigurd Højby himself had been agitating for the need to foster equality through the restructuring of the education system in the context of World War II.[92] And professor of theology and social democrat Hal Koch had played an active role in these debates on democracy and education during the war years (Ross 1942:112), speaking at students' meetings about how "the crisis of democracy" was not a crisis concerning systems, but "education [opdragelse];" an argument that he later developed in the book *What is Democracy* (Koch 1945a, cf. Koch 1945b, Koch & Ross 1949, cf. Nielsen 2013:110ff). Equally, high school lecturer and later professor of physics Mogens Pihl, who also contributed to the 1960 reform program, had during the war in numerous debate pieces in the union magazine for high school teachers argued for the importance of independence, critical thinking and relativism in high school education, calling for "doubt" as the basic element of education (cf. 1941a:27). Pihl declared that he thus took a "reactionary" stance on the debate on education [opdragelse], which he found otherwise to build on a false distinction between "character training" and the "imparting of knowledge" (1941a:28). For Pihl, "truth is only relative – a method if you wish – and must continually be revised. The doubt that others refuse, is for us the means by which we help ourselves and our students to seek the truth, which after all may never be reached" (1941b:313).

By the end of the Second World War, the idea of the need to foster more democratically oriented and independent students by experimenting with new work forms had proliferated, particularly in the Copenhagen area (cf. Arvin 1945:38, Brøndsted 1945:34, Christensen 1952, Højby 1944, Nordentoft 1945, Mønsted et al. 1944, Samraadet 1948:34).[93] At this time, notions of unity and independence as well as the problem of the division into specialized disciplines emerged as part of a critique of ways of organizing education that aimed at memorizing details for the exam, which was said to "stifle independent thinking," as opposed to teaching general ideas aimed at training the character (cf. Mønsted et al. 1944:4, Arvin 1945:43). Indeed, these collectives were arguing for a redefinition of "independence," connecting the notion to "self-activity" through educational methods such as "study circles" and thus confronting the

encyclopedic approach to knowledge of the 19th century that had related the notion of independence to 'a study of the specialized science' (Brøndsted 1945:35, Ny Collegial-Tidende 1845:721).[94] The problematization of specialization in disciplines as well as the emphasis on independence that characterized the outline for a New High School, thus, reflected the preoccupation of a reformist movement with democratizing education.

In particular, it was connected to the activities of a collective of high school teachers and rectors primarily from Aurehøj and Øster Borgerdyd High Schools in the Copenhagen area, who had formed a reading group (Hastrup et al. 1958:i). Several of the ideas and techniques that appeared in the outline for a new high school in 1960 reiterated points presented in a debate book published in 1958 called the *Task of the High School* authored by this collective (Hastrup et al. 1958). This book, which in a newspaper review by a high school student was described as very progressive and promising (Kaufmann 1958). This book not only emphasized the need for students' "independent work with the material," [95] but it also rejected what it called the "encyclopedic" idea of education, which assumes that one can approach "the complete," which it argued cannot be upheld considering the current "degree of differentiation and extent of knowledge today" (Hastrup et al. 1958:12-13). This book also emphasized the importance of "freer forms of work," and new work forms such as "experiments" and for the need to "activate of the students" through "independent work with the subject matters" later appearing in the reform program (Hastrup et al. 1958:13,39). Moreover, it proposed a rearrangement of the classroom, "whereby the teacher's desk is leveled with the students'" (ibid. 40), as well as arguments for reorganizing timetables, as current structures were said to "mechanically cut up connexions in arbitrary small bits" (ibid. 18). This book also stressed the benefits of introducing interdisciplinary conferences so as "to harness the connexions to other disciplines" (ibid. 24).

In other words, the introduction of interdisciplinarity in Danish high school education was an outcome of part of a wider problematization of disciplinary arrangements enthused by a group of progressive intellectuals and teachers preoccupied with democratizing the education system and its educational methods in the years following World War II. And indeed the progressiveness of these plans were not unequivocally welcomed, but among other things critiqued for having a too strong

emphasis on ”culture” (Jacobsen 1960, cf. Pihl 1960b), or for degrading mathematics to being about “developing the phantasy and inventiveness” (Høeg 1960, cf. Jensen 1960).

III. An interdisciplinary orientation

While this reform was not the first to emphasize the importance of methods of teaching, it was nevertheless the most extensive in terms of proposing new educational arrangements, and the first to introduce interdisciplinarity. Interdisciplinarity with this reform program was one among a series of new arrangements and techniques supposed to democratize and engender the new aim of *general humanism*. The reform program presented two arrangements through which interdisciplinarity was supposed to take place. The first was a central coordination of the curriculum plans so as to allow for the collaboration between disciplines, the second was a book on the history of ideas.

“The board has noticed the danger threatening the unity of high school teaching,” it was argued in a section on “the collaboration between the disciplines,” “and to mitigate that danger, the curriculum plans within each discipline are organized in such a way that the disciplines as much as possible support one another and invite for collaboration” (ibid. 24).[96] Such coordination was said to have “previously been common practice” yet, it was emphasized that it was now aiming at encouraging a day-to-day collaboration between teachers of different disciplines to make sure that students did not “overlook the interplay between phenomena in different disciplinary areas” (ibid.).

The other arrangement supposed to “foster coherence and unity” was a book on the history of ideas. Such a book on the history of ideas was a novelty in Danish high school education (Undervisningsministeriet 1960:24). It was described as a response to the “considerable,” yet necessary disciplinary specialization in high school education (ibid. 106). The aim of such a book was to ensure that students would not “lose the historical perspective on past and contemporary problems which is so important for their understanding” (Undervisningsministeriet 1960:24). Indeed, the committee argued for the importance of all high school students to “see the Western culture area […] through one coherent perspective” (Undervisningsministeriet 1960:24). Offering a coherent perspective on the interrelations between human, social and natural sciences was said to “support an interdisciplinary orientation” (106). Indeed, it was asserted that “the students

may have difficulties seeing the connections that may often be between the disciplines," and here a history of ideas would help, given that "any problem only figures in its true perspective when it is considered from its natural conditions and is set in relation to similar thoughts in other areas" (106).[97]

Although the history of ideas was not taught through a course, it was presented as "self-evident that the students can make good use of the book's interdisciplinary treatment of problems in their exams" (ibid. 24). In fact, students' responsibility for engaging with these materials was presented as leading to a "valuable new formation" as "the acquisition of parts of the material […] is entrusted to the students' own initiative" (Undervisningsministeriet 1960:25). In this way, offering this book for all students to read was also presented as encouraging student independence.

It was professor of physics and former high school teacher Mogens Pihl who together with high school rector and historian Erik Lund and theologian Johannes Sløk authored a book for the purpose. This book entitled *The History of European Ideas* was published in 1962, ready for the introduction of the high school reform in 1963, and it figured in the national curriculum until 1988 (Lund, Pihl & Sløk 1964 [1962]). The book was distributed as a gift for each student from the Ministry of Education in the 1960s, and the history of ideas continued to figure on the curriculum plans until the introduction of the new structure, called The Electives High school in 1988 (Grøn 2010).[98]

The History of European Ideas presented an approach to problems of society as ideas relative to specific cultural formations. "Ideas," the authors argued, are responses to problems that are "general for humankind," namely problems concerning "what the world is," and "what kind of creature man is" (Lund, Pihl & Sløk 1964:11-12). "It will hardly be possible to find a culture that is not built upon ideas, which each in their own way offer a solution to these problems" (Lund, Pihl & Sløk 1964:11-12). Ideas were treated as cultural formations [kulturdannelser] that could vary from one culture to the next (Lund, Pihl & Sløk 1964:13).

Discussing themes such as early Christianity, philosophers of the Greek-Roman world, the merging of philosophical and Christian truths in Christianity, and "Man's emancipation" in the renaissance, the book created equivalence and connections between ideas, be they Christian, philosophical or natural scientific facts. It presented Christianity,

the writings of Kant, Hegel and Marx alongside the making of human rights, ending in considerations about relativity in science and culture.

In this way, it presented the foundations for the need to take a relativist position, concerning different societal forms and the solutions to specific problems they were seen to express:

> One could [...] doubt whether it makes any sense to ask *what solution is the right one.* It may be impossible to avoid evaluating the different solutions; one immediately finds some noble and breath-taking, and others inhuman and loathsome, however, in principle one must maintain that this may be a problem that challenges man to solve through an idea, and it would be obstinacy to propose ones own as the only legitimate one (Lund, Pihl & Sløk 1962:13, *emphasis in original*).

Presenting ideas as cultural formations, then, this book offered a relativist outlook from which to question ones own assumptions and truths.

The new high school aim of *general humanism* appeared to underlie not only the arrangement, but also the conclusions of this book. An important discussion in this book concerned the importance of the idea of the "general" [almenbegrebet] to European thought. Characteristic of European cultural development, the authors argued, is the ability to think in terms of the general (Lund, Pihl & Sløk 1962:93). Discussing the concept of the general in Plato and Aristotle, the authors pointed to the roots of this particular line of thinking: The "general," the authors argued, was created through a process of abstraction that makes a concept still more deprived of content, including still more incidents. This process was described as key to achieving scientific accuracy. "One can for instance create the line: Dog, mammal, animal, creature. The scientific classification of things build on these kinds of series of abstraction, and the scientific accuracy appears in the grouping of different incidents in the right way." "The concept of the general and the grouping of things, which this concept has caused," they argued "has granted European culture a world that is ordered in a scientifically tenable way." "This is clear," they remarked "if one compares those groupings that through the contributions of science have become natural for us, with the groupings that so-called primitive peoples make. For them, things can belong in groups that to us are completely incomprehensible because they have paid attention to coincidental and external traits" (Lund, Pihl & Sløk 1962:93). The concept

of the *general* in other words, was presented as contingent on a particular European cultural development and the heart of a specific scientific ordering of the world.

This relativist outlook of the book was also emphasized on the last pages dedicated to carving out and arguing for an orientation called "the European thought." This argument was taking its point of departure in an understanding of culture, which the authors argued was currently gaining ground; "a new attitude," which has "created the possibility of meeting foreign cultures with greater freedom from prejudices than ever before." This, they argued was "truly necessary," given the conditions of change in technical, political and natural sciences (ibid. 360). "Admittedly a long way still lies ahead, as it is a fundamental human attitude to think that only one's own is right and that all else is 'strange' and inferior," they decried, "but despite all difficulties, a new attitude is making its way – an attitude, which the changed conditions make absolutely necessary (Lund, Pihl & Sløk 1962:360).[99] "The European thought" was argued to encapsulate this attitude. It asserted a "respect for the inviolability of the fellow human being, for its right to basic conditions for life with dignity and its free self-determination" (ibid. 361). Together with these ideas, the European "activity," "the tireless striving for new results, the urge to master - through research and other activities - still more areas of life" is what "Europe has to offer a world which is finally fighting for new economic, political and spiritual living conditions" (ibid. 361).[100]

The interdisciplinary orientation promoted through this book, thus, entailed a relativist mode of relating to ones own assumptions and to truth as contingent cultural productions. It translated the notion of general humanism into an argument for a cultural-relativist disposition, emphasizing the importance of a scientific attitude and liberal human rights. The interdisciplinary orientation emerging from this book, in other words, was a humanist, cultural relativist, but also scientific general humanism.

Conclusion

With this chapter, I have examined the emergence and configuration of interdisciplinarity with the New High School reform of 1960. I have illuminated the broader problematization of disciplinary arrangements that interdisciplinarity was part of in this moment, but also unpacked and examined the practical, technical and material arrangements through which

interdisciplinarity was supposed to take place, and which imbued it with a specific character.

First of all, I have shown that the introduction of interdisciplinarity with this reform was part of a larger problematization of prevailing disciplinary arrangements. This problematization, I have shown, was evident in the new definition of the aims of high school education, emphasizing *general humanism.* This new aim implied a critique of specialization in disciplines for their implications for the differentiation of society, but also a problematization of the existing encyclopedian ideals of knowledge and their division of learning. Moreover, it involved a critique of students' passive appropriation of what the teacher presents as the truth. Simililarly, the arguments about the need for interdisciplinarity were directing attention to the need for a general outlook over too much specialization, a unified attitude, and ideas of promoting students' independence. The emphasis on coordinating curriculum and the introduction of a book on the History of Ideas with this reform, for example, were described as ways of fostering "coherence and unity." These techniques through which interdisciplinarity was supposed to take place, can thus be seen as closely related to the reform's aims of fostering *general humanism*. I have shown how in the book on the European History of Ideas, presented a view of problems of society as ideas relative to specific cultural formations, but also presented a view of the *general* as a specific form of thought contingent on a particular European cultural development and at the heart of a specific scientific ordering of the world.

Tracing out the ideas and activities relating to this specific problematization of prevailing disciplinary arrangements, I have shown that the emergence of interdisciplinarity with the New High School reform of 1960 was closely connected to a vision of democratizing society through education. This vision, I have shown, was driven by movement of progressive teachers and education scholars, sometimes called 'reformists,' who were preoccupied with the implications of arrangements and methods of education in fostering a democratic attitude. Since the 1920s, and particularly in the years around World War II, they discussed and promoted an agenda of alternative modes of disciplining, emphasizing ideas of unity and a unified outlook as well as students' independence. I have shown how they were explicitly drawing on ideas and techniques described by John Dewey and his followers, and how many of the ideas published in a book

in 1958 by a collective of progressive high school teachers were appropriated in the reform program of 1960.

Recalling the writings of Dewey's that I presented in chapter 1, also indicates that this reform program appropriated and translated ideas and techniques proposed by Dewey. Indeed, Dewey's emphasis on unity, democracy, the importance of problems, and the training of thought were reiterated in these policies. Dewey's ideas, however, were also translated as they were mobilized into a nation-wide program of democratization, aiming for the integration and homogenizing of the education system. This ambition related to the idea of a unity school, and the aim of creating one school for all from grade 1 to high school.

Moreover, Dewey's ideas of unity, democracy, problems and the training of thought were translated into practical arrangements, such as the coordination of disciplines and the reading of a book on the history of ideas – rather than specific arrangements for students' "self-putting of problems" or a rejection of "ready-made material" (Dewey 1915:151). Indeed, the envisioning of interdisciplinarity as taking place through techniques of coordinating curriculum and through a history of ideas were new inventions. Nevertheless, this book on the History of European Ideas, was promoting a relativist attitude to existing assumptions and truths, not unlike Dewey's emphasis on thinking as a contingent and open-ended process, and the role of doubt as a central principle of knowledge. In sum, what seems to characterize the configuration of interdisciplinarity emerging from the New High School reform of 1960 is this emphasis on fostering a specific humanist orientation – on creating a democratic mode of disciplining through a relativist humanist but nevertheless scientific outlook.

Indeed, this reform program epitomized an era of preoccupation with the arrangements of education and pedagogic experimentation in Danish education. In the early 1960s, 'humanistic laboratories' were established (cf. Nykøbing Mors' kommunale gymnasium 1966:33), and new high schools were built whose architecture could "meet the requirements of the reform" (cf. Vejle Gymnasium 1967:31). Moreover, a new grading scale was introduced in 1963, introducing the notion of independence in the descriptions of the best performances (Undervisningsministeriet 1963, Rindung 1963). Indeed, as we shall now see, this reform preluded a new preoccupation with relation between disciplinary arrangements and society.

3. Interdisciplinarity and society

Critique of disciplines, emancipation and problem-oriented project after 1968

> The Free High School should - through a consequent democracy and a flexible and untraditional structure of the subjects and teaching methods - frame the students' and teachers' personal development and wellbeing. It should inspire their independent point of view and inter-human responsibility and create an understanding for contemporary social conditions and their own relation to these.
>
> The Free High School, February 14, 1968[101]

In 1968, a group of students and high school teachers were working to establish a free high school. Their visions of a free high school heralded a decade of an explicitly anti-authoritarian and emancipatory concern with education, its methods and practical arrangements as a way of intervening in society (cf. Viwel & Nymark 1970). The idea of interdisciplinarity was mobilized as part of this emancipatory engagement with creating freer arrangements of education.

The idea of interdisciplinarity was now seized by a new collective of students and young researchers affiliated with the students' riots, reading French and German critical theory. Some of them were involved in developing the Free High School, which became one of the cornerstones of a new institutionalization of interdisciplinarity in Danish high school education (cf. Det frie Gymnasium 1975:33; 1977:40). And several were preoccupied with describing the pedagogical work forms in relation to the establishment of two interdisciplinarity university centers in the early 1970s. More specifically, they were formulating and developing an explicitly interdisciplinary didactic technique later named "problem-oriented project work" (cf. Illeris 1974; Illeris et al. 1976, Berthelsen et al. 1977, Bernth 1974; Hultengren 1976, 1979; Larsen 1977:54).[102]

This new interdisciplinary technique of problem-oriented project work became the model for teaching at the interdisciplinary university centers (Andersen & Kjeldsen 2015), and in high school education it proliferated through the growing number of experiments supported by the Danish Ministry of Education. Over the next two decades, several thousands of experiments were conducted in Danish high schools (Haue 1998:324),[103] many of which centered on interdisciplinarity.[104] Problem-oriented project work also became key to new experimental high schools initiated by the Ministry of Education in the aftermaths of 1968, accompanying the Free High School,[105] and as interdisciplinary collaboration was now emphasized with a curriculum reform in 1971, interdisciplinary problem-oriented project work became a common way of arranging teaching (Undervisningsministeriet 1971:12).

With this chapter, I examine the configuration of interdisciplinarity in Danish education emerging in the aftermaths of 1968 in relation to the techniques of project work and problem-orientation. I am interested in the broader problematization of disciplinary arrangements that interdisciplinarity now became part of; a problematization which not only concerned implications for democracy, but also the reproduction of bourgeois knowledge and the mechanisms of capitalism disciplines were seen to forge. Although there were clear continuities between the configuration of interdisciplinarity of 1960, interdisciplinarity after 1968 emerged in connection to new problems and solutions, and indeed a new practical arrangement through which interdisciplinarity was supposed to take place.

I. The problematization of disciplinary arrangements after 1968

In Denmark, the years around 1968 were characterized by an explicitly anti-authoritarian and emancipatory preoccupation with education, its methods and practical arrangements. Students active in the student riots of 1968 were confronting the aims, contents and organization of education, not only with a view to the concrete educational arrangements, but as a way of intervening in society (Hansson 2018, Nielsen 2015). In these years, new areas were recognized as fields where authority was exerted. The introduction of the new grading scale – the 13-scale in the universities in 1971, for example, fostered intense discussions on the arbitrary dynamics and implications of measuring performance and disobedience amongst university and college staff (Blume 1971).

While the student riots had been characterized by a critique of the power of professors, storms against existing governmental structures for being undemocratic, and actions against existing curriculum and exams, they also fostered calls for alternative arrangements of education. As expressed in a publication by the Danish Student's Council [Danske Studerendes Fællesråd], there was a need for a "positively formulated" "alternative" to what was called "bourgeois science:"

> What is needed – along with the critical and thus negative strategies - is to build up positive theories that can serve as a foundation for an alternative practice [...] More concretely: What must be developed is a didactic practice that connects to the present and future situation of the working class, and a corresponding didactic theory and sociology of consciousness. (Olesen 1972:196-197)[106]

The student expressing this was Henning Salling Olesen, who was employed in the new interdisciplinary Roskilde University Center in 1972 at its establishment. Such an alternative arrangement, Olesen argued, would presumably "break up" both the human sciences and the academy itself, but he saw that as a "necessary goal" for the kind of "discipline-critical work" they were engaged in (Olesen 1972:197).

Two years later, another student, Knud Illeris who had also been involved in establishing The Free High School (Det frie Gymnasium 1971:145) developed exactly such a discipline-critical didactics in his master's thesis, *Problem orientation and participatory governing: proposal for an alternative didactics* (Illeris 1974). With this didactics, Illeris was confronting disciplines for passing on "fundamental dogmas of capitalist society," not only reproducing a specific truth, but spawning a specific world order, as he later described it (Illeris et al. 1976:8).

Illeris took his point of departure in American pragmatist John Dewey's critique of disciplines. For Illeris, Dewey's program "rejected the selection [of material for teaching] based on scientific disciplines and problems." Illeris argued that there was a conflict between arbitrary disciplines and the individual experience, drawing on Dewey's point that "the subject-matter, just as it is for the scientist, has no direct relationship to the child's present experience" (Dewey 1902:22-23, cited in Illeris 1974:156). Like Dewey, he emphasized the prospects of taking a point of departure in a problem, rather than starting out from a discipline and a given tradition of topics and methods. Taking a point of departure in a problem, Illeris argued, "cancels the disciplines as constitutive categories

for the organization of education" (Illeris 1974:67). As Illeris later specified, this was not only to avoid the division of subjects, which were breaking up reality, but also a way of breaking with "fundamental dogmas of capitalist society" by disconnecting from the bourgeois traditions of the disciplines (Illeris et al. 1976:8).

Illeris' idea was, on the one hand, to stimulate "creative qualifications" where the "individual's thought follows untraditional ways, uncovering new connections as you go – where phenomena appear with other possibilities of use and function than they would usually do (Illeris 1974:64). He was drawing on the distinction of psychologist of child development Jean Piaget between assimilative and accommodative learning to argue for the need for a transgressive kind of learning, rather than learning as merely adding on to existing understanding (ibid. 68). Therefore, it was also important that the problem was not decided beforehand:

> If you decide politically in advance what problems should be the point of departure for problem-oriented teaching, and how to work with the problems, then, you may have transgressed the traditional disciplinary boundaries, but at the same time established new ties which in the same way as the old will stand in the way for the accommodative learning which is the premise for developing the intended creativity and flexibility. (Illeris 1974:69)[107]

Yet, Illeris was also inspired by German sociologist Jürgen Habermas' critique of the "technical interest of understanding," of traditional education and his call for the need to develop an "emancipatory interest of understanding" (Illeris 1974:13). Rather than being guided by the question of how students can most effectively be lead to objectives given from the outside, Illeris, then, aimed to develop a didactic method, which incorporated the "relations from the outside" as an aspect of the analysis. He wanted to "give the participants of the education the prerequisites for recognizing the societal function of education" and thus the conditions "for pursuing their own societal and in the last instance class-given interests" (ibid.).[108] Problem-oriented work, thus, aimed at what Illeris called "a radical participatory form," where the student would not only learn something about a problem, but at the same time learns to recognize the societal function of education itself (ibid.).

In this way, Illeris' didactic program of problem-orientation implied a critique of prevailing disciplinary arrangements, not only for breaking up reality, but also for

representing bourgeois traditions that were passing on fundamental dogmas of capitalist society.

A couple of years later, Illeris co-authored a book called *Project work – experiences and practical guidance* with colleagues from Roskilde University Center. Project work, they stated, was a method now deployed "in all parts of the education system" (Berthelsen et al. 1977:14). With this book, they offered instructions on working with the techniques of project work and problem-orientation and examples of existing experiences with project work. Describing project as a "problem-oriented work form," this book built on from the radical participatory prospects of Illeris' emphasis on problem-orientation" (ibid. 206). More specifically, the authors defined "project work" as a "form of teaching where the students – in collaboration with teachers and possibly others – explore and treat a problem in close relation to the societal reality it appears in" (ibid. 14). This focus, they argued, was "opening still wider perspectives and offered more profound understandings." (ibid.)

The book explained in more detail the interdisciplinary character of problem-oriented work. The interdisciplinarity of this method, the authors stated, was connected to the ways in which the problem was to be "approached from a range of different viewpoints across traditional disciplinary boundaries" (ibid. 14). Rather than taking its point of departure in established traditions and conventions of disciplines whose constitution lie far back in the past, "theories, methods and tools" were to be "selected in relation to the problem at issue (ibid.). Interdisciplinarity, then implied the dislocation of the authority of established disciplines, giving these traditions only a secondary role, defined by the problem (ibid. 14, 206).

Moreover, going through the process of problem-solving, the authors argued, could create a more profound understanding in the individual, rather than an "external" understanding, characterizing "teaching that is divided into disciplines or themes" (ibid. 227). Such process, they contended, allowed for the "appreciation the determining underlying structures," by placing it "in relation to the overarching societal context" (ibid.).[109]

A central point of the book was that by dislocating authority from established systems of knowledge to problems in their societal context, project work was also "contributing to dissolving the suppressing corrosion between theory and practice,

between academics and lay people, between science and human actions." In fact, project work was taken as a demonstration "that everyone is capable of building theory and applying it in their everyday life and own societal practice" (ibid. 257).[110]

The emergence of interdisciplinarity in relation to this technique of problem-oriented project work, was thus part of a broader problematization of prevailing disciplinary arrangements, connected to an anti-authoritarian and emancipatory preoccupation with education. Interdisciplinarity was now connected to a radical participatory program, which was seen to create consciousness of the societal function of education and dislocate the authority from bourgeois traditions, and instead allow students to pursue their class-based interests.

II. A freer education

While this engagement with interdisciplinarity as a confrontation with authoritarian arrangements and concerns with its emancipatory potentials was closely related to the student riots and German and French critical activities and theories, it was also conditioned on the preoccupation with democratizing society through educational arrangements arising in the context of the education reforms of 1960 (cf. Hansen 1968). It had now become commonplace to draw a connection between educational arrangements and a democratic society, something which in the 1940s had been presented as mainly being debated amongst a few "revolutionary" psychologists and reform-oriented pedagogues (cf. Samraadet 1948:34).

This new preoccupation with the organization of the teaching situation is illustrated in the publications by the Danish Pedagogic Institute, established in 1954.[111] While publications in the 1950s and early 1960s primarily included standards for teaching and testing (cf. Danmarks Pædagogiske Institut 1955a,b,c 1957), publications from the 1960s began to address experiments, group work and how children make friends (cf. Florander 1960, 1961; Jensen 1961; Florander and Rasborg 1959, 1962, 1965).

Moreover, the rising preoccupation with educational methods was connected to the massive expansion of the education system in those years. In 1966, the government gained a majority in the parliament for establishing a new upper-secondary program, 'higher preparatory exam' (hf), which targeted students for teachers' college and groups who have not had the opportunity to get a high school exam, "making the path to higher education a

broader one" (Folketingsårbog 1966:346; Undervisningsministeriet 1966).[112] And by 1970, one third of a generation graduated from an upper-secondary school and education. In high school education, a new program and exam in pedagogy was introduced in 1961, aimed to strengthen the pedagogical aspects of the existing teachers' training (Undervisningsministeriet 1961:14-15).

The crystallization of the idea of society as an object of intervention was also involved in the new ways of drawing connections between educational arrangements and a democratic society. With the introduction of sociology and social science as university programs in 1958, the idea of society now emerged as an object of systematic study and practical intervention as part of the development of the Danish welfare state. 'Social studies' was introduced as a subject in high school education from 1963, and although many high schools could not offer this subject until the late 1960s when the first teachers had been trained, its introduction as a teaching subject contributed to the "acceptance of the science of human society" along with the natural and human sciences, as the president of the newly founded Institute for Social Research argued (Friis 1961:13). With the establishment of this Institute for Social Research (SFI) the 'social' also became a field of systematic interrogation and problematization. With the Institute's studies of youth and the social conditions of education, the relation between education and society emerged as an area of examination and intervention (eg. Hansen & Jørgensen 1966, Hansen 1969).

In other words, the activist engagements with the emancipatory potentials of pedagogy and didactics were transpiring in a context where the relation between educational arrangements and society was already in question (cf. Hansen 1968, Danske Studerendes Fællesråd 1969). Indeed, the preoccupation with freer arrangements of education was also discussed in terms democratization and an understanding of society as changing.

A handbook for a "freer high school" published in the aftermaths of the student riots is telling of the prevalence of democracy in problematizing educational arrangements. Here two teachers involved in developing the Free High School argued that different ways of organizing education corresponded to different kinds of societies:

> In the middle-aged, authoritatively bound reality, an authoritarian school was appropriate – education would lead the individual to that reality which was allowed. But in the dynamic reality, the school has to be dynamic, if it is to allow its students to use all possibilities and develop along with the new

> opportunities that follow. If it does not do so, the school is an inhibiting body – not solely for the individual but for the entire society.[113] (Hansen & Højmark 1968:19)

New arrangements of teaching, the authors argued, were needed to bring students into "unknown situations" and develop the experimental attitude that was indispensable in a continuously developing and moving society. This thematization of authoritarian work forms and their relation to society, then, also entailed an aim of shaping education in ways that corresponded to "a dynamic reality."

This idea of a dynamic reality also appeared as a rationale in justifications for experiments with interdisciplinarity. In one of the first high school experiments with interdisciplinarity supported by the Ministry of Education in Rødovre State School, a similar notion of acceleration was connected to the justifications for new, freer arrangements of education. This experiment ran for two years, involving 43 teachers and 400 students organizing scheme free days for independent work on an assignment, most of them on an "interdisciplinary topic" (Sinding 1969:130).[114] The teacher reporting about the experiences with this experiment pointed for the need to base arrangements of education in what he called the "ideal of a high school student in a democracy under the law of acceleration." This involves "a scientific principle of free research," so as to "create a type of student who is independent, cooperative, tolerant, flexible and trusting." The teacher argued that such arrangements were opposed to arrangements directed at autocratic societal forms, which "because of its immanent belief in authorities leans towards the static, and create a type of student who is conform, respectful, moralistic, stagnated, with a defensive attitude" (ibid. 129).[115] The potentials of interdisciplinarity, in other words, also circulated in connection to an understanding of the need for cooperative and flexible students for a continuously accelerating society.

In sum, interdisciplinarity in the late 1960s was emerging as part of a preoccupation with education, which assumed a rather direct connection between the practical organization of education and the mode of governing society. But whereas it was mobilized in some branches as a way of dislocating the authority of bourgeois traditions and raise consciousness about the societal function of education it was also circulating in relation to visions of freer arrangements of education seen to correspond to an accelerating society.

III. Raising consciousness

Throughout the 1970s, the techniques of project work and problem-orientation gained grounds as the dominant way of arranging interdisciplinarity. From 1974 to 1981, Illeris' elaborated master's thesis on problem-oriented participatory teaching sold in 20,000 copies and was followed by a new edition in 1981, *The pedagogy of contra-qualification* (1981:vi). Moreover, 'Project work – experiences and practical guidance' (Berthelsen, Illeris & Poulsen 1977) was published in more than 11 editions and translated into Norwegian and Swedish (Berthelsen et al. 1996). These techniques also created the grounds for experiments with interdisciplinary education in The Free High school, which became a central reference point in discussions of high school pedagogy (Det frie Gymnasium 1975:27, Gullberg-Hansen 1975:490). They even appeared in the development plans for the education system towards 1990, initiated by the Ministry of Education in 1975 in connection with calls for interdisciplinarity (Undervisningsministeriet 1978a:78-79).

While different publications and activities differ slightly in vocabulary and scope, the books defining and circulating these methods were emphasizing their emancipatory potentials. The emancipatory agenda of these interdisciplinary techniques involved establishing a specific consciousness in the students, confronting their assumptions by relating them to problems in society. It was connected to a set of procedures, through which the student – the participant – was to be confronted with her own givens by connecting her personal experience to a societal problem and ultimately a capitalist dynamic.

In Illeris' first work, he was specifying the emancipatory potentials of problem-orientation drawing on the ideas of "exemplaric learning" by the German sociologist Oscar Negt.[116] Illeris here emphasized Negt's inspiration from the sociologist C. Wright Mills' concept of "sociological imagination" and his descriptions of "the capacity to shift from one perspective to another – from the political to the psychological from examination of a single family to comparative assessment of the national budgets of the world." The important thing, Illeris argued, was that through this shifting of perspectives the student would begin to "realize the structural connections between individual life stories, immediate interests, wishes, hope and historical events" (Illeris 1974:160).

Problem-orientation for Illeris thus involved the potential of the participant to become conscious of the ways in which her own problems and experiences were connected to problems of a capitalist society. A problem was seen to reflect a "sociological imagination" as it formed a way of imagining society through a shift of perspectives between individual, politics, economy. It was through this process of shifting perspectives and connecting otherwise unconnected fields that individual experience could come into being as an exemplar of a societal problem.

This consciousness-raising potential of the problem was also to be reflected in the topics of problem-orientation, Illeris held. "The topics of problem-orientation should be selected for their inherent possibilities of societal emancipation, which lies in a communication of the connections between the participants' own world of experience and the general societal structures in the broadest sense," Illeris stated (Illeris 1974:168). To achieve the consciousness-raising possibilities of problem-oriented teaching, the topics needed to connect the participants' own world of experience to the structures of society. "The essential thing is that problems for the specific participants in the specific situation qualify for creating a consciousness of society," Illeris argued (Illeris 1974:239). In other words, it was through the selection of the right kind of problem – one that would connect participants' world of experience and the general societal structures – that the potential for emancipation could come about (ibid.).

These ideas of the problem as a device through which personal experience and society were connected also appeared in the later discussions and more instrumental guidelines for project work. In the book *Project Work,* Illeris and his colleagues described problem-orientation as a process ideally involving "confrontational learning," whereby the individual's preconceptions were confronted. Such confrontational learning "can take place when there is an opposition or conflict between our assumptions, conduct and opinions, and the experiences we are having," they asserted (Berthelsen et al. 1977:21). Confrontational learning was described as a challenging and unpleasant process, as "you are unceasingly confronted with conflicts, problems and new realizations (ibid. 245). While this confrontational way of learning was said to be demanding, it was described as essentially bringing about "a qualitatively new and deeper understanding of how things are" (ibid. 21). In this process, the theoretical insights derived from disciplines were becoming "inadequate, as the student is confronting her theoretical presuppositions with

practice" (ibid.). The process of problem-oriented project work, in other words, was ideally a transformative one aimed at confronting the individual's preconceptions.

This aim of achieving a new and deeper understanding of how things are, also meant that not all problems were seen as suitable for project work (ibid. 225). First of all, it was stated, a problem should be interdisciplinary in its outset. Problems were not to be framed within disciplinary traditions, but rather needed in the outset to cross disciplinary boundaries. Project work was said to open "still wider perspectives and offer more profound understandings" primarily because a problem was approached from "a range of different viewpoints across traditional disciplinary boundaries" (ibid. 14; cf. Illeris 1981:99).

The work of "formulating a problem" was presented as a vital part of the process, as this "problem formulation," was seen to ensure that the project was not only asking "concrete questions," which the participants could start examining immediately, but also questions that connected these examinations to "general considerations of the disciplinary and societal structures of the study" (Berthelsen et al. 1977:231). Describing a teaching situation, where the teacher guides the students in finding and formulating a problem, the book pointed to the importance of formulating the right kind of problem. Here, after the students had presented their initial ideas, "the teacher had to point to:"

> "There is not a single problem here – they are all *topics*." And the teacher continued: "But what is the problem?" Why did you select this? What is the problem here? For whom is this a problem? The teacher firmly ordered that all the groups started writing: *It is a problem that...* Slowly the students started understanding and the teacher continued: "It is not enough that there is a theoretical problem, or something you have heard of – how is the problem expressed in reality – concretely? And what does this mean for every single one of you? Do you all experience this as a personal problem for you, something that each of you want to spend time and energy solving? [But] also the problem should be experienced as a logical problem where you can draw the line between your personal motivation and the general concerns of education and society. (Berthelsen et al. 1977:228)[117]

In other words, formulating a problem suitable for problem-oriented project work involved the work of recognizing a topic, which expressed itself as a problem in a concrete way, of which one had an individual experience, but at the same time something which could be articulated in terms of a more general concern of society.

The notion of society in these writings was referring to an idea of "fundamental underlying structures" characterized by "essential contradictions" (Berthelsen et al. 1977:227, 24).[118] It is "important that the students select actual experienced problems with a societal perspective, which gives the possibility for uncovering essential contradictions and relations in different levels of society," it was argued (ibid. 24).[119]

This view of the process of uncovering essential contradictions also had implications for the learning process envisioned to take place through problem-oriented project work. "The task of the student is on the basis of a concrete problem to gather and assemble knowledge in a still higher level, and this way become capable of understanding and acting in still more complicated and antagonistic situations," it was argued (ibid.). In other words, the educational process envisioned to take place through interdisciplinary problem-oriented project work thus involved a process of examining a concrete and personally experienced problem by gathering and assembling knowledge of a still more general kind, uncovering essential contradictions in society so as to begin to understand and be able to act in ever more complicated and contradictory situations.

In sum, the kind of educational process envisioned to take place through this interdisciplinary problem-oriented project work was presented as emancipatory. It implied that through an interdisciplinary problem, a participants' world of experience and general societal structures of society were to be connected and understood in new ways. This transformative aim was connected to a set of procedures for formulating problems in a way, whereby the student would both challenge the conventions of existing disciplinary traditions, confront her individual preconceptions, and gather knowledge that would allow for the uncovering of contradictions in society. Ultimately, this interdisciplinary arrangement was envisioned as making the participant capable of understanding and acting in still more complicated and antagonistic situations.

Conclusion

With this chapter, I have examined the emergence of what I argue to be a new configuration of interdisciplinarity in Danish education in the aftermaths of 1968. I have illuminated the broader problematization of disciplinary arrangements that was part of this new engagement with interdisciplinarity, and while there are clear continuities with

the preoccupation in the early 1960s, I have also shown the novelties and specific character of interdisciplinarity, as it took form in problem-oriented project work.

First of all, I have shown that the new engagement with interdisciplinarity emerged as part of a specific problematization of prevailing disciplinary arrangements in the context of 1968. This problematization was not only related to questions of democracy, but concerned ideas of anti-authoritarian and emancipatory educational arrangements. I have shown how the first formulations of problem-oriented project work combined Dewey's critique of the arbitrary relation between disciplines and the individual experience to the emancipatory programs of Jürgen Habermas, and Oscar Negt's emphasis on exemplary learning. In this way, interdisciplinary problem-oriented project work was not merely a question of creating a more coherent and participatory arrangement of education, but also of confronting disciplines for passing on fundamental dogmas of capitalist society. The idea was to connect a personal experience of a problem with a societal problem in a radical participatory form, where the student was not only learning something about a problem, but also recognized the societal function of education itself.

Tracing out the ideas and activities relating to this specific problematization of prevailing disciplinary arrangements, I have shown the emergence of interdisciplinarity with problem-oriented project work to be closely connected to a vision of creating a freer society through education. While this in the context of 1968 was characterized by an explicitly anti-authoritarian and emancipatory preoccupation with education, I have also shown it to be connected to other visions of fostering independent, cooperative, tolerant, flexible and trusting citizens. In both cases, these engagements were related to the assumption of a rather direct connection between the practical organization of education and the mode of governing society; an assumption that was also circulated through new institutions of pedagogy and proliferated through educational experiments.

The configuration of interdisciplinarity emerging in problem-oriented project work, then, was intrinsically connected to an idea of the social ends of education. While it was clearly inspired by John Dewey's problematization of disciplinary arrangements and in particular by the idea of students' self-putting of problems as central to the arrangement of education, problem-oriented project work was also connected to a more explicit aim of emancipation by creating a specific awareness of society in the individual. It involved a set of procedures, through which the student was to be confronted with her own givens by

connecting a personally experienced problem to a societal problem that allowed for the uncovering of essential contradictions of society. While Dewey had highlighted the outcome of students' work with a problem as a matter of reflective thinking, problem-oriented project work was described as an emancipatory and consciousness-raising endeavor, making students capable of understanding and acting in still more complicated and antagonistic situations. Dewey's ideas, in other words, were translated into quite a specific set of rationalities and arrangements, through which the potentials of arranging education around student's own inquiries into a problem were connected to a specific vision of emancipation by being conscious of the dynamics of capitalism.

Moreover, although there were continuities between the ideas of interdisciplinarity of the 1960 reform program, the new configuration of interdisciplinarity emerging in problem-oriented project work was less a matter of fostering a general humanism, a relativist, doubtful attitude through which students were supposed to independently evaluate truth, and rather connected to potentials of students gaining a consciousness about the relation between a personal problem and problems of capitalist society.

While problem-oriented project work became the dominant method for organizing interdisciplinarity from the 1970s, the emphasis on the emancipatory potentials was not necessarily following. Indeed, in a great plan of education towards 1990 launched by the Social Democratic government, interdisciplinarity and problem-oriented project work were highlighted as new promising ways of organizing education (Undervisningsministeriet 1978a:78). Yet, rather than emphasizing the emancipatory potentials, these techniques were described as vital given the "increased need for competences such as collaborative skills, broad qualifications, independence, creativity and adaptability to changing conditions" (ibid.). This interpretation caused a heated debate in environments concerned with education as a matter of "anti-qualification" (Bjerg et al. 1978, Illeris 1981). The emphasis on the potentials of interdisciplinary problem-oriented project work for business nevertheless foreshadowed the rise of a new preoccupation with interdisciplinarity and problem-oriented project work in the 1990s.

4. Interdisciplinarity for the knowledge economy

Accountability, innovation and performance management in 2005

> One of the causes of the changed qualification requirements is the new [flexible] organizational forms. [A series of Danish studies] suggest that collaborative skills and communication skills, independence and the ability to interdisciplinary work and in teams will become increasingly important in many Danish businesses.[120]
>
> Danish Ministry of Education, *National Competence Development: Business Development through the development of qualifications,* 1997

In the 1990's, interdisciplinarity reappeared on the political agenda in Danish high school education. After a change of government in 1993, interdisciplinarity was not only introduced in the public school, but also re-emerged as a theme in debates about the future of high school education (cf. Schnack 1995:76). This followed a decade of liberal and conservative parties in government abolishing the experimental status of some high schools and launching a high school reform in 1988, which emphasized lines and electives with no mention of interdisciplinarity (Retsinformation 1987).

With the new government headed by the Social Democratic Party, the notion of interdisciplinarity began to appear in outlines describing the qualifications needed in the future Knowledge Economy (Undervisningsministeriet 1997:10). But interdisciplinarity was also circulating as a "sign of quality" in pamphlets aiming to encourage teachers' and managers' work with developing the quality of teaching (Undervisningsministeriet 1993a). Indeed, interdisciplinarity in these years both emerged in connection to ideas of innovation taken as an imperative in a global competitive knowledge economy, and in conjunction with new arrangements of performance management.

In 1999, the Ministry of Education presented a development program outlining a reform of high school education in which the notion of interdisciplinarity was a central.

This program, which passed in Danish Parliament in April 1999, presented the first suggestions for reforming high school education in the light of the "great technological and global challenges we face" (Undervisningsministeriet 1999:1). In this program, the notion of interdisciplinarity [tværfaglighed] was key in the description of new aims for Danish high school education. Interdisciplinarity here was connected to an emphasis in this program of developing students' "study competences" (Undervisningsministeriet 1999:3.2).

In 2005, with the introduction of the Study Program High School, interdisciplinarity figured as a key organizing principle in Danish high school education. Although there were clear remnants of previous ideas and techniques of interdisciplinarity in this policy program, the configuration of interdisciplinarity emerging from these policies was connected to new problems and solutions, techniques and practical arrangements.

With this chapter, I examine the configuration of interdisciplinarity in Danish high school education emerging in the reform program of 2005. I am interested in the kind of problematization of disciplinary arrangements that interdisciplinarity now became part of; a problematization which did not concern questions of democracy, nor mechanisms of capitalism, but were related to questions of accountability: to questions of fostering competences required in a Knowledge Society and ensuring students' learning. Although there were clear continuities between the engagements with interdisciplinarity in 1960 and after 1968, interdisciplinarity with this reform thus emerged in connection to new problems and solutions, and indeed to a complicated accumulation of practical arrangements through which interdisciplinarity was supposed to take place.

I. The problem of disciplines in a Knowledge Society

The high school reform of 2005 entailed a substantial rearrangement in aims, contents and methods, with the interplay of disciplines as an organizing principle. Even though the notion of "interdisciplinarity" was now replaced with "disciplinary interplay" or "the collaboration across disciplines," the aims, contents and technical arrangements introduced with this reform popularly called *The Study Program High School*, reflected the emphasis on interdisciplinarity that also characterized the policies leading up to the reform. These rearrangements reflected new ways of problematizing prevailing

disciplinary arrangements, which concerned questions of fostering competences required in a "knowledge society" and ensuring students' learning.

In the proposal for the Parliament in 2003, the need for a high school reform was presented as a response to "comprehensive and rapid changes in science and technology," which was said to demand the students being able to work "independently" and "across disciplines" (Undervisningsministeriet 2003a:1). Pointing towards the idea of knowledge society, this proposal pointed out that there was a need to develop a new set of competences if Denmark was to compete in a global economy (ibid. 1). These competences, it was later to be specified, concerned among other things "innovation" and "entrepreneurship" (Undervisningsministeriet 2003b:11). "Working across disciplines" – in these reform proposals was presented as part of introducing a new "educational standard" [ny faglighed], which reckoned with the rapid changes in science and technology and competition in a global economy. In addition, they stressed the need to ensure what was called "real study competence" (Undervisningsministeriet 2003b:12), arguing that this demanded the restructuring of curriculum in ways that aimed for "governing by objectives" [målstyring] (ibid. 6). Interdisciplinarity in this proposal was thus connected to a problematization of the lack of correspondence between the existing high school education and qualifications adequate for a Knowledge Society. But these reform proposals also entailed a problematization of existing disciplining structures for not sufficiently addressing the need to govern students' learning.

This emphasis on new qualifications and new modes of governing learning was also manifest in the reform program, which introduced the Study Program High School in 2005. Here interdisciplinarity figured as a key organizing principle. The "interplay of disciplines," figured in the new aims, and it was central to the descriptions of the new structure of "study programs" formed across disciplines or subject areas (Undervisningsministeriet 2004a:§1, §8-22; 2004b:§8-22). Moreover, the interplay of disciplines was highlighted in descriptions of the project-oriented interdisciplinary course construction called "general study preparation," as well as in the two large interdisciplinary assignments during the 3 years of the high school education (Undervisningsministeriet 2004a:§4; 2004b:§4; 2004b, bilag 9). The interplay of disciplines was even mentioned in the paragraphs describing the manager's obligations, stating that the manager was to ensure that "educational and methodological guidance is

given in the single subjects and in the interplay of the disciplines" throughout the high school education (2004b: §41).

In the new definition of the aims of high school education, the interplay of disciplines figured as a central means of what appeared primarily as a preparatory aim of high school education:

> The aim of the education is to prepare the students for further education, including that they acquire general education [almendannelse], knowledge and competences through the education's combination of educational breadth and depth and through the interplay between the disciplines. (Undervisningsministeriet 2004b:§1)[121]

While this definition of aims was reiterating the two aims introduced in 1903 of preparing students for further education as well providing them with general education, it also marked a significant shift – particularly in comparison to the 1960 reform which introduced interdisciplinarity (cf. Undervisningsministeriet 1960). In these new aims, general education was now described as a component of the preparatory aims, and the notion of competence was introduced alongside with the notion of knowledge. The interplay of disciplines in this formulation was thus figuring as a means of bringing about the competences and knowledge needed for the – primarily – preparatory task of high school education. The introduction of interdisciplinarity in other words was not related to an emphasis of this reform on general education, but rather to a focus on the preparatory and more applicable outcomes of high school education.

This emphasis on applicable outcomes of high school education was also reflected in the description of the new course construction "general study preparation" (Undervisningsministeriet 2004b, bilag 9). Running through all three years of the high school education, this construction aimed at fostering collaboration of disciplines across what was described as the three main areas of the high school education: the natural sciences, the humanities and social sciences, "deploying theories and methodologies of all three areas" (ibid.). In the objectives of this new course construction, the interplay of disciplines was connected to aims of fostering students' innovative as well as critical sense:

> The aim of General Study Preparation is to challenge the students' creative and innovative abilities and their critical sense in working with academic knowledge through collaboration, [it aims at] strengthening their ability to relate reflectively and responsibly to their environment and their own development, based on a broad academic and methodological foundation with a future-oriented perspective (Undervisningsministeriet 2004b: Bilag 9).[122]

The notions of the interplay of disciplines and collaboration were thus associated with the idea of competence as well as with aims of fostering creative, innovative, critical, reflective, responsible abilities. These descriptions not only connected the collaboration between disciplines to a specific set of competences; they also marked a new focus on the applicable outcome of learning, describing this in terms of specific competences and abilities, rather than broader general aims of education.

This emphasis on the outcome of learning was also reflected in the introduction of management by objectives, which was introduced through a new set of techniques for ensuring student's learning outcome, such as "study plans," whereby teachers were to document the "learning goals" of a course. The study plan, the reform program stated, "should ensure that there are clear goals for the development of the students' competencies in the subjects, of their general competencies and personal competencies" (Undervisningsministeriet 2004b:§ 63).[123]

These techniques of learning goals and study plans were replacing a system where teachers [fagkonsulenter], appointed by the Ministry of Education were to approve of a list of readings sent in by the teacher teaching the subject. Thus, rather than a collegial and centralized arrangement focusing on the specific syllabus of each course, a new arrangement was introduced with this reform, whereby teachers were to document their teaching in relation to learning objectives and students' competences for the managers to read.

In other words, the emergence of this new configuration of interdisciplinarity not only related to ideas of innovative competences needed for a global knowledge economy, but was also introduced in conjunction with new arrangements of performance governance with techniques for documenting and making students' learning visible. In this way, it was connected to problem of accountability in two ways: On the one hand in the emphasis on fostering competences for a Knowledge Society, such as innovative abilities.

On the other hand, in the emphasis on students' learning through new arrangements of performance management, such as learning goals.

II. Competences for the Knowledge Economy: innovation and performance management

The emphasis on the preparatory aims of high school education or techniques of evaluation and control were of course not new in Danish high school education. It nevertheless marked a shift from the reforms mentioning interdisciplinarity in 1960 and 1971. In the 1960 reform program, the notion of interdisciplinarity was connected to explicit concerns with the need for a general education – *general humanism*, as it was called; and in the 1971 reform, interdisciplinarity was also not coupled to preparatory aims. In contrast, the 2005 reform emphasized the interplay of disciplines as a means of cultivating competences applicable for business and in connection to disciplining techniques emphasizing definite learning objectives.

This specific association of interdisciplinarity with aims of applicable competences and arrangements of performance management was an outcome of a process of translations and associations between ideas and techniques otherwise unconnected. The specific configuration of interdisciplinarity that emerged from this reform was connected to a preoccupation in the 1990s with questions of new qualifications, but also with the rise of a preoccupation with governing performance.

Throughout the 1990s, the idea of interdisciplinarity became connected to a vision of innovation as a pivotal competence for the knowledge economy. This connection between knowledge society and the potentials of interdisciplinarity for developing innovative capabilities was clearly stated in an interview with the director of the department for high schools in the Ministry of Education during the time of the reform:

> It is well-known that in a knowledge society like ours, new ideas, discoveries occur in the fractured surfaces between the disciplines. If we are not [...] preoccupied with the fractures in the borderlands of the disciplines, we will have problems finding use for the candidates that come out of the system.[124] (Damgaard in Haue et al. 2003:13)

The emergence of the idea of the knowledge economy was central to this association between interdisciplinarity and innovation. The notion of Knowledge Society emerged in the early 1990's and gained grounds in the mid 1990s in debates on management (cf. Larsen 1992, Mandag Morgen 1994, Larsen 1995, Kærhøg 1996), and the developments of labor market and education (cf. Duus 1994, 1996; LO 1995).

In the late 1990's, the notion of knowledge economy figured as a central theme in debates about the future of the high school, and later as a premise for the need for innovation in high school education (cf. Undervisningsministeriet 1997, 1999, cf. Jakobsen & Ørnby 2012:11).[125] In 1998, for example, the notion of the knowledge economy appeared in a presentation by the high school teachers' union about "The future of the upper-secondary educations." This presentation pointed to the acceleration in technologic development as the central challenge for high school education. "The students of the high school today," it was argued, "have to use their competences until the year of 2050. Today, society is developing fast, but we must expect that in 2050 things are moving even faster (Gymnasieskolernes Lærerforening 1998, cited in Jakobsen & Ørnby 2012:11). These ideas of rapid change and a global competitive knowledge economy were also figuring in engagements with redefining the aims and content of the Danish education system in terms of competences (cf. Kolind et al. 1999).

The circulation of the notion of the knowledge society in debates on high school education was connected to a model appropriated from the American report called *Spanning the Chasm: Corporate and Academic Cooperation to improve Work-Force Preparation.* While this model problematized what it described as a chasm "between higher education and business" in the USA (Business Higher Education Forum 1997:vii), the Danish translated version circulating, echoed the wordings of a Knowledge-based Economy and workforce development raised in the context of the OECD (Undervisningsministeriet 1997:6, cf. OECD 1996, esp. 13-14). This translated model was named "General tendencies of change," and it showed the developments from a "traditional economy" towards a "knowledge economy."

The model depicting the developments from a traditional economy towards a knowledge economy appeared for the first time in a report by the Ministry of Education called the "National development of competences: Business development through the development of qualifications" (Undervisningsministeriet 1997:23). Drawing on

interviews with representatives from business as well as reports on workforce development, this report pointed for the need to rethink the "qualification requirements for education of a new age" (Undervisningsministeriet 1997). It aimed at discussing the future of Danish education in relation to business needs. "Education," the minister stated in the preface to the report, "is an essential premise for the competitive ability of business and industry" (Undervisningsministeriet 1997:4).

The notion of knowledge economy was central to the report's conclusions about the new qualification requirements that were to be met by Danish educational programs. Presenting a model, which summarized the trends in society and business as a involving a transformation from "traditional economy" to a "knowledge economy," the report argued that educational reforms needed to take the implications of these transformations into account (ibid. 23). They involved a change from "limited competition" to "global competition;" and a replacement of "large organizations" with "flexible learning organizations." This was presented as implying new qualification requirements. "Manual work," for example, was being replaced by "knowledge work," just as the "specific job qualifications" that are needed in a "traditional economy" were described as being replaced by "broad job qualifications" (ibid.). In other words, the developments towards a knowledge economy were presented as the blueprint for the restructuring of Danish education.

The report entailed an ambiguity about the need for specialization in education. On the one hand, the changes in the knowledge economy were described as implying such complex and rapidly changing job situations that qualification requirements of this new age was beyond precise definition. Not only did the complexity of tasks and functions in most industries and jobs make it difficult to "define precisely the qualification requirements for specific types of jobs" (ibid. 52). The "speed through which the professional qualifications are changing and thereby become outdated," was also "increasing," the report stated (Undervisningsministeriet 1997:56). As a response to this situation of complexity and rapid change, new kinds of competencies were needed, the report argued, calling attention to the need for what was called "personal qualifications," which were said to be "at a premium in the future labor market" (ibid. 58). This emphasis on personal qualifications, the report argued, was corresponding to the focus of the OECD on what they were calling 'Cross-Curricular Competences' in their work on developing

indicators for a project on cross-national comparison of education systems (Undervisningsministeriet 1997:6, 60, cf. OECD 1997:11). The report, thus, argued that collaborative skills and communication skills, independence and the ability of interdisciplinary work and work in teams would become increasingly important in many Danish businesses (Undervisningsministeriet 1997:31).

On the other hand, however, specialization was also presented as vital for the competitiveness of businesses. Drawing on interviews with representatives from Danish businesses, the report emphasized that "employees should not be so interdisciplinary in their orientation that their qualifications are too superficial to ensure the competitiveness of the business" (104). The competitive power of a business is "to a wide extent dependent upon a specific, deep knowledge that makes it possible to be distinct in the market. The employees, nevertheless, should be interdisciplinary in their orientation to such an extent that they can understand each other, which is an essential precondition for collaborating in teams," the report concluded (104). With this report, then, the notion of interdisciplinarity was connected to an agenda of reforming education in response to business needs, and in particular to the understanding of changed qualification requirements being connected to an ongoing transformation from a traditional economy towards a knowledge economy. Here, the notion of interdisciplinarity was connected to the idea that specialized knowledge in such times of rapid transformation would easily become obsolete, making personal and collaborative skills more important. Yet, this need for interdisciplinary and collaborative skills was also moderated with reference to the importance of specialized knowledge for business competition. In other words, interdisciplinarity was now emerging in connection to a preoccupation with restructuring education to be more accountable to business needs.

Throughout the 1990s, interdisciplinarity also emerged in relation to another preoccupation with accountability, namely in relation to a rising concern with techniques for governing performance in Danish high school education. This preoccupation with governing performance went under different names and involved different techniques and programs, from evaluation, management by objectives, or simply development, or improving quality. In the early and mid 1990s, this preoccupation with governing performance in high school education was primarily taking the form of inspiration catalogues on "service development" (Undervisningsministeriet 1987), "user surveys" and

"evaluation practices" (Undervisningsministeriet 1990, 1992, 1993a, 1994, Herskind 1995). In these years, the emphasis was on development and issues of professionalizing "pedagogic management" (Undervisningsministeriet 1993b, cf. Heurlin 1999:180), but also on how to appeal to the student's "personal responsibility for learning" [ansvar for egen læring] (cf. Alfarnæs 1995; Petterson & Gleerup 1995). One such technique for making students responsible was called Bloom's taxonomy. Originally formulated in the 1950s USA as an assessment tool, Bloom's taxonomy circulated in relation to experiments in high school education as a technique to "make demands visible" (Undervisningsministeriet 2001:77).[126] This technique of Bloom's taxonomy also figured centrally in a new manual on problem-oriented project work for students at Roskilde University (Olsen & Pedersen 1997).

In the late 1990s, this preoccupation with governing performance in Danish education was also influenced by the OECD's transnational comparison of educational performance through the PISA program (cf. Undervisningsministeriet 1997). And the notion of quality control was now connected to questions of workforce development, and also involved a concern with the "financial returns of education" (Undervisningsministeriet & Finansministeriet 1998).

In sum, throughout the 1990s, interdisciplinarity was thus associated with a new motif of accountability. On the one hand, interdisciplinarity was connected to a preoccupation with competences of innovation needed for business in a knowledge economy; on the other hand, interdisciplinarity was entangled with new arrangements of performance governance. The particular configuration of interdisciplinarity emerging with the reform program of 2005 was thus characterized by a new set of stakes. It involved a new problematization of disciplinary arrangements, which concerned the chasm between education and business, and it was connected to ideas of innovation and techniques of performance governance.

III. Towards innovative, critical and specialized competences

These new ideas of innovation and techniques of governing performance also characterized the practical arrangements through which the interplay of disciplines was supposed to take place in the reform programs introduced in 2005. They even appeared in

the descriptions of the kind of competences the interplay was envisioned to foster in the students.

The course construction of General Study Preparation most obviously shows how the interplay of discipline in this reform program was associated with the fostering of innovative competences. Representing the most radical rearrangement of high school teaching, this course construction was supposed to run through all three years covering 40% of all lessons, that were now to be organized around disciplinary interplay, rather than normal discipline-based courses (Undervisningsministeriet 2004b, bilag 9).

In the course descriptions, the interplay of disciplines was presented as having the aim of "challenging the students' creative and innovative abilities and their critical sense in working with academic knowledge through collaboration" (ibid.).

Such critical sense concerned the students' understanding of disciplines. Disciplines, the students were to learn, were not given or "isolated systems of knowledge," but formations with "possibilities and limits" (ibid.). Students should evaluate these "possibilities and limits of different disciplines and their methods," and they were to reflect upon a series of issues: on the relation between problem and discipline; on how disciplines can "illuminate aspects of a problem," and how problems are constituted in specific ways if they are approached from a "uni- or multidisciplinary perspective." These reflections, the course descriptions continued, were meant to ensure an understanding of "science," as "broadly understood, building upon a continuous discussion and argumentation" (ibid.). In other words, these aims emphasized not only the importance of fostering innovative abilities, but also of developing a critical sense of disciplines and science through collaborative work.

On the other hand, this collaborative work was to be "based on a broad academic and methodological foundation." The aims of General Study Preparation, thus, also stressed the importance of specialized academic knowledge and methods as a basis for disciplinary interplay. Students were to be able to "apply different methodologies to illuminate a complex problem" and to "evaluate the possibilities and limits of different subjects and their methods" (ibid.). More concretely, the course of General Study Preparation was to be assessed through an exam based on a synopsis that the student should write selecting a combination of two disciplines (Undervisningsministeriet 2004b, bilag 9). In this examination form, it was a matter of combining disciplines. In this way, these objectives

not only emphasized a critical view of disciplines, but also emphasized the importance of specialized disciplines and their combination as a starting point for an inquiry.

In addition to being critical of disciplines and taking a combination of disciplines as a starting point for an inquiry into a complex problem, students were also to "understand knowledge of a singular discipline as a contribution to a coherent world-view" (ibid.).

In other words, these learning objectives were conjoining different ways of relating to disciplines as both contingent on a continuous discussion and argumentation, as resources that can be combined and illuminate a complex problem, and as a part of a coherent world-view.

At the same time, all this was now presented in a somewhat easily assessable list of learning objectives:

> Students should:
>
> - acquire knowledge about a topic by combining more disciplines and subject areas
> - apply different methodologies to illuminate a complex problem
> - understand knowledge of a singular discipline as a contribution to a coherent world-view
> - evaluate how a theme is part of larger historical and/or contemporary contexts
> - evaluate the possibilities and limits of different subjects and their methods
> - employ the insights of elementary theory of science and scientific reasoning to formulate and reflect upon problems of a single disciplinary,- multi-disciplinary or common-disciplinary character" (Undervisningsministeriet 2004b, bilag 9).[127]

These learning objectives of interplay of disciplines in General Study Preparation connected aims of innovation and a future-oriented attitude to specific forms of critical approaches to disciplines as methodological resources, problems as complex and science as a field of contestation. This somewhat miscellaneous assortment of learning objectives conjured a kind of competence that may be described as reflective, specialized and accountable. Its multifarious character was indicative of a complicated accumulation of different of ideas and techniques associating moves made elsewhere, earlier, in other engagements with problematizing prevailing disciplinary arrangements. Yet, now appearing as a list of assessable learning objectives.

Conclusion

With this chapter, I have examined the emergence and configuration of interdisciplinarity with the high school reform of 2005. I have illuminated the broader problematization of disciplinary arrangements that interdisciplinarity was part of in this moment, but also unpacked and examined the practical arrangements and techniques through which interdisciplinarity was supposed to take place.

First of all, I have shown that the introduction of interdisciplinarity with this reform was connected to a problem of accountability. This problem of accountability both related to questions of the content of high school education, more particularly to the lack of correspondence between the existing high school education and competences adequate for a Knowledge Society. But it also concerned the methods of ensuring students' learning and involved new arrangements for managing teachers' and students' performance.

I have shown how this problem of accountability appeared in the reform program of the 2005 reform, where the notion of interplay of disciplines was figuring as a means of cultivating competences applicable for business. But I have also pointed to the entanglement of interdisciplinarity with a rising problematization of disciplinary arrangements, which concerned the need to develop quality through arrangements of performance governance, and entailed an emphasis on the objectives of students' learning outcome and making concrete competences explicit. This specific association of interdisciplinarity with aims of applicable competences and arrangements of performance management, I am arguing, marks a remarkable shift from previous engagements with interdisciplinarity.

Tracing the preoccupation with interdisciplinarity in the 1990s, I have shown this specific association to be an outcome of a process of translations and connections, particularly in a report from 1997 on the relation between business development and the development of qualifications. With this report, a model of the developments from what it called a traditional economy towards a knowledge economy became pivotal to the argument for the need for innovative skills. Referring to OECD's developments of indicators for their transnational comparison of educational performance this report argued for the need for interdisciplinarity. Yet, at the same time it contended that specialized knowledge was vital for business and innovation. These debates, thus, showed

how interdisciplinarity connected both to an emphasis on personal skills and to the importance of specialized disciplines.

Turning to the reform program, I showed that there were also traits of this double emphasis on personal skills and specialized disciplines, now expressed in terms of innovation and critical thinking, on the one hand, and the emphasis on academic and a methodological foundation, on the other. This reform program thus indicated a complicated accumulation of ideas and techniques from other times and places. Yet, it also involved an arrangement of interdisciplinarity, which was not about displacing disciplines as secondary for learning, but rather of combining them. And it presented interdisciplinarity as in terms of a series of specified learning objectives.

With this chapter, we thus begin to see the specific stakes of this configuration of interdisciplinarity of the 2005 reform, as well as the translations it implies.

First of all, this configuration of interdisciplinarity connected to this reform program differs from previous engagements in being permeated by a motif of accountability. This motif of accountability, on the one hand, appeared in the justifications for interdisciplinarity as a means of fostering competences for the knowledge economy and in its connections to innovative abilities, but it was also central to the new arrangements of explicit learning objectives of the interdisciplinary courses and assignments.

Secondly, disciplines and disciplinary knowledge was presented in quite specific ways, in this reform program. While, students, on the one hand, were to develop a critical sense about disciplines through interdisciplinary collaboration, they were at the same to be "based on a broad academic and methodological foundation." Disciplines were thus not necessarily secondary to a problem, nor were they to be taken as given; rather, they were to be complicated through interdisciplinary collaboration. In this way, there were clear remnants of the 1960s' problematizations of truth and the 1970s problematization of disciplines as contingent, yet the translations were also clear: For Dewey existing 'studies' could be consulted as part of the work with a problem – in the library. In the reform program of 1960 disciplines were presented as a needed resource for education, emphasizing the need for coordination so their specialized knowledge did not stand in the way for a unified outlook. In the 1970's problem-oriented project work, disciplines were described as vehicles of bourgeois knowledge and thus mechanisms of capitalism, and there was thus an emancipatory potential in reducing disciplines to resources whose role

was subordinated problem-orientation. In the reform program of 2005, however, the notion of discipline emerged both as an object of critical reflection, but also as the starting point in an arrangement where disciplines were to be combined. This, as we shall see in the following chapter did not go without complications in the day-to-day work with disciplinary interplay.

The notion of the problem likewise appears to have been translated. The problem for Dewey was envisioned as the primary technique of inquiry and seen to allow for the development of a reflective attitude, which he ultimately pointed to as precondition for democracy. In the 1960s' high school reform the teachers were urged to develop the students' interest in problems of society and their ability to critically and independently evaluate problems. In the 1970s' problem-orientation, problems were less a means of democratization and rather a way of rejecting conventions of existing disciplinary traditions and confronting the individual's preconceptions as well as a device for gathering knowledge that could uncover the essential contradictions of society. The problem that emerges in the reform program in 2005 has remnants of this problem-orientation, yet, it is now described as a complex problem, and disciplines are not secondary, but the starting point for illuminating the complex character of a problem. In chapter 6, I go into more detail with this arrangement and the implications it has for how the interplay of disciplines take form in practice.

Through these historical examinations of the shifting configurations of interdisciplinarity, we now begin to see how the 2005 reform program has partially displaced previous problematizations of disciplinary arrangements and their critique of standardized learning processes with definite learning objectives and directly applicable outcomes. Rather interdisciplinarity now figures as a means of fostering competences of innovation and is described in terms of assessable learning objectives. In the next three chapters, I will look further into the implications of this in the day-to-day arrangements of the interplay of disciplines.

Part II

Governing interdisciplinarity after 2005

Governing interdisciplinarity after 2005

Introduction

The flat, red brick edifice of Appleton High School rises above its tree-lined soccer fields in a suburb of Copenhagen.[128] With around 800 students and 100 teachers, Appleton is an average-size Danish high school [gymnasium] in a middle-class neighborhood. The late-1970s school buildings are functionalist in design, an architecture echoing that of any number of other high schools built in the 1960s and 1970s, a time when Denmark as a welfare state invested massively in education. The school has long hallways with brown tile floors and bare brick walls, while the benches in the atrium are concrete, features that reflect a preference for functional materials and for communal spaces where people can gather for the social and cultural activities so characteristic of these "democratic" institutions (cf. Byggedirektoratet 1978:4). At the time Appleton was built, Greater Copenhagen was expanding in step with 1950s urban development plans and the construction of an extensive metropolitan rail system.

One enters Appleton through a glass door marked "Appleton High School." The first offices one encounters house the administration. There, two secretaries sit at the reception counter, behind which are the principal's office and the vice-principal's office, where three education managers also sit. Since 2005, these staff have been referred to as the "management." Next comes the teachers' lounge, a large, light space with tables and couches next to a small wardrobe and kitchen. Every day at noon, the school cafeteria brings lunch to teachers and staff who have signed up for the meal plan. The teachers have a working area and a photocopier on the second floor, but many prefer to use the lounge for meetings, class prep and grading papers. The broad hallways are flanked by classrooms, some of which are specially equipped for physics, chemistry, arts or biology, and all of which have blackboards and newly installed electronic smart boards. Located on the second floor, the school library overlooks a new sports hall and the green soccer fields.

In this second part of the thesis, Appleton High School forms the central locus of my further inquiries into the governing of interdisciplinarity in Danish high school education after the reform of 2005. These chapters draw on ethnographic fieldwork conducted in 2012-13, focusing on the more obscure practical arrangements and sticky entanglements

involved in the day-to-day work with interdisciplinarity. They aim to elucidate the stakes and translations implicated in these everyday arrangements, that is, to unfold the enunciations, techniques and practices that are translated from different times and places and joined together imbue interdisciplinarity with a specific character and expression. In this way, the chapters draw on Bruno Latour's emphasis on approaching phenomena as an association or a *network of translations,* and to pay attention to the specific entanglements and their implications in practice. My aim is to reach a better understanding of what about these specific arrangements of interdisciplinarity sparked such controversies over the governing of interdisciplinarity and led the reform to be described as both a bureaucratic monster and critiqued as echoing postmodern ideas.

The themes of the three following chapters mirror the themes of the chapters of Part I, highlighting *disciplines*, the technique of the *problem* and, *Bloom's taxonomy.* This echo of themes allows for a comparative view aiming for the distinctive character of the configuration of interdisciplinarity in Danish high school education after 2005 to come better into view.

Moreover, the following chapters also resonate with what I in chapter 1 called the rise of a new productive potential of transdisciplinarity that I argued to be a tendency in the discourse on interdisciplinarity from the late 1990s across academic discussions and international agencies' such as the UNESCO. Yet, as we shall see, although these ways of imagining and justifying interdisciplinarity may be said to be pervasive, and can also be detected appear in Danish high school education, the translation of such ideas and discourses into practical arrangements and actions, nevertheless alters them significantly. While the current discourses on interdisciplinarity seem to go hand in hand with ideas of flexibility and adaptability, these next chapters, thus, highlight the importance of another set of conventions that are at work in the current configurations of interdisciplinarity in Danish high school education, namely new arrangements of performance governance and techniques of visibility that have – as we have just seen – have gained prominence in Danish education over the last 30 years.

In other words, these next three chapters direct attention to how the governing of interdisciplinarity in Danish high school education is propelled by discourses and actions oriented at transgressing disciplines, exploring complex problems and engaging with the unknown, but also entangled with arrangements of techniques of visibility, standardizing

and measurement. Through these investigations we will begin to grasp a view of what it was about the practical arrangements that after 2005 sparked such controversies, and a widespread perplexity amongst teachers in the Danish high school concerning the intentions and practical arrangements of interdisciplinarity. Indeed, as we shall see, the predicament of interdisciplinarity in this moment is connected to the co-existence of ideas and techniques that were historically at odds.

In this way, the chapters of Part II not only aim to characterize the distinct expression and character of the configuration of interdisciplinarity in Danish high school education at this time, but also to complicate common assumptions about interdisciplinarity today more broadly. They aim to prompt a moment of reflection upon the current preoccupation with the productive potential of transgressing disciplines by re-routing it through the practical arrangements in Danish high school education.

Before proceeding to these analyses and discussions, I want to consider the conditions of production of my ethnographic material through which I came to ask questions about the circulation and transformation of certain ideas and techniques that were associated and were affecting the everyday governance of interdisciplinarity. The ethnographic chapters that follow are thus not only a product of a work of thinking, but also of the dynamic and embodied experience and constraints of participant observation. Participant observation has the advantage of generating knowledge about what people and things do, rather than what they might say they do, yet such observation is also contingent on specific circumstances and arrangements. In the following, I shall therefore describe the trajectory of my ethnographic fieldwork in order to clarify the conditions of this knowledge production.

Ethnographic fieldwork at Appleton High School

If there was ever such as thing as an ethnographer's encounter with an unknown field, my arrival in Appleton High School was not one such facing exotic, undiscovered land. Apart from having been educated in the Danish education system myself, I had also worked as a research assistant since 2009 on three research and development projects, financed by the Ministry of Education (Pedersen & Ryberg 2009, Pedersen & Ryberg 2011). These projects were aimed to study and give input on management and planning in the Danish high school after the reform's enactment. When I arrived for my first meeting with the Appleton

management in October 2012, I therefore already had some sense of the pressing issues relating to interdisciplinarity in Danish high school education. At this stage, though, these issues were not yet accessible to me as subjects of study, nor was I familiar with the organizational, pedagogical or historical aspects of interdisciplinarity. Appleton High School was the first site at which I encountered such concerns.

As an anthropologist of training, I approached this encounter from a perspective not primarily concerned with education, or, for that matter, with Danish public administration or governance. Although I framed my question in terms of "management," my approach was more open-ended: I was curious as to what this preoccupation with interdisciplinarity was about. How did interdisciplinarity take form in the everyday actions of a high school? What actors, values, rationalities and practical work determined how it was regulated on a day-to-day basis? And what were the implications of all this?

I chose Appleton High School as a site, as it was neither a high-profile, elitist institution, nor a school struggling financially after a 2007 reform in which high schools formally became economically self-managing institutions and student populations became an economic parameter. I also wished to avoid working with one of the few among Denmark's 140 Danish high schools always involved in Ministry of Education development projects. I was interested in studying interdisciplinarity in a place where other agendas were in less of a spotlight. I learned about Appleton through a colleague in research project on elderly care. He connected me to an education manager who was his personal friend.

Appleton High School is characteristic of the high schools built in the 1970s, and in some ways exemplifies the high school education expansion of the 1950s and 1960s, when the focus was on mobilizing the "intelligence reserve." The majority of Appleton students have parents who did not go to high school themselves, but who both work. While high schools in the larger cities worked on profiling themselves as "science" high schools or "innovation" high schools throughout the 2000s, Appleton, like many high schools in suburban and rural areas, participated in a couple of development projects financed by the Ministry of Education, and built a new sports hall with funds from their budget surplus that a generational rise in students had brought. Recruiting teachers was simple enough, although finding natural science teachers proved quite difficult. This was because

candidates for science teaching positions could often get higher salaries in fields other than education, while those with a humanities background had fewer job opportunities.

As I already had a sense of the policies and discourses on the issues of governance in the high school, I conducted a focused short-term ethnography (Pink & Morgan 2013), engaging in participant observation at Appleton High from fall 2012 to spring 2013, which was the time of the school year when the courses and exams explicitly aimed at disciplinary interplay were given. Being more interested in aspects related to the organization of education than, say, the effects of such organization on learners, I focused on the techniques and practical arrangements stated in the reform as relating to an "interplay of disciplines," including the Study Program Assignment (SRO), the Study Program Project (SRP) and the course General Study Preparation (AT).

I also pursued a more explorative trajectory, asking managers and teachers where I could learn about their practical work with interdisciplinarity. They invited me to participate in the management meetings from November 2012 to April 2013, as well as the meetings of an ad hoc group set up to develop the General Study Preparation (AT) program. I was also invited to participate in a supervision course for teachers arranged by Lis Boysen from Unversity College of Copenhagen.

The management initiated my contact with nine teachers, with whom I then made arrangements. I primarily observed their supervision connected with the SRO and SRP interdisciplinary projects and their teaching and supervision regarding the final AT exam. Several of them taught either Danish or social studies as one of their two subjects, but some taught mathematics. I followed these teachers around, conducting ethnographic interviews in their short breaks. I also shadowed an education manager for a couple of days and sat in the office of the vice principal and three managers to observe their daily routines and various work tasks (Czarniawska 2007). I interviewed the teacher that management had appointed to work on progression plans, which it saw as a key component of the organizational development around the interdisciplinary study programs. I also talked to teachers following the teachers' training program [pædagogikum], asking them what they were taught, and I conducted informal interviews with teachers participating in a project on teaching innovation. In the summer of 2013, I spent a day with the two teachers preparing the grand schedule for all students and

teachers, in this way endeavoring to get a sense of the most pressing considerations when planning the coming school year.

I collected a variety of documents, including meeting agendas, teacher training literature and standards for furthering progression, but I also borrowed books from the schoolbook depository in order to learn about interdisciplinarity discourses through the textbooks used in the General Study Preparation (AT) course. I also visited EMU, a national web portal on education, which helped me consider the discourses on and techniques for organizing interdisciplinary teaching. In this way, I collected documents not only through a concern with what they were describing, but also how they were used and took part in regulating action (Prior 2011:xxvii).

I spent a lot of time hanging out in the teachers' lounge, doing brief informal ethnographic interviews on the couches or trying out my tentative analyses and theses during lunch (Spradley 1979:58). As such, I often engaged in observation as opposed to active participation (Spradley 1980:58). Moreover, I often heard teachers discuss the dispositions of the management or the implications of the reform, for example, when they were discussing themes for one-day project teaching where different disciplines were to present various perspectives on the same theme.

Parallel to my Appleton fieldwork, I conducted interviews with some of the people who had worked on the 2005 reform policies, which gave me a sense of the politics tied to the technical and organizational aspects involved in introducing interdisciplinarity. It became obvious in these interviews that apparently mundane techniques like problem-oriented interdisciplinary assignments or thematically coordinated interdisciplinary courses were also highly political and putting issues regarding the role of progressive education [reformpædagogik] into play.

Although recognizing these more general political aspects, I also found them to differ from the politics of teachers' and managers' everyday high school practice. At the time of my fieldwork, the managers were highly concerned about ensuring that teachers felt sufficiently at home with their own discipline to bring it into interplay with another one. Students had been complaining that some teachers seemed insecure. Teachers felt it important to ensure that interdisciplinary assignments were both coherent and demonstrated the students' understanding of two different disciplines. Many were frustrated with the artificial and incoherent form that the large interdisciplinary projects

took, because they had to combine specific and sometimes rather different traditions and approaches. Another concern repeatedly raised by teachers was the arrangement and format of interdisciplinary assignments, which many told me had led to compartmentalized and incoherent assignments that combined two disciplines only to evaluate them separately.

By focusing on the practical arrangements of interdisciplinarity over the next three chapters, I aim to illuminate these stakes involved in the everyday governing of interdisciplinarity. I show that the ways in which interdisciplinarity was governed after 2005 is an outcome of specific historico-practical stakes and translations that despite being influenced by John Dewey's progressive educational ideas and by the emancipatory and consciousness-raising agendas of the 1970s', was also entangled with discourses on innovation and new arrangements of performance governance, at times, with some surprising implications.

5. The core of disciplines

In a small office on the second floor of Appleton High School's red brick building, I am meeting education manager Beth and vice-principal Carl for an introductory meeting about the aim and focus of my fieldwork. I ask them about their current work with the interplay of disciplines. As with all high schools since the 2005 reform, Appleton High School is organized around interdisciplinary study programs, Beth and Carl say. However, at the moment, the school management is working to develop the teacher groups organized around disciplines that have remained from before the reform. They want to qualify the teachers' familiarity with the disciplines they teach in these study programs, they tell me. The teachers have to develop a stronger sense of the "core of their discipline" to be able to engage in interplay, they say.[129]

Much discussion of interdisciplinarity today points to the character of the relation between disciplines as essential to what interdisciplinarity is, of what arrangement we are talking about. As I argued in the introduction, it has since the 1970's become commonplace to distinguish between inter,- multi- and transdisciplinarity as a way of conceiving of the kind of collaboration or degree of transgression of an interdisciplinary arrangement. While such distinctions may offer a vital model for action and reflection, they do, however, not say so much about the practical arrangements of interdisciplinarity or the kind of work interdisciplinarity may also involve, for example the work one does to a discipline so that it assumes the right form for interdisciplinary collaboration.

In this chapter, I am interested in the kind of work managers and teachers in Appleton high school were doing in order to make a discipline capable of disciplinary interplay. Or in other words, in the work teachers were doing to present their knowledge of a specific field in such a way as to make it appear as suitable for interplay. In particular, I am interested in the preoccupation of teachers and managers at Appleton high school with what they called the disciplines' core in relation to their everyday governing interdisciplinarity. I want to pay attention to this work, both because it is telling of the configuration of interdisciplinarity in Danish high school education emerging after 2005,

but also because it may say something more general about the practices involved in actualizing interdisciplinarity – and their implications.

My starting point is Latour's notion of *translation*, and the way this notion draws attention to the small scale displacements involved in making of a fact, or as in this case, to the actualization of the interplay of disciplines. I will pursue such translations both in day-to-day practices and in the trajectory of the notion of the core of disciplines in Danish education policy. My argument is that by looking into this work and the translations involved, we may begin to get a clearer understanding of how interdisciplinarity was governed and configured in particular ways in Danish high school education after 2005, and its implications.

Yet, turning attention to the more obscure kinds of work and efforts involved in interdisciplinarity in Danish high school education, I also want to consider a question of more general character, namely the implications to disciplines of what I with Strathern have pointed to as the self-conscious kind of mixing implied in engagements with interdisciplinarity (cf. Strathern 2004b:37). Such self-conscious mixing, Strathern argues elsewhere, is premised on a naturalized or even fictive assumption about the distinct and definite character of disciplines; a "convenient fiction" (Strathern 2007:131). Or, as philosopher Peter Osborne has put it, interdisciplinarity assumes *disciplines* that may be "inter"-ed (Osborne 2013). My interest here, thus also concerns, what such assumption implies in practice. My argument is, briefly put, that interdisciplinarity not only assumes, but may also reinforce the fiction of disciplines.

I. The core of disciplines

As I arrived in Appleton High School in the fall of 2012, I soon learned that the management had just initiated a project to strengthen the teachers' sense of what they called the "core of the disciplines." Pedagogical manager Beth and vice-rector Carl told me that this initiative was primarily a response to a generational shift in the teacher staff. "Qualifying the teachers' sense of their discipline" was particularly pressing, Beth explained, as they had employed around 40 new teachers over the last 2-3 years, now counting approximately 100 teachers. These new teachers had exam papers with subjects and disciplines far from what the older teachers would understand as reflecting the 'core' of the high school disciplines. Some of them, for example, had mixed degrees from

interdisciplinary universities, she explained. This was a problem, Carl asserted, which not only manifested in the teaching of Danish or Biology, but also concerned teachers' work with the interplay of disciplines: One has to be familiar with the core of one's discipline to be able to engage in disciplinary interplay, he said.[130]

This rationale that having a sense of the core of one's discipline was a precondition for engaging with the interplay of disciplines seemed to be predominant in Appleton High School. On another occasion, Appleton's rector told me that it might be that this initiative to "qualify the disciplines" could seem surprising, given the reform's emphasis on "interplay." However, she continued, it was a response to those frustrated students who found that the teachers were not clear enough on the core methods and propositions of their own discipline, and therefore did not supervise so well in the interdisciplinary projects.[131]

The managers' efforts at qualifying the teachers' familiarity with the core of their discipline, involved creating arrangements that they found would cultivate the teachers' sense of the core of their discipline. It was a matter of strengthening the teachers' awareness of the disciplines' specific methods and identity, Beth explained.[132] To do so, they were working to develop the existing "discipline groups." These discipline groups had been key in organizing high school teaching for decades. In these groups, teachers, who are normally trained in two university disciplines, would meet more or less formally to exchange ideas and teaching material on the subjects they were teaching. In some high schools, the discipline groups were given budgets for buying books or making copies. In the Study Program High school after the reform of 2005 these groups still constituted a central organizational form in many high schools, but they were now mobilized for new purposes.

As part of the initiative to develop the teachers' awareness of the core of the disciplines, the management of Appleton High School had appointed a formal 'group leader' for each of the disciplinary groups. The managers described the group leader's role as someone responsible for the qualification of the discipline groups and as a broker between the management and the discipline group. The group leader, the managers explained me, was meant to bring up themes in the meetings that the management has raised and also to report back on issues and needs of the group. The managers evaluated the state of the discipline's development based on their contact with the group leaders.

They were occupied with how they might ensure a more active debate in some of the discipline groups, for example in the Sports group, where the managers found teachers to be less responsive to how they should engage with qualifying their discipline. A teacher told me that she suspected this appointment of group leaders to be a managerial move to make the discipline groups easier to govern.[133]

To make the discipline the object of shared discussions, the managers made agendas for some of the meetings in the discipline groups, for example the bi-annual pedagogical development day, where issues for discussion included the discipline's "use of materials" or "progression." The aim was to facilitate the teachers' discussion and classification of themes and methods of their disciplines, and their arrangement of such themes and methods according to what should be taught sooner or later, what is basic or advanced, core and marginal.

This process of strengthening the teachers' awareness of the disciplines' specific methods and identity, then, was not merely a matter of dusting off existing disciplines. Rather, it presumed a process of devising an otherwise tacit or anonymous field of objects, methods and propositions in the light of their progression and their distinct contribution relative to other disciplines. In short, this work with the core of disciplines involved a process translation, whereby teachers were to establish a specific collection of material and themes under the rubric of their discipline.

II. Core-disciplinarity and the translation of accountability

The preoccupation of the managers in Appleton High School with developing the core of the disciplines was not an isolated endeavor.[134] While the managers related their concern with the core of the disciplines to the problem of new employees in Appleton High School, the notion of "core-disciplinarity" had emerged in the political and pedagogical debates at the time of the high school reform of 2005. The preoccupation with the "core" of disciplines reflected a more widespread tendency in those years with naming new approaches to disciplines and approaches in the face of a nascent engagement with consigning interdisciplinarity at the center of educational reform and the inclinations towards accountability in the face of the rise of a preoccupation with accountability an technique of performance governance in the late 1990s.

Core-disciplinarity was one of several new concepts that emerged in the late 1990s and early 2000s as part of the debates on how to develop a "new educational standard" through the interplay of disciplines. In those years, new concepts for describing and classifying disciplines and professional approaches proliferated across policies, pedagogical literature and everyday practices, often appearing alongside notions of "transgression" and "innovation" (Undervisningsministeriet 2003:1, cf. Undervisningsministeriet 2000, Busch et al. 2004:5).[135] Many of these concepts depicted the skills related to interdisciplinarity, as for example meta-disciplinarity (*meta-faglighed*) and meta-perspective (*meta-perspektiv*) that designate the ability to rise above a discipline so as to reflect upon its distinct propositions and methods (cf. Dolin 2005:188).[136] But there was also the opposite tendency of notions emerging that described the skills of working or adhering to one discipline. For example, the concept of "discipline-disciplinarity" (*fagfaglighed*), which became a common way of distinguishing a mode of expertise related to an authoritative discipline. The concept of core-disciplinarity appeared among this latter group of concepts that designated the skills related to having or working with one discipline.

The concept of core-disciplinarity (*kernefaglighed*) first appeared in a report by the Ministry of Education in 2000 (Undervisningsministeriet 2000). This report was one of several studies, experiments and policy papers initiated by the Ministry of Education concerned with examining and establishing the premises for a "new educational standard" in the upper-secondary education and beyond (cf. Busch et al. 2004:5, Krogh 2003:21, Dolin 2003:384).[137] The report reflected an engagement with defining how education institutions could be accountable, given what it described as a current pressure on traditional disciplinary knowledge, due to the rapid societal and technological development (Undervisningsministeriet 2000:21). The report described its focus on core-disciplinarity as a matter of encouraging a consideration of what was the "inalienable" core of a discipline in relation to the current emphasis on the need for interdisciplinarity across science and education (Undervisningsministeriet 2000:21). The aim was to compel the disciplines to "define which of their insights that - in relation to other disciplines - are necessary […] [in order] to contribute to the societal development of competences" (ibid. 22). In this way, the concept of 'core'-disciplinarity involved a call for disciplines to be

accountable by defining their core as a distinct contribution to the societal development of competences.

This emphasis on the core as a matter of contributing to the societal development of competences, however, was an outcome of an interesting process of translation. In defining core-disciplinarity, the report referred to the Anglo-Saxon concept of "core-curriculum," which in those years was circulating in relation to the OECD's focus on transnational comparison of systems of education through the PISA programs. Yet, the report positioned its conceptualization of core-disciplinarity against this focus on "core-curriculum." Referring to education scholars, who had been invited to present papers on "core-disciplinarity," the report presented instead a definition that drew on German critical scholar of didactics Wolfgang Klafki's point that disciplines consist of basic categories that may be realized through exemplaric teaching focused on current key problematics of society (ibid. 74-75, 161).[138] So while the preoccupation with core-disciplinarity prompted by an engagement with ensuring accountability in the face of the implementation of new techniques of performance measurement in those years, the idea of the core of disciplines was associated with a conception of disciplines as contingent repertoires of more or less essential objects, methods and propositions. Rather than a question of creating a standardized core-curriculum to pertain to systems of measurement, the notion of the core-disciplinarity was instead translated into descriptions of a process of determining and making objects, methods and propositions of a discipline explicit so that disciplines "may in a dialectic and dynamic interplay enrich one another" (ibid. 76).[139]

In other words, while this report, took issue with an idea of core-curriculum circulating in the context of the OECD's transnational comparison of systems of education, it also associated them with a rather specific notion of discipline, drawing on German critical didactics. And while the motif of accountability was thus pursued and carried on, it took a rather different direction from a question of standardizing curriculum towards prompting a self-conscious consideration and reflection about a discipline's objects, methods and propositions in relation to its contribution "to the societal development of competences" as well as the "dynamic interplay" with other disciplines (ibid. 22, 76).

This appeal to reflection on the accountability of disciplines in relation to the societal development of competences, however, had quite specific implications as it was translated into the everyday arrangements of the interplay of disciplines in high school education.

III. A 'tool discipline'

Although no one in Appleton High School ever mentioned the political and pedagogical discussions on the core of the disciplines 12 years prior, there were clear parallels between the framing of disciplines as a matter of their contribution to the societal development of competences, and the teachers' work with the core of their disciplines in Appleton High School.

In the discipline group meetings of the Danish group, teachers were committed to sharing their experiences with materials on such issues as semantics, discourse analysis, or how to teach Romanticism. This was a work of making explicit what was otherwise tacit or anonymous assemblages of objects, methods and propositions in the light of their distinct contribution relative to other disciplines. But it also involved a process translation, whereby teachers under the rubric of their discipline, were concreting a specific collection of material and themes suitable for interplay.

In the teachers' supervision of students' interdisciplinary assignments, this mode of relating to disciplines as a core of tangible and distinct objects, methods and propositions was conspicuous. In the supervision sessions for the interdisciplinary project assignment in the second year, the Study Program Project (SRP), two teachers representing each their disciplines would help students find a topic for their project in 15 minutes' supervision sessions with groups of students doing individual work.

In the first round of these sessions, teachers would often present their discipline in generalizing statements, highlighting their disciplines' distinct methods and propositions, saying "in political science, we like disagreement: try to frame the problem in terms of Romney vs. Obama," or "a way of bringing Danish into play is to approach it as if you were analyzing a novel." In these presentations, teachers described their discipline in simple statements, specific enough to display its distinctness, but also in such a way that it could potentially be applied.

Teachers would often use metaphors of perspectives or a certain kind of gaze in these situations. "I am trying to find a Biological perspective, here,"[140] as one teacher said during supervision. At other times, they would deploy the metaphor pair of glasses, as in: "how might we get Danish in action, here? Do we have a pair of methods glasses that could fit in here?" In the case of Danish, such "methods glasses" referred to delineated, well-described and applicable program for analysis such as semantics, semiotics, the actant model or discourse analysis. [141] During supervision of interdisciplinary assignments, then, disciplines teachers were performing disciplines as a collection of definite, tangible tools to be applied for gaining a distinct perspective - as a set of methods glasses ready for use.

The leader of the Danish group told me that she saw the work with the core of disciplines as part of an on-going transformation of the disciplines. Danish, for example, had since the reform developed from having an emphasis on literature and fictive worlds to being primarily about teaching concrete tools for analyzing language, media and literature, she said.[142] It was becoming a "tool discipline," she said. This transformation was not uncomplicated, she explained. "It is important for Danish to find strengths in being a tool discipline," she said, explaining that many of the Danish teachers were employed before the reform and were "literature enthusiasts," who were now struggling with this shift towards relating to Danish as a toolbox.

But this change in the role of the discipline, she found, was also reflected in students' expectations of what Danish should teach: "I have difficulties explaining to my students why we are reading romantic texts," she said. Instead "the new black is discourse analysis," she remarked, illustrating the move towards a 'tool discipline' where the teaching of explicit techniques such as discourse analysis had taken over from more tacit practices of reading and analyzing literary texts.

In sum, while one may trace a series of translations from the engagement with the core of disciplines was prompted by a preoccupation in the OECD with standardizing core-curriculum; to the Ministry of Education into a call for reflection about a disciplines' contribution to the societal development of competences; to the managers aims to qualify the teachers' familiarity with the core of their discipline its implications for the concrete work of teachers in the everyday arrangements of the interplay of disciplines were quite specific. Here, it involved an intense labor of molding disciplines into definite propositions and methods whose distinct contribution could be manifest in still new instances of

disciplinary interplay. In this work, tool-like theories and approaches were more in demand than practices and approaches without a name or a distinct procedure, such as the reading of literature. And it was important that disciplines could serve as a distinct perspective.

While the Danish teacher characterized the preoccupation with the core of disciplines as part of a more general transformation of disciplines into a "tool discipline," these translations are indicative the specific expression and implications in practice of the motif of accountability, which was also characterized the 2005 reform program. Indeed, through these arrangements, disciplines were reinvented as distinct perspectives with distinct contributions and a specific set of tools. In this way, what we may call, the fiction of disciplines was reinforced in a continuous and not always too convenient way.

IV. You are always the whore of another discipline

Half a year after ending my fieldwork at Appleton High School, I was invited back to participate in the biannual pedagogical development day to give a brief presentation on interdisciplinarity that could inspire a discussion. While I was there, I learned that the theme of the pedagogical day was "toning of the disciplines." This focus on toning was part of a new management initiative that they described as creating more coherent interdisciplinary study programs to realize the "soul of the reform."[143] Their initiative was echoing a wider debate in Danish high school education those years.[144]

In Appleton High School, this emphasis on toning included a new structure of teacher teams, "pillar teams," and the management argued that such a structure would ensure collaborations amongst teachers who were working in the same Study Programs.[145] This new structure, however, met critique from some teachers who argued that it increased the number of organizational units and meetings.[146]

On this day, the management had arranged for the teachers to gather in the discipline groups to discuss the practical circumstances of the interplay of disciplines in relation to this new emphasis on toning. The management had distributed a list of discussion points, encouraging the teachers' concretization of how disciplines can be "toned" in relation to the new "pillar teams;" "how should the toning of disciplines in the study programs take place, and to what extent?" "What are the current experiences?"[147]

In the discipline group of Danish teachers, a teacher opened the discussion with the point on the "extent of toning." "Danish appears to be a discipline, which easily takes part in disciplinary interplay," he uttered. Others nodded in agreement. Another teacher added that both in the interdisciplinary project assignments and the interdisciplinary courses,[148] Danish seemed to be expected to "slip in easily."

After some discussion a younger teacher returned to the theme of Danish as a discipline that slips in easily. He pointed to it being tricky, that ease through which Danish was always offering itself as a collaborator. "[I have] that fear of never being let alone," he said. "If you have to tone [your discipline towards other disciplines] the entire time, then you're always the whore of another discipline."[149]

Evoking this metaphor of prostitution, the teacher thus expressed a sense of denigration in how he came to relate to his discipline in the face of this new demand for "toning." Danish, he suggested, was engaging in disciplinary interplay so easily that it often came to act as servicing another discipline. As the toning of disciplines in Study Programs was now adding to the existing interdisciplinary projects and courses that was already succeeding one another throughout the school-year, this prostitution-like mode of relating came to define what Danish teaching was; it became what Danish teachers do "the entire time."

The teachers' comment was undoubtedly a response to the recently declared changes in the organization of Appleton High School. However, the image of prostitution also points towards a critical aspect in the mode of relating to disciplines as a contribution. It suggests that there is a backside to relating self-consciously to one's discipline as just constructed and contingent enough to be molded into definite propositions and methods, whose distinct contribution to can be manifested in ever new instances of disciplinary interplay. It indicates that this mode of performing an otherwise multifarious body of knowledge in an instrumental and object-like form in the service of another discipline may also implicate a sense of estrangement; that relating to a field of knowledge as a pair of methods glasses is not only enriching, but also a loss.

This sense of estrangement, however, did not amount to all teachers. Some teachers pointed the enriching aspects of having to reflect differently upon their discipline as an effect of the introduction of interdisciplinarity with the 2005 reform. And others expressed a sense of confusion when they were describing their work on interdisciplinary courses

and exams, rather than a sense of estrangement and loss. These variations were partly related to what discipline they were teaching. As several studies of interdisciplinarity suggest, interdisciplinary collaborations may have winners and losers, and they may reassert existing hierarchies between disciplines, or install new ones (eg. Barry & Born 2013). In the case of the Danish high school, teachers of some disciplines, such as Danish, often acquired a more accommodating position, while others, particularly the natural sciences often stood better on their demands or got the better part of the interdisciplinary project assignments.

Nevertheless, the metaphor of acting as "a whore of another discipline" may offer a point of reflection upon the implications of the changing forms of accountability that appear to take form in current arrangements of interdisciplinarity. While interdisciplinarity may itself have come to figure as an 'index of accountability,' as Marilyn Strathern has convincingly argued (Strathern 2004b:80), the inclination towards accountability in current arrangements of science and education also appears to affect the very mode of relating to disciplines, inclining disciplines to be explicit about their contribution, and thereby reinforcing the very same fictions as was originally problematized.

Conclusion

In this chapter, I have examined the preoccupation of managers and teachers in Appleton high school with what they called the core of disciplines. I was interested in what this preoccupation might tell us about the governing of interdisciplinarity in Danish high school education after 2005, but also more generally with the practices related to disciplines in situations of interdisciplinarity. Taking a point of departure high school managers' preoccupation with the notion of the core of disciplines, and following the trajectory and translations in Danish educational debates around 2005, I have shown this notion to be connected to political intervention intended to ensure accountability in the wake of the (re)engagement with interdisciplinarity in Danish science and education. I have also shown how such concerns with accountability were translated in teachers' and managers' work to develop the core of disciplines, where the core of disciplines involved the molding of disciplinary knowledge into explicit propositions and definite methods so

they could perform as a tool or looking glass in arrangements of interdisciplinarity. This work with the core of disciplines, I argue, is thus telling of the specific arrangements and governing of interdisciplinarity of this moment. What comes into view, studying these these practical arrangements of the interplay of disciplines, is that teachers are presenting disciplines as applicable and productive perspectives. This has implications for teachers, however, who express a loss of treasured aspects of their work, and the sense of being the perpetual whore of another discipline.

By looking into this work with disciplines and the translations involved in the core of disciplines, we thus begin to understand the characteristics of the configuration of interdisciplinarity in Danish high school education after 2005. More specifically, we begin to see how disciplines here are treated as a resource of specialized knowledge to be applied as a distinct perspective. In contrast to Dewey's envisioning of studies to be consulted in the library, or the 1970's problem-oriented project work where disciplines were only to act as a resource of knowledge and methods secondary to a problem, disciplines in this configuration of interdisciplinarity, rather, are enacted as a distinct perspective whose contribution is to be made explicit.

This way of relating to and enacting disciplines, thus, is outside the scope of whether we are talking about inter,- multi- or transdisciplinarity. These dynamics cannot be explained merely in terms of the kind of relation between disciplines. Rather focusing on these the more subtle dynamics of the kind of work and ways of arranging and enacting disciplines allow for the view of how the configuration of interdisciplinarity after 2005 is characterized by a motif of accountability and the practices and the loss this may also imply.

6. The complex problem

It is the second week of February and, as at all of Denmark's 142 high schools, the supervision of the interdisciplinary exam in General Study Preparation is about to begin. Two days ago, the management sent all teachers an e-mail informing them about "the many good pieces of advice on this exam that can be found in the national teaching site."[150] *I am sitting in the teachers' lounge talking to Eric, who is waiting for his next Danish lesson. I ask him about the supervision of the upcoming interdisciplinary exam of General Study Preparation. He says these assignments have an awkward incongruity. On the one hand, someone has decided that the real world cannot be approached through a single discipline, but only through what is called a complex problem. On the other hand, however, a problem only counts in these assignments if it can be viewed from two distinctly different disciplines.* [151]

Much literature on interdisciplinarity today emphasizes the prospects of interdisciplinarity in dealing with and solving complex problems. As several scholars have remarked, the preoccupation with interdisciplinary arising in the 1990s connected a concern with interdisciplinary problem-solving with the anticipation of industrial innovation (Barry & Born 2013:24, Osborne 2015:13, Strathern 2004b:26). This emphasis on complex problems as eliciting innovation was also central to the discourses on interdisciplinarity in the context of the 2005 reform of Danish high school education. In the new interdisciplinary course construction General Study Preparation, for example, the students' work with "complex problems" was described as a way of "challenging the students' creative and innovative abilities and critical sense" (Undervisningsministeriet 2004b, bilag 9).[152] Yet, in the concrete arrangements and procedures of interdisciplinary projects, students were first to select a combination of two disciplines, and then find a complex problem to be illuminated.

In this chapter, I am taking a closer look at the technique of the problem in relation to the interplay of disciplines in Danish high school education. Rather than starting from the premise that the problem is one thing that always means and does the same, however, I want to examine the different expressions of the problem by taking a closer look at the different ideas and practical arrangements that were taking place under this rubric. More

particularly, I am interested in what many teachers were referring to as an awkward construction of the idea of a complex problem in the interdisciplinary assignments and its dual arrangement in practice, and what it might tell us about the governing of interdisciplinarity in the context of this reform.

My point of departure for studying this technique of the problem is Bruno Latour's approach to techniques as a *network of translations.* In particular, I am drawing on Latour's argument that techniques and technical action are complicated accumulations that assemble different actions and matters in ways that may displace means and ends (Latour 2002:251). My aim, however, is not to show how such displacements occur through a series of translations through which particular modes of ordering come to dominate (cf. Latour 1990). Rather, I want to show the different conjunctions of means and ends that coexist under the heading of a problem in Danish high school education after 2005 as an outcome of such gambit.

Unpacking the ideas, techniques and practices that are associated with the notion of the problem, I argue, will elucidate important aspects of the governing of interdisciplinarity in high school education after 2005. In particular, I will show how a means of innovation have come to coexist with techniques once invented as a means of radical participation, but I will also point to their displacements in the mundane practical arrangements of the interplay of disciplines.

In this way, this inquiry into the ends and means of the problem in relation to interdisciplinary arrangements also raise issues of a more general kind; namely of the role of mundane practical arrangements of interdisciplinarity to the kind of complexity or innovation that may take form.

I. The problem of the problem

During my fieldwork in Appleton High School, teachers would often comment on the perplexing aims or confusing arrangements of the problem or 'problem formulations' when I presented my interest in interdisciplinarity.

While some teachers and managers applauded the arrangement of interdisciplinary assignments as problem-oriented projects, others expressed confusion or even skepticism. Several teachers emphasized that working with problems offered exciting opportunities

for developing new ideas. Some noted that their training in problem-based project work from an interdisciplinary university had now become a resource.[153] Other teachers, however, expressed a sense of disconcertion. Particularly teachers of languages, such as Danish, English or German told me that they found that the emphasis on problems framed interdisciplinary assignments in favor of Social Science. A German teacher, for example, told me that before the reform, interdisciplinarity would be arranged around a theme. It could be German and Music working contemporaneously on Goethe, approaching his works each their way. Interdisciplinarity did not have to involve a problem, she said, indicating a sense of mishap.[154]

This disconcertion about the problem as a technique for organizing interdisciplinarity also pertained to the technique of problem formulation. This technique, formulated as part of an engagement with defining problem-oriented project work in the 1970s now figured centrally in the descriptions of the new interdisciplinary project assignments. At the time of my fieldwork, however, there was a controversy at Appleton high school about the vocabulary for conducting these problem formulations. Paul, a teacher of Social Science, told me on several occasions that there was confusion and disagreement around how to work with a problem and make a 'problem formulation.' He raised the issue in a working group formed by the management on the organization of the courses in General Study Preparation, describing it as a lack of a "common conceptual apparatus:"[155] While he was working with the 'problem formulation' through the three concepts "describe, analyze, discuss," others were using interrogatives, such as who, what, why, how.[156] The technique of the problem, it appeared, was not only challenging some groups of teachers, but also causing controversies over procedures and ways of arranging interdisciplinary assignments.

Eric, for his part, pointed to what he called an "awkward construction" of the problem in interdisciplinary assignments. There was, he said, a "paradox" between what he described as a "discourse" on complex problems of the real world, which he found to reflect a "normative position," and on the other hand, the practical arrangement of interdisciplinary assignments, where students were to combine two disciplines.[157] To Eric, the problem of the problem concerned the contradiction between the ideas of complex real world problems and the arrangements of interdisciplinarity that he found did not reflect these ideas.

In different ways, these teachers were thus pointing to issues of the means and ends of the problem. For some teachers, the specific means and ends of the problem was somehow seen to challenge their approach to teaching, favoring the social sciences. Others wanted to ensure a specific set of means and ends by standardizing procedures of problem formulation. And still others, pointed to the contradictions of means and ends in a discourse of complex real world problems and a practical arrangement of combining two disciplines. In the following, I will take a closer look at what different means and ends were associated with the problem in high school education at this time.

II. Innovation and problem-oriented project work

The idea of innovation was a central theme in the introduction of interdisciplinarity with the 2005 high school reform. As I showed in chapter 4, the idea of innovation was a key issue in the debates on interdisciplinarity in Danish high school education from mid the 1990s. And this preoccupation with innovation was also central in the proposal for a high school reform in 2003, where the emphasis on "actual study competences" was presented in terms of "innovation" and "entrepreneurship" (Undervisningsministeriet 2003b:§3.5, Undervisningsministeriet 2003a:11). The technique of project work in these writings was presented as the means of fostering such innovation and entrepreneurship. Indeed, the students' "independent preoccupation with a problematic" through "project work" was presented as a key example of new work forms that would foster "active participation" and "realize the main aims of the reform," namely the double aim of "strengthening the educational standard as well as the students' actual study competences." (Undervisningsministeriet 2003b:§3.5).

Similar to the technique of problem-oriented project work of the 1970s, the notion of the problem was described as a "work form" and in relation to "problem formulation" (cf. Undervisningsministeriet 2003b:§3.5, Undervisningsminsteriet 2004b, bilag 7). In the reform program, this connection between problem-oriented project work and innovation was most clearly expressed in the new course construction of General Study Preparation. Here, the students' work with "complex problems" was described in relation to an aim of "challenging the students' creative and innovative abilities and their critical sense in their use of knowledge" (Undervisningsministeriet 2004b, bilag 9).[158] The learning objectives

included the point that students were to become capable of "applying different methods to illuminate a complex problem" and able to "formulate and reflect upon problematics of single disciplinary, multidisciplinary and common-disciplinary character" (ibid.). The reform programs, thus closely connected the technique of problem-oriented project work similar to the 1970s to a discourse of innovation: work with a complex problem in these reform texts figured as a means of fostering competences of innovation in the students.

In the policy program, we thus encounter the first conjunction of means and ends connected to the problem, namely that between the technique of problem-oriented project work and the aim of fostering innovative abilities.

III. The problem and what lies behind

The aim of training students' creative and innovative abilities was less obvious in the more instructional discourses on interdisciplinary assignments at the time of my fieldwork. In the announcement of the exam in the 3-year interdisciplinary course General Study Preparation, the problem appeared in another conjunction of means and ends. Not unlike the definitions of the 1970's problem work that I described in chapter 3, the problem here figured as a means of uncovering essential contradictions and relations of society:

It is ten minutes to twelve on the 28th of January 2013. Karen, a pedagogical manager walks from the office to the teachers' room with a box of wine to give to Rose, a teacher of math and computer science in her 50s. "We want you to have these," Karen says. "If you hadn't noticed, we would have been in great trouble," she adds laughing. Rose had accidently noticed that the date had been changed for the Ministry of Education's official pronouncement of the exam topic in the yearly interdisciplinary exam for 3rd year students.

The managers Carl and John are making the projector ready to show the film at 12 exactly. Carls holds the DVD from the Ministry of Education in his hand. The 3rd year students are gathering at the tables in the assembly hall. Many of the students are also eating, a few of them take out a notebook and pen. Carl walks up to the screen, smiling. He takes the microphone and says welcome. "The theme of this year's exam in General Study Preparation is 'Fighting for the good life,'" Carl says, "and what we will show you in a minute is the video

material that is a kind of appetizer presenting different perspectives on this theme." Carl gives sign to John, who starts the film.

The film opens with loud music. It shows two students who are watching a screen where a series of pictures roll up illustrating possible cases of an interdisciplinary project assignment on 'fighting for a good life.' Images of the trial of Socrates, cancer treatment and technological development in media are accompanied by a deep voice-over saying:

"The fight for the good life is taking place everywhere, but the understanding of what the good life is has changed through times and differs from culture to culture. The good life is dependent on natural resources, social relations and cultural opportunities, and the good life is being interpreted and presented in fiction, arts and non-fiction. Many conflicts and fights over values have their origins in different perspectives on the good life. The fight for the good life often has its driving forces in technological and societal development. The fight consists of an ideal, an opponent and a path. Behind this lie fundamental assumptions of what the good life is. The fight can have different aims like human rights or the access to resources. The fight can be turned towards nature, towards habits and attitudes, towards those in power, or you can be your own enemy. A fight for the good life can be fought in many ways, by groups or individuals. The means of this fight can be technology and scientific development, education, art or particular perceptions, or it can be putting grand narratives into discourse. You should choose a case where a fight for the good life is central. You should study and discuss both the understanding of the good life that lies behind, and the means of the fight in relation to the aim. You should make a problem formulation and a synopsis that illuminates a case of a fight for the good life through the use of knowledge and methods from two disciplines. The methods should be different, and one of the disciplines should be a subject you are studying on at least level B."

The film finishes with a description of the features in the 'inspiration room' at the national educational site, emu.dk. Carl thanks everyone for listening and says: "During the next couple of weeks you should meet with your supervisors to get the process started. The document where you can see who your supervisors has been put on the intranet." John turns off the projector, and the students start walking to their classrooms.[159]

In this announcement from the Ministry of Education, the problem appeared in relation to the notion of problem formulation. Yet, it was also implied in the notion of "case" [sag],

which had gained grounds in the formal descriptions of the interdisciplinary courses and exams at the time of my fieldwork, indicating the influence of German critical education theorist Wolfgang Klafki (Undervisningsministeriet 2013, bilag 7, cf. Undervisningsministeriet 2004c).

The notions of case and problem formulation here were drawing attention to what could be a suitable topic for the exam paper, how to ask questions, and what material to collect. In these descriptions, a specific conjunction of mean and ends appeared. A case was described as being one where "a fight for the good life is central," but also one that allows for the "study and discussion" of the "understanding of the good life that lies behind," as well as "the means of the fight in relation to the aim." In other words, these instructions for students' work with a problem were directing attention the connection of problems to underlying contradictory structures of society. The aim of a problem or a case was thus to study and discuss in a way which uncovered "fundamental assumptions" and interest conflicts. Indeed, the case was connected to a procedure in approaching a problem, namely the tracing of an ideal, an opponent, and a path.

The concept of "case" is indicative of this rationality of uncovering contradictory structures of society. The concept of case is similar to the wordings of German education theorist Wolfgang Klafki, whose works became particularly influential in the Danish high school education in the context of the reform, and has for years been mandatory reading in the teacher training courses (cf. Undervisningsministeriet 2013, bilag 9). During my fieldwork it was a common understanding that the concept of 'case' that began to circulate in relation to project assignments was derived from the writings of Klafki.[160] Klafki's works have since the 1970s combined didactics with critical theory developed by the Frankfurter school, insisting on the role of education in changing society (Uljens 2005:71). His concept of "case" relates to his emphasis on 'Categorial Bildung,' which involves the idea that education (*Bildung*) includes both the acquisition of content and the shaping and development of the individual's way of relating. The "case" reflects an approach to didactics that underlines the role of exemplary problems in such a process. It is closely related to Klafki's emphasis on learning through what he calls "global and epochal key problems," which count peace, environment, inequality, modern communication technologies and the relation I-you (Klafki 2001:97). In other words, this notion of case, indicates a specific didactical tradition related to German critical theory, which proposes

global or societal problems or cases as devices for exemplary categorical learning, whereby students were seen to learn (general) categories by engaging with the particular.

In sum, the problem – or case – in its instructional expression at the time of my fieldwork, then, conjured a didactical technique with a specific rationality of uncovering fundamental assumptions and interest conflicts. These dispositions may elucidate why teachers felt that working with the problem favored social studies. And they were indicating what Eric called a normative position.

In addition to this rationality, however, the announcement from the Ministry also connected problem formulation with yet another conjunction of means and ends, namely to an arrangement where a case was to be analyzed through the use of knowledge and methods from two disciplines. Here, the problem or case was defined as being one whose "illumination requires more disciplines," and it must be a combination of two disciplines that the student has studied on at least level B (Undervisningsministeriet 2013, bilag 7, cf. Undervisningsministeriet 2004b, bilag 7). This arrangement of combining two disciplines in an interdisciplinary assignment was what Eric found was in conflict with the discourses on complex real world problems. Let us take a close look at how the problem emerges in the mundane everyday arrangements of interdisciplinary assignments.

IV. Combining disciplines with problems

At Appleton High School, supervision for the interdisciplinary exams and assignments were organized around the ministerial demand of combining two disciplines. The management first collected the students' wishes for the two disciplines they wanted to combine, and assigned two teachers as supervisors, representing each their discipline. Teachers then arranged supervision sessions in breaks or at times when there are no lessons. They invited 3-4 students for supervision at the time, each was writing individual assignments. There were typically 10-15 minutes for the discussion of each student's assignment. The assignments were later assessed by these two teachers, or in the case of General Study Preparation by two teachers from a different high school representing the two disciplines that were combined.

In the first of the supervision meetings, the teachers would often help students find or establish a topic that could serve as an interdisciplinary problem for making a problem

formulation. In these meetings, teachers and students discussed the student's interests, whether there was appropriate literature for an assignment, and whether the problem could encompass both disciplines' methods or knowledge areas. In this way, the process of establishing a problem was on the hand conditioned upon the combination of two subjects on B-level, but the work of establishing a "case" or a "problem" also involved a range of other practical matters.

Settling a problem and formulating it in a way that allowed for the combination of two disciplines' different methods was not always an easy exercise. Here, a supervision session with the Biology teacher Thomas and Danish teacher Diana shows their work of settling a problem and formulating it in a way that allows for the combination of their disciplines' different methods.

Supervisions for the exam in General Study Preparation are now running in their second week. I am following two teachers of Danish and Biology, Diana and Thomas, who are sitting in a classroom where they have arranged to meet with the three students that they are supervising together. The students are entering and sit down with Thomas and Diana around the two desks that have been put together. The students write their assignments individually, but in these first meetings, Diana and Thomas have arranged for them to be supervised together. The supervision is only 10-15 minutes per student, and they might learn something from listening to each other, Diana has explained me. It is their second meeting in the process of preparing a synopsis for the AT-exam. As they sit down, Diana, says hello and turns to ask one of the students where she is in the process.

Student: I would like to change topic and work with anorexia like [the two others]. I have worked with obesity in the last interdisciplinary exam project, SRP, so I think this makes sense.
Thomas: What issues would you work with then?
Student: I would look at the different kinds of eating disorders and then analyze this short story. (She points to a book that she has brought with her)
Thomas: Where does 'the good life' come into this topic – seen from the anorectic's point of view?
The student seems to think about this question, but looks over at Diana, who takes up the thread from Thomas.
Diana: Perhaps that's fine because they will probably have the same censor, and then it is a good thing that they have different angles.
Thomas: I think it is a little bit tricky, because biology is coming in rather negatively in relation to the point of view of the anorectic. I have a hard time finding good arguments that what the anorectic is doing is fighting for a good life. …Biology comes in negatively with a raised finger. … I have difficulties finding biological mechanisms – I mean, it is something psychological, right? I don't know the explanation, but I

haven't seen any brain scans saying that this is how the brain works in relation to anorexia. I am worried that I cannot find a biological argument for the ways in which this is the good life.

Diana: But do you need that? In Danish there isn't an argument like that.

Thomas: I would like Biology to explain the methods for achieving a good life.

Diana: Isn't there something about the ways in which the stomach gets smaller when you starve yourself?

Thomas: It is still not a fight for a good life.

Diana: Maybe we could be a bit pragmatic and…

Thomas: And if I cannot come up with ideas, I would say: do something else…

Diana: And what would that be? How would you frame it? Should she analyze this documentary and then discuss the way in which this disease is depicted and its way of creating an argument in relation to curing these people? For me that would also be fine, because Danish has methods to do both. … could we ask instead what are the consequences for the good life? What does it take to starve to death, the different stages. I am just trying to find a biological angle here. But off course, I am not the biologist here, sorry Thomas.

Thomas: Yes, there are a lot of things you could look at, whether for instance you get minerals or not; you could look at that. But when the assignment is about the good life, then this is a bit backwards to use biology to say what goes wrong. You will simply have a hard time doing what is being asked for, to account for both means and ends.

Diana: Why can't Biology be part of this? There are several fields in this, but maybe Biology doesn't have to be part of it all.

Thomas: But it would be nice to have something biological to say about why you become an anorectic.

Diana: But you could easily describe what happens in the body when you are starving yourself? Well, we have to find a solution.

Thomas: I think you will have difficulties using Biology if you want to live up to the requirements of describing the methods that your are using – because it is only related to eating too little.

Diana: But what about the kinds of foods, then?

Thomas: But that is not really going to be an interesting discussion.

Diana: I guess the two of you should meet, because I am pretty sure that Danish can fit in either way you formulate it.

Thomas (to the student): You should go home and write about how biology can contribute in describing the fight for a good life – in the fight to get out of this anorectic situation. That would certainly be more fruitful.

Diana: We are 10 minutes behind schedule, so the two of you have to work it out together.

These hectic negotiations between Diana and Thomas may give the impression of teachers taking over the conversation, rather than supervising the process of the students' work and realizations. While not all supervisions were as hectic or dominated by teachers, most supervision sessions I observed, involved the kind of work reflected in these negotiations:

the intense labor of negotiating a topic and a way of formulating a problem that allowed for two disciplines to be combined, and for the application of their methods.

This exercise of finding a good problem also involved considerations of what literature was available, and what ideas a possible censor might have, depending on their training or similar assignments written. Teachers would often look through the books that students had brought from the library; they would suggest literature and refer students to the school library or the book deposit.

Moreover, formulating a problem also took into account the assessment. Thomas' insistence on biology being a positive contribution relates to how the interdisciplinary assignments were assessed. The interdisciplinary assignments were assessed by a teacher of each of the two disciplines that were combined. Formulating a problem, then, was also a matter of ensuring that each discipline was represented in such a way as to get a good assessment by a discipline-based teacher.

On the way out of the classroom, I talked to Thomas about what topics he found worked well in these interdisciplinary projects. He said that what he found important was that the student formulated a really good problem, and was able to pose questions from that problem. He explained how important it was to be able to analyze something, and then show how the disciplines could ask questions that would illuminate a case from more "perspectives."

In these mundane practical arrangements of project assignment supervision, a third conjunction of means and ends thus appears, as the problem here also figured a means for combining two disciplines into one interdisciplinary assignment. The problem here was a junction for the application of disciplinary knowledge, a means of combining two different disciplinary perspectives, ensuring the flaunting of each discipline's distinct contribution. It was a matter of combining disciplines with problems.

The outcome of this, as is also indicated in the supervision session, was that students often chose the same topics for these interdisciplinary assignments. In Appleton High School, the requirement that this exam must combine one discipline that students study on at least level B, and must represent "different methods" had had the effect that some disciplines were more often combined, such as Danish, History, English, and Social Science, whereas disciplines that ran for only a year, such as Drama, French, Spanish, appeared less often as a combination in these assignments.

Teachers and managers sometimes commented on what they described as "peripheral" or even unimportant problems that were repeatedly chosen by the students, or the fact that they had to supervise or examine topics they did "not know anything about," as one teacher formulated it.[161] Such topics included Egyptian mathematics, or the history of radar technology. Moreover, as Eric noted, these were not strikingly "complex." Its primary quality, rather, was as a means of combining of two disciplines.

Conclusion

In this chapter, I have examined the different conjunctions of means and ends figuring under the rubric of the problem, as it appeared in relation to the arrangements of interdisciplinary assignments. Unpacking the different discourses and practical arrangements surrounding the problem, I have sketched out three different conjunctions of means and ends that co-existed under the rubric of the problem during my fieldwork. The first such conjunction related to a discourse on innovation, in which the problem figured as a means of fostering innovative abilities. The second appeared in the instructions for an interdisciplinary exam, in which the problem appeared as a means of uncovering fundamental assumptions and interest conflicts in society. Yet, as we have seen, a third such conjunction appeared in the mundane practical arrangements of project assignment supervision where the problem was a means for combining two disciplines in one interdisciplinary assignment. Such arrangements implied the replication of certain problems that teachers found to be neither strikingly important, but whose primary quality was that they allowed two specific disciplines to be applied and combined. In this way, ideas of complexity, innovation and uncovering societal contradictions were displaced in the day-to-day practical arrangements of the interplay of disciplines.

Nevertheless, these different conjunctions of means and ends of the problem in interdisciplinary assignments, I argue, are telling of the configuration of interdisciplinarity in the reform in 2005, and the way it, on the one hand, was justified by a discourse on innovation, and on the other was arranged through translated techniques once connected to an emancipatory ambition of radical participation through the connection of personal experienced problems and contradictions on society. But it is also telling of the specific role of disciplines in the practical arrangements of the interplay of disciplines, where

disciplines were not secondary to a problem, or areas to be confronted for their assumptions, but rather worked as perspectives to be combined and applied as an explicit contribution.

In this way, tracing these different expressions of the problem and the means and ends associated with it, offers a view of the specific stakes of the day-to-day governing of interdisciplinarity in high school education after 2005. Yet, it also raises issues of a more general kind; namely of the role of mundane practical arrangements of interdisciplinarity to the kind of complexity or innovation that may take form. In the next chapter, I will take a closer look at this tendency of combining disciplines in the practical arrangements, as I examine the standard for interdisciplinary assignments and the way it involves allocating disciplines to different sections.

7. Definite steps towards the unknown

"Bloom permeates everything we do," says Lea a teacher of Danish, as we are talking about her task of "ensuring progression" in the interdisciplinary study programs in Appleton High School. Lea is referring to Bloom's taxonomy of cognition; an assessment tool, formulated by a group of educators in University of Chicago in the 1950s, which outlines six progressive steps in cognitive development (Bloom et al. 1956). Bloom's taxonomy is the basis for her work on a plan for ensuring progression in the students' oral skills throughout the three high school years, she tells me. The management has asked her to make a plan that enables the coordination of the teaching of oral skills in a progressive manner across different subjects over the three-year period of a study program.

Lea's work involves making detailed descriptions of the elements of oral skills, ordering them in a progressive hierarchy and distributing them between the different courses over the three years of a study program. When I ask her how she is using Bloom's taxonomy, she says that she has not looked directly at the model, but Bloom's taxonomy is guiding her work. The model she is referring to is a drawing of a staircase with six steps, each with a headline from Knowledge to Evaluation and subcategories describing competences corresponding to each step. The competences on the highest step are "criticize, discuss, consider, defend," whereas the lowest is "describe, account for, identify, recognize, reproduce." Two arrows along the staircase indicate that moving up the stairs is also a move from simple to complex and from known to unknown. [162]

In this chapter, I am taking a closer look the technique of 'Bloom's taxonomy' and its role in the day-to-day governing of interdisciplinarity in the Danish high school education after 2005. During my fieldwork in Appleton High School, I found that this assessment tool, originally formulated in the 1950s was not only deployed as an instrument of assessment, but as a technique for organizing interdisciplinarity. Teachers used it, like Lea, as a device for planning courses across disciplines in the study programs, but Bloom's taxonomy was also the name of a standard for structuring the interdisciplinary project assignments. In both cases, the expression of Bloom' taxonomy was somewhat different from the original assessment tool from 1956 formulated by Bloom and his colleagues in University of

Chicago. The notion of Bloom's taxonomy in day-to-day interactions in Appleton high school referred, on the one hand, to a staircase model with arrows pointing towards the ever more complex and unknown, and on the other, it simply referred to three headlines of interdisciplinary assignments: 1) describe 2) analyze, 3) discuss.

My interest in this chapter is with how such an assessment standard could become a prominent part of the arrangements of interdisciplinarity in Danish high school education, but also what these specific expressions and its daily use may tell us about the governing of interdisciplinarity in Danish high school education after 2005.

To study this, I take my point of departure in Latour's approach to techniques as a *network of translations.* In particular, I am drawing on Latour's argument that techniques are complicated accumulations that assemble different actions and matters (Latour 2002:251). This accumulated character is what makes techniques form interesting sites of study, because its specific expression is telling of a series of translations and displacements through which particular modes of ordering have come to dominate (cf. Latour 1990). My aim is thus to pursue the translations of Bloom's taxonomy so as to gain a better understanding of its specific character in the governing of interdisciplinarity in Danish high school education – and the specific modes of ordering it entailed.

Following these translations of Bloom's taxonomy, I shall argue, offers a point from which to understand what characterized the governing of interdisciplinarity after 2005. I will show that the specific expression of Bloom's taxonomy is indicative of a marriage between critical, progressive engagements with interdisciplinarity and the rise of a preoccupation with performance management in education. The chapter concludes by arguing that this prominence of Bloom's taxonomy in the governing of interdisciplinarity in Danish high school education after 2005, is indicative of an entanglement of ideas and techniques, which have historically been at odds; more specifically it shows how previous problematizations of disciplinary arrangements and their critique of standardized learning processes with definite learning objectives and directly applicable outcomes have been displaced in this moment.

I. The inception and circulation of Bloom's taxonomy

What is today called 'Bloom's taxonomy' first appeared in published form with a book from 1956 called "A Taxonomy of the Cognitive Domain." It was developed in the late 1940s and 1950s by a group of education scholars under the auspices of Benjamin Bloom. Bloom, who held the position of Associate Director of the Board of Examinations of the University of Chicago, was allegedly hoping that such a taxonomy of cognitive progression would "reduce the labor of preparing annual comprehensive examinations" (Krathwohl 2002:212). The efforts to make a taxonomy of cognition, however, also seems to reflect the preoccupation with learning and development that echoed the work of development psychologist Jean Piaget, whose ideas had become gospel in the US in the 1950s (Conway 2000:59). Bloom and his team of researchers were creating a generic model, which was not bound to specificities of curriculum, but centred instead on human cognition. Introducing a "range of possible educational goals or outcomes in the cognitive area," the model emphasized "activities such as remembering and recalling knowledge, thinking, problem solving, creating" (Bloom et al. 1956:2). This distribution of cognitive categories on a scale from lower to higher order cognitive forms allowed for a mode of assessment directed at a generalized learning subject, rather than being tied to an order assumed in specific educational material.

In the book from 1956, Bloom's taxonomy of cognition is presented as a progressive model consisting of six levels, where each level presupposes the skills in all the lower levels. The levels are described through a list of six points, placed in the appendix of a 100 pages book that explains the six different categories and presents examples of ways of formulating assignments and assessing the students within each category. The first level is called Knowledge (of specific information, abstract schemes, and theories or structures), and it is followed by Comprehension, Application, Analysis, Synthesis, and Evaluation. The highest level is called Evaluation and involves the student's ability to "judge" and "evaluate" the value of what the student is learning about:

> **Evaluation:** Judgments about the value of material and methods for given purposes. Quantitative and qualitative judgments about the extent to which material and methods satisfy criteria. Use of a standard of appraisal. The criteria may be those determined by the student or those which are given to him (Bloom et al. 1956:207).

The progressive scale, thus, ranges from having knowledge of a subject towards the ability to apply, synthesise and finally evaluate the value of a given material or method in relation to a given task. In this way, different kinds of activities are related to the different cognitive levels: from gaining specific information, applying it, towards writing or speaking about it in more or less synthesizing or evaluative fashions.

Bloom's taxonomy became a huge success. By the early 1980s, Bloom's taxonomy was said to be the most influential tool in teaching in the USA (Phil & McGaw 1981:93, Paul 1985:36). The circulations, debates and transformations of Bloom's taxonomy are telling of the changes in the modes of conceiving and organising education in the west during the rise of mass education in the second half of the 20th century. The book A Taxonomy of the Cognitive Domain has been translated into at least 22 languages (Krathwohl 2002:213). Being deployed in education systems world-wide, particularly in the US and Australia, it was modified and mobilised for various purposes, portrayed as pyramids, circles, triangles etc. Its design and assumptions has been the subject of controversies in the field of education: The cumulative hierarchical structure of the six taxonomic levels of Bloom's Taxonomy has been questioned (Madaus et al. 1973, Hill & MacGav 1981:93, Seddon 1978:307), and the assumptions that it presented a neutral evaluation tool that transcended age, gender, type of instruction and subject-matter content was disputed (cf. Furst 1981:421, Hogsett 1993:28, Paul 1985, Sockett 1971, Stedman 1973).[163] However, it was also mobilised in studies emphasising the need for "dynamics thinking" rather than teaching students facts (Roberts 1976), as well as for its value for instruction in the 'critical thinking movement' (Paul 1985).

In the early 2000s, a former member of Bloom's team as well as a former student of Bloom's presented a modification of the 1956 taxonomy (Anderson & Krathwohl 2001). This revised taxonomy stressed the actions of learning by turning the nouns into verbs, and replacing the notion of "evaluation" with that of "creating." The modification also included the introduction of a new subcategory of Metacognitive Knowledge, emphasising the need for "helping students become more knowledgeable of and responsible for their own cognition and thinking" (Pintrich 2002:219 cf. Krathwohl 2002:214).

II. The emergence of Bloom's taxonomy in Danish education in the 1970s and its relation to interdisciplinarity

Bloom's taxonomy found its way into the pedagogical debates in Denmark in the 1970s. Writings by Benjamin Bloom on problem-solving processes of college students and methods in personality assessment' had already appeared on the shelves of Danish libraries in the late 1950s (Bloom 1950, Stern et al. 1956). Yet, Bloom's taxonomy first figured in Danish pedagogic handbooks from the 1970s (Ålvik 1972). The controversies over the taxonomy as well as the different modes of mobilising it are telling of how this standard of assessment became so pervasive in the midst of an engagement with interdisciplinarity in 2005.

In the early 1970s, a paper by Benjamin Bloom appeared in the major public disputes over the role of exams and marks (Bloom 1971[1968]). In the spirit of the 1968 student revolts, the introduction of the numbered 13-scale in institutions of higher education had fostered public action.[164] Students had burned exam papers in public, teachers of the agricultural college had gone on strike, and professors of the teachers' college refused to use the new scale (Blume 1971:1, Information 1971:1,8). In a compendium collected by a student organisation aiming to "foster political debate and critique of the system of examination," Bloom was introduced as "one of the most recognised authorities in this area" (Blume 1971:4). His paper "Learning for Mastery" figured alongside arguments against what was called the increased central governance, the problem of competition and "social discrimination" of students that was said to be a consequence of the introduction of the 13-scale. Bloom's paper was said to represent "an attack on the myth of normal distribution, which is the theoretical foundation for the use of marking scales" as well as offering a "series of arguments against the existing structures of teaching and exams," in particular, the "hypothesis that 90 % of those who have received teaching will be capable of acquiring the optimal knowledge" (Blume 1971:9). Bloom's work, then, was mobilised as a critical position against the techniques of assessment in education.

Throughout the 1970s, Bloom's taxonomy of cognition gained popularity in the field of education. Predominantly through the influential book on teaching 'Undervisningslære 1' (Ålvik 1974),[165] where it figured in a chapter on organising teaching around objectives (Reisby 1974). But the taxonomy also figured in a translated guide on how to state

behavioural objectives for classroom instruction (Gronlund 1972, referenced in Hultengren 1979).

The relationship between the engagement with interdisciplinary education and Bloom's taxonomy of cognition, however, was unsettled. Knud Illeris, who was affiliated with the new Roskilde University Centre,[166] critiqued Bloom's taxonomy in his book 'Outline of an alternative didactics,' where he proposed interdisciplinary problem-oriented project work (Illeris 1974). In line with the on-going critique of 'teaching technologies' [undervisningsteknologier], Illeris was sceptical that Bloom's taxonomy would involve the exclusion of the participatory prospects of teaching (cf. Illeris 1972:189, Andersen et al. 1979:88).

> In many cases, for example, in most university studies, there is still only very general or no statement of goals (or the goals are defined through exam regulations – cf. Kvale 1970, s. 80-84). [...] In other cases, eg. in the vocational programmes, teaching technologies with its demand for formulating goals in precise behaviouristic terms (cf. Bloom et al. 1956, Krathwohl et al. 1964, Mager 1968, Reisby 1972) meant that entire education programmes have been developed through lists of several thousand detailed sub-targets, so "there is no doubt what each class should be devoted to and it is mildly speaking microscopic what is left to the students and teachers to decide. (Illeris 1974:84)

For Illeris, the problem with Bloom's taxonomy, then, was the focus on learning objectives, which, even if they were formulated in general behavioural terms, allowed for a centrally controlled mode of governing education that undermined the participation of students and teachers in arranging teaching. This critique of the implications of detailed curriculum plans and exams was also reflected in the popular book on problem-oriented project work that Illeris later was involved in:

> What is the use of such beautiful formulations [about personal development, independence, responsibility and critical sense] when the students actually, if the demands for curriculum and exams are to be met, are becoming submissive, competing with their friends and becoming subservient and uncritical? (Berthelsen et al. 1977:18)[167]

Bloom's taxonomy of cognition, however, came to be discussed and applied widely in relation to interdisciplinarity and problem-orientated project work in the new interdisciplinary university center of Aalborg[168] (cf. Hultengren 1979:252; Laursen &

Olsen 1991:40; Olsen & Pedersen 1997:15). In the late 1970's, psychologist of Aalborg University, Eva Hultengren, for example, pointed to the advantages of Bloom's taxonomy in relation to evaluating interdisciplinary problem-oriented projects (Hultengren 1979:252). In her book 'Interdisciplinarity as Political Teaching,' Hultengren was concerned with whether it was "possible through an interdisciplinary organisation of teaching to advance specific forms of consciousness/political awareness," more specifically "to reach a marxist mode of realization" (Hultengren 1979:2). Discussing the problems of evaluating interdisciplinary problem-oriented projects, Hultengren proposed Bloom's taxonomy for evaluating the "intellectual skills or proficiencies" of interdisciplinary project work, whilst she contended that a taxonomy of the affective domain, also published by Bloom and his team, was more appropriate for the evaluation of the "process of group work" (Hultengren 1979:252). For Hultengren, deploying Bloom's taxonomy to evaluate "intellectual skills or proficiencies" did not appear at odds to the aims of advancing a specific political consciousness through interdisciplinarity.

Bloom's taxonomy continued to play a key role as a technique for governing interdisciplinarity and problem-orientated project work in Aalborg University. In the early 1990s, a pamphlet from a research project on Technology and New Pedagogies in Open Education in Aalborg University Centre, Bloom's taxonomy was highlighted in a discussion of how 'project work' might be fostering "higher cognitive skills" in the students (Laursen & Olsen 1991:7). Following Hultengreen's writings, the authors described Bloom's taxonomy as a "useful" technique for planning and evaluating interdisciplinary project work (Laursen & Olsen 1991:40, citing Hultengreen 1979:246-263). They stressed that its generic language "avoids specific value-laden concepts" and is "so broad that it can include any goal of education," including what was now called the "transgressive" and "transformative" purposes of interdisciplinary project work (Laursen & Olsen 1991:25, 62, 64).

III. The re-emergence of Bloom's taxonomy in Danish education in the 1990s

From the mid 1990s Bloom's taxonomy surfaced anew in relation to an emergent discourse on the quality of education. In those years, techniques for measuring and

ensuring quality became key themes in Danish education policies. The emphasis on measuring quality both appeared in relation to the preparation for the national surveys of the OECD that assess and compare countries (OECD 1999, Undervisningsministeriet 1998:2.1), as well as in policies on workforce development, where the "financial returns of education" for students became a matter of concern (Undervisningsministeriet 1997, Undervisningsministeriet & Finansministeriet 1998, bilag 1).

As I showed in chapter 4, the re-emergence of interdisciplinarity as a political preoccupation in the 1990s went hand in hand with discussions of techniques of measurement in what was later named the Program for International Student Assessment (PISA) of the OECD (OECD 1999). In several Danish policy papers, interdisciplinarity was presented together or interchangeably with concept of 'Cross Curriculum Competencies' – a concept that Danish representatives had allegedly worked to get on the agenda in the OECD to create indicators that reflected competencies other than those tied to subjects like maths or physics (Undervisningsministeriet 1998:1.1, cf. Undervisningsministeriet 1997:10, OECD 1999:8)

The PISA tests, which were instituted in the early 2000s, however, were not the only manifestation of the preoccupation with measuring the quality of education. In these years, the foundation of a new national Institute of Educational Evaluation was initiated, just as new policies on "visible quality"[169] and a variety of 'models' for governing institutions of education, such as 'decentralisation' and 'taxameter governance' were promulgated in the so as to ensure the quality in education (Undervisningsministeriet 1998:3.0). In the year 2000, a policy passed on 'transparency in the educational sector,' demanding that marks and evaluations of all educational institutions were to be made public (Retsinformation 2000). In these governmental policies ensuring quality was connected to techniques that would make 'visible' or 'transparent' so as to measure and compare performances.

This emphasis on making visible also materialized in the discourse on Bloom's taxonomy and its usefulness in situations of organizing learning. In discussions of experiments conducted in Danish high school education, Bloom's taxonomy now appeared as a technique that was deployed to "enhance the level" by "making visible" the "Bloomian demands to encompass descriptions, analyzing/comparing and evaluation and putting into perspective in the same project" (Undervisningsministeriet 2001:77).[170]

In these years, Bloom's taxonomy also came to figure centrally in a re-conceptualization of project work in the manual for students at Roskilde University on problem-oriented project work (Olsen & Pedersen 1997). Here, Bloom's taxonomy was presented as a model for describing "issue-based academic competence," serving to "clarify the particular kind of academic competence fostered by problem-oriented project work" (Pedersen 1997:15).

The rising preoccupation with Bloom's taxonomy of those years, however, did not pass uncontested. In a publication for the Ministry of Education, for example, Bloom's taxonomy, was said to involve a "divisive and very detailed mapping out of learning objectives that cannot support the intentions of holistic learning and especially not the intentions of making the pupils co-responsible for and engaged in the unfolding of the didactic space" (cf. Undervisningsministeriet 1999).

Such reservations also about the limits of controlling learning also characterized ministerial publications on learning objectives. In a catalogue providing "inspiration to the future education in natural science" devised by the government agency, the "potentials" of introducing "descriptions of competences in the natural sciences" is presented with somewhat hesitantly" (Dolin et al. 2003:59). Here, the presentation of Bloom's taxonomy, was introduced a citation by the education scholar Etienne Wengers' stating that "learning cannot be designed (Ibid. 83)." This citation was presented as a way to remind teachers and didacticians that "learning does not happen as a result of teaching design, but as a response to it: Students will always actively interpret, negotiate and act in response to the planning of teaching" (Ibid. 83). In the ensuing discussion, the existing deployment of Bloom's taxonomy in what is called 'the visible goals policies' was critiqued for not reflecting "a conscious thinking regarding the progression in the visible goals" (Ibid. 88).

Despite the reservations, Bloom's taxonomy was circulated in relation to the demands for learning objectives and in relation to the notion of 'competence.' Bloom's taxonomy began to appear in handbooks for students on writing assignments at this time (cf. Rienecker & Jørgensen 2005:58ff), and it became prevalent in the emergent field of 'university pedagogy' where it was discussed side by side with the so-called 'Solo Taxonomy,' and the emphasis on "aligning" learning objectives with forms of examination (Andersen 2010, cf. Undervisningsministeriet 2003:89, 95).

This preoccupation with visibility and competence also characterised the blossoming of Bloom's taxonomy in Danish high school education in the 1990s. Although Bloom's taxonomy has figured as part of the pedagogic training for new high school teachers since mid 1980s (Witt-Hansen 2006), it now became the topic of lengthy pedagogical deliberations. In the late 1990s Bloom's taxonomy appeared in a handbook on high school didactics called Pedagogy and Perspective (Damberg 1999a). Written by a collective at University of Southern Denmark responsible for the pedagogic training program for high school teachers, this re-engagement with Bloom's taxonomy had wide impact in the field of high school teaching. The book was presented as reflecting an ambition of re-engaging with 'didactics.' The editor argued for what he called a more instructional mode of approaching pedagogic questions, reflecting a "tightening up to come to grips with the subjectivism and relative truths of postmodernism, on the laissez-faire pedagogy etc." (Damberg 1999b:105).

The presentation of Bloom's taxonomy in this book reflects this new engagement with didactics. The discussion of Bloom's taxonomy was presented as part of a description of different theories of developmental psychology and theories of hierarchies of learning. Reinvigorating the psychological theories of Piaget "who has for some years been shrugged off, but are now starting to re-emerge," (78) Bloom's taxonomy is presented as a model that allows working towards bringing "the material's and the students 'scheme' into correspondence" (Damberg 1999c:79). "Each time this [correspondence] succeeds, the student will move up on a higher plateau of learning" (ibid.). In other words, Bloom's taxonomy not only appears as a technique of assessment by making students' competences visible, but rather as a didactical technique for envisioning and attuning the relation between the material that the student should be learning and her cognitive schemes.

The authors present what they call a "simplified version" of Bloom's taxonomy "systematized to create a 'staircase'" (ibid.). In line with the development psychological approach, the staircase model depicts the process of learning as a course whereby one "comes into contact with the 'schemes' of the long-term memory" and may be able to "move upwards in the Bloomian taxonomy" (ibid. 86). The highest level of learning in this staircase model is "evaluation." Evaluation is described as "the ability to evaluate the total value of the learned" and it may involve relating what you have learned to something else

"internally" within the discipline, or "externally" outside it (ibid. 80). This highest level "will in many disciplines be considered as a matter of putting something into perspective [perspektivering]." Bloom's taxonomy, thus, figures as a model for arranging the relation between the material and the students' cognitive schemes in a step-by-step learning process towards a last step characterised by the students' ability to evaluate the total value of what she has learned by relating it to something else. This idea of a staircase, as we shall see, comes to be incorporated in later manifestations of Bloom's taxonomy in the gymnasium.

IV. Bloom's taxonomy in Danish high school education after 2005

In 2005, when one of the most sweeping reforms of the Danish gymnasium was to introduce the interplay of disciplines as a key organizing principle, Bloom's taxonomy reappeared in a new curious incarnation. In the first book devised for the interdisciplinary container course General Study Preparation, Bloom's taxonomy was discussed, depicted as a staircase with six steps (Føge & Hegner 2005:129). At the time of my fieldwork, various handmade and copied drawings of this staircase model were circulating, and a version also appeared in the high school pages on the site of the government agency of education, the emu.dk.[171]

The staircase model of Bloom's taxonomy was presented in a chapter called Taxonomic Levels. It was following a presentation of the new 7-level marking scale and the statement that "a grading scale should in an unequivocal way express to what degree a performance meets the aims in the system of education." The taxonomy, it said in the caption, reflected Bloom's efforts to categorise the level of difficulty of those questions that all teaching is based on" (Føge & Hegner 2005:129). Depicting Bloom's taxonomy as a staircase, this materialisation inculcated the description of the taxonomy in Pedagogy and Perspective 6 years earlier (Damberg 1999c:79).[172] The staircase image encapsulated the idea of a progressive scale in a simple and symbolic fashion. Each step contained the headline of one of the six points of Bloom's original text, depicting steps escalating from Acquaintance, Understanding, Application, Analysis, Synthesis and finally to Evaluation. The steps stipulated the idea of the course of learning as a progressive development, not circular or triangular, but a step-by-step move towards a final and defined stage.

Under each step, a list of keywords were listed, said to describe "what you can do if you want to meet the goals of this step" (Føge & Hegner 2005:129). In the first step 'Acquaintance,' a student should be able to "describe, account for, acquire, mention, define, reproduce, recognize." And on the top step, "Evaluation," the student should be able to "criticize, discuss, consider, defend" (ibid.). At this highest level, it said in the caption, "you should be able to consider and judge to what extent, for example, the proposed solutions to the problems are good or bad. You should be able to consider different alternatives from, for example, external and internal criteria of evaluation" (ibid. 130). The lists of competences under each step, thus, attached concepts referring to specific activities to each step, ranking not only different general cognitive orders, but specifying and hierarchizing the different kinds of activities: "Comparing," "selecting," "combining," "defending" and "discussing" were here figuring as higher ranking than "accounting for," "identifying," "defining" and "explaining." In this way, it invited students and teachers to consider their performance or to attune what they were teaching to these scaled activities.

This staircase of ranked lists of competences was accompanied by two arrows; one vertical described as a move "from the simple - to the complex," and one along the staircase accompanied by the text "from the known - to the unknown." Although the text did not specify what the relation is between the arrows and the staircase, these arrows suggests a different mode of ordering than the specified steps. While the steps in the staircase picture a rather unambiguous step-by-step learning process with specified lists of activities through defined stages, the arrows insinuate an indefinite move towards the unknown. They indicate a process of learning as involving a course of action towards an indefinite – complex and unknown – endpoint. In this incarnation, learning is depicted as taking form through definite steps towards the unknown.

Bloom's taxonomy in this specific incarnation, in other words, summons two rather different approaches to learning and teaching: On the one hand, it depicts learning as a progressive development along well-defined stages with specified lists of activities or learning objectives. On the other hand, however, the model presents learning as involving a move towards the still more complex and unknown. In this way, it implies two rather different frameworks for action: On the one hand, it depicts learning and teaching as predictable processes, presupposing the duty of the teacher as instructing students according to step-by-step lists of competences that should be exercised, and where what

should be taught is important because of how it lays the groundwork for further teaching and for finally completing a definite goal. On the other hand, it indicates that learning is an unforeseeable endeavor towards the still more complex and unknown, conjuring the teacher as someone responsible of making arrangements to foster such an experimental and explorative learning process.

My point is here that this specific pictorial and discursive expression of Bloom's taxonomy both portrays an instructional, definite approach to education, as well as containing a critique of education often raised under the rubric of progressive education; that education should not be arranged around definite goals and learning objectives, but rather involves the facilitation of an active and independent endeavor in an open-ended, experimental spirit of inquiry. In this way, this specific configuration of Bloom's taxonomy is indicative of a marriage between critical, progressive engagements with education and the techniques of measurement and comparison that were promulgated as part of the preoccupation with ensuring quality through new arrangements of performance governance in education 1990s. However, this particular assemblage is not merely an indicator of different traditions and rationalities that meet on the same paper, it also invites for different forms of action: It both yields an orientation to learning as an experimental mode of inquiry with an unknown endpoint, at the same time as it encourages activities of control and evaluation of student performance from specific criteria. In other words, while this specific version of Bloom's taxonomy reflects a process of translation, its specific expression also invites for rather contradictory ways of relating to learning.

V. The definite and the unknown

During the time of my fieldwork in Appleton High School in 2012-13, the staircase version of Bloom's taxonomy had gained grounds in the everyday governing of interdisciplinarity. Its everyday use often did not involve the concrete standard, however. Rather Bloom's taxonomy was actualized in more or less habitual action, which nevertheless regulated how interdisciplinarity was taking effect.

Bloom's taxonomy was intrinsic in specific gestures or preferences. I often overheard teachers saying "that is not enough to get all the way up there," when they were discussing

interdisciplinary assignments or courses. Or when they were making problem formulations for students' project assignments, they would say: "how do we get them up on a high enough level of abstraction."[173] Such statements were sometimes accompanied by an upward gesture with the hand. I asked what 'up' meant, teachers would answer promptly that it was referring to Bloom's taxonomy. Bloom's taxonomy, it seemed, was a key actor in teachers' envisioning of courses of teaching and their evaluation of students' performance, where it was directing their valuation of higher or lower ranking forms of knowledge.

This tacit character of Bloom's taxonomy also applied to Lea's use of Bloom's taxonomy in her work on "ensuring progression" in the development of oral skills in the interdisciplinary study programs. Here, the steps of Bloom's taxonomy was part of Lea's actions to define and specify details of teaching in ways that allowed for the coordination across different teachers' teaching disciplines over time, even if she had not looked directly at the model itself, as she said.[174]

Yet, while Lea was drawing on the step-by-step depiction of learning of Bloom's taxonomy, the ideas of moving towards the still more complex unknown was also discernable in teachers' everyday actions. In teachers' work with interdisciplinary project assignments, for example, their preference for open-ended forms of inquiry was spelled. In supervision, teachers would often react enthusiastically when students brought up an unconventional and surprising topic.[175] On occasions, they would articulate this value of the unexpected and unknown. For example, after a session supervision with a teacher of Biology, when I asked what he found made a good assignment. This teacher told me of a girl, who came from an underprivileged background, and who had examined the connection between overweight and social class. It was before this connection was well-established in the public debate, he said, but she had a sense of that correlation. Her identification of this still unrecognized connection was remarkable, he said.[176]

The two rather different approaches to learning and teaching entailed Bloom's taxonomy, then, also seemed to direct daily actions; Bloom's taxonomy, it appeared, was both involved in actions of defining definite learning goals, but also in teachers' preferences and evaluations of ways of inquiring directed towards the unknown.

VI. Bloom's taxonomy as the structure for interdisciplinary assignments

The notion of Bloom's taxonomy in day-to-day interactions in Appleton high school not only circulated with reference to a staircase model. The notion of Bloom's taxonomy also referred to a specific arrangement of interdisciplinary assignment in three parts, corresponding to the headlines of describe, analyze, discuss. "Bloom's governs the way we formulate assignments," Lea explained me. She showed me a typical assignment with three headlines: '1) describe 2) analyse, 3) discuss.'

This connection of Bloom's taxonomy with three headlines was not a local invention, but the most common way of structuring students' writing in the interdisciplinary projects at the time of my fieldwork. It derived from the first book devised for the interdisciplinary course General Study Preparation after the 2005 reform. In this book, which also entailed a version of the staircase model that was circulating, these three different activities were discussed as an example of how a project assignment could come to entail elements of all taxonomic levels (Føge & Hegner 2005:129).

In Appleton high school, this version of Bloom's taxonomy was central to a procedure where students first decided on the two disciplines to be combined, then they met with the two teachers assigned and decided on a topic, and finally the teachers would meet to formulate three questions for the student, using the notions of account, analysis and discussion. During this work with making the problem formulations, teachers divided the three parts of the assignment between the two disciplines, sometimes negotiating over who got which part. The students would then spend a week at home writing an assignment, combining the two disciplines, treating each in a section.

In supervision, teachers would often guide students to writing a text that could be distributed into the three different parts. Supervising a project assignment that combined Social science with Biology, a teacher for example said: "you will mainly use the research reports in the biological part, and this is also where you can do your own experiments."

Teachers treated the three parts as representing different levels, and thus also allowing different roles for their disciplines. Often teachers would argue over getting the final part, the "discussion." They would also guide their students' so as to ensure that they had a "discussion." This could, for example, be done by finding two opposing positions. As when Margot, a teacher of Biology and Social studies said to a student "The way you are talking about this is very descriptive [redegørende]. If we are to turn this into a discussion, you

need some conflicts: What are they fighting over, what interests are at stake? In Denmark, you would have opposing interests, for example farmers vs. environmental interests."[177]

Teachers were commonly point to "description" as entailing a lower level of performance. One teacher, for example said to me that the weak students never get up on a higher level than "description." And before a supervision session, a teacher commented: "Next on is Sara, one might fear she could become a little too descriptive in this one." This teacher told me on another occasion, that "description' is what saves the weaker students." When I asked if describing something could also be analytical, he said that he meant that if the students were basically just making a summary of the attachments to the assignment, they were not getting "up there."[178]

The assumption that a "discussion" was higher ranking than an "account," however, had implications for teachers of disciplines for whom the notion of discussion did not necessarily correspond to what would count as higher or lower levels of performance. As a history teacher said, the difference between the disciplines meant that "mathematics do not have a clue what we're on to." Equally, teachers of language sometimes struggled with the notion of "discussion," as it was not necessarily reflecting the highest level of skills in interpreting a text.

Nevertheless, this arrangement of interdisciplinary assignments in three parts, allowed for a kind of interplay of disciplines that could bring together otherwise incompatible disciplinary fields, placing them side by side in separate sections.

Some teachers, however, were skeptical of the compartmentalization of the disciplines this arrangement involved. They pointed to how this fostered "divided assignments," rather than coherent texts or argued that this was standing in the way of unfolding fully the question that the students were pursuing. Some even refused to make questions around these three parts, arguing that it did not give the students an opportunity to be independent, but "locked" them into a specific structure.[179]

Others emphasized how this division in "account, analysis, discussion" made interdisciplinary assignments easier to assess. Lea, for example, explained that this way of ordering interdisciplinary assignments with explicit parts allowed for teachers to assess assignments, even if they were not experts on the topic. "That way we have covered our back," she said. "Often with interdisciplinary assignments you have to evaluate something you don't know about. Then, you lean on this: can the student describe, analyze, discuss"

[180] With the three parts as indicators of the level of student's performance, then, this division not only worked as an arrangement of the students' text that allowed for the combination of two disciplines, but also as a way of governing and later assessing students' performance.

Although the version of Bloom's taxonomy in the everyday arrangements of interdisciplinarity involved a translation through which it had come to entail elements that pointed towards more open-ended forms of inquiry, the central role of Bloom's taxonomy in these arrangements of interdisciplinary assignments nevertheless show how an arrangement for governing student performance had become key to the organization of interdisciplinarity at this time.

Conclusion

In this chapter, I have examined the technique of Bloom's taxonomy showing its prominent role in the day-to-day governing of interdisciplinarity in the Danish high school education after 2005. Tracing out the history of Bloom's taxonomy in relation to interdisciplinarity in Danish education, I have shown how it might be that an assessment standard could end up as a prominent part of the arrangements of interdisciplinarity in Danish high school education. More specifically, I have pointed to its trajectory through preoccupations with assessing interdisciplinary work in the interdisciplinary university centers since the 1970s and its emergence with the rising preoccupation with governing performance in the 1990s.

Turning attention to the specific expressions of Bloom's taxonomy in high school education after 2005, I have shown how the model circulating at the time of my fieldwork summoned two rather different approaches to learning and teaching; on the one hand, depicting learning as a progressive development along well-defined stages with specified lists of activities or learning objectives, while at the same time presenting learning as involving a move towards the still more complex and unknown. This specific pictorial and discursive expression of Bloom's taxonomy, I have argued, is indicative of a marriage between critical, progressive engagements with interdisciplinarity and the rise of a preoccupation with performance management in education.

Likewise, I have shown how another version of Bloom's taxonomy dominated the structure of interdisciplinary assignments at the time of my fieldwork. Here the notion of Bloom's taxonomy referred to a specific structure of students papers in three parts, corresponding to headlines of describe, analyze, discuss, allowing for two disciplines to be combined, yet still in a way that allowed for a generic evaluation.

Following these translations of Bloom's taxonomy and its everyday use, I argue, offers a point from which to understand what characterized the governing of interdisciplinarity after 2005. This prominence of Bloom's taxonomy in the governing of interdisciplinarity in Danish high school education after 2005 shows the entanglement of ideas and techniques, which have historically been at odds: It shows how progressive ideas formulated in previous problematizations of disciplinary arrangements now figure as concepts in arrangements of an instrument for governing performance.

The central place of Bloom's taxonomy in the day-to-day governing of interdisciplinarity, then, is suggestive of the influence of the rise of arrangements of performance governance in these years. As Marilyn Strathern argues in the case of the recent preoccupation with interdisciplinarity in British universities, the emergence of a new engagement with interdisciplinarity around the millennium was taking place simultaneously as the rise of what has been described as a form of government, which works through new vectors of accountability and audit (Strathern 2004b:79). Yet, while Strathern argues that interdisciplinarity is strangely held outside of scope of these systems, appearing itself to be an "index of accountability," this appears not to be the case in Danish high school education (ibid.).

In fact, examining the very mundane practical arrangements surrounding interdisciplinarity in high school education, we see that techniques of accountability and visibility are at the very center of how interdisciplinarity was manifested and actualized in the wake of the 2005 reform. This was the case in the arrangements of the core of disciplines, which I examined in chapter 5, showing how the teachers work with disciplinary knowledge in the arrangements of interdisciplinarity was connected to a motif of accountability, and implied turning disciplines into a perspective with a distinct contribution to the interplay of disciplines.

This was also the case in relation to the specific assemblage of the technique of the problem, which I showed both associated a discourse on innovation and a participatory

technique of exemplary work, but which in its practical arrangements involved ensuring the explicit contribution of disciplines' specialized knowledge. In the case of Bloom's taxonomy, the marriage of notions of open-ended exploration and definite learning objectives points to this somewhat surprising entanglement of a heritage of progressive techniques of interdisciplinarity with techniques of accountability.

In other words, by paying attention to the practical arrangements and the stakes and translations they imply for the governing of interdisciplinarity, we get a clearer picture of what characterizes the configuration of interdisciplinarity after 2005. What comes to light through these historico-practical studies is quite a remarkable association between resources that were developed as critiques of disciplinary arrangements for creating "passive and conforming" students (Dewey 1899:90) or passing on "fundamental dogmas of capitalist society" (Illeris et al. 1976:8) and new disciplining arrangements of governing performance. More specifically, it shows how previous problematizations of disciplinary arrangements and their critique of standardized learning processes with definite learning objectives and directly applicable outcomes have been somewhat displaced in this moment. Instead, standardized learning processes with definite learning objectives are at the very core of the configuration of interdisciplinarity in Danish high school education after 2005.

Conclusion: Rethinking interdisciplinarity

It was the puzzlement over the storms about the Danish high school reform of 2005 that first provoked me to question the practical governing of interdisciplinarity. My concern then, as now, has to do with the implications of the sticky practical arrangements for our notion of what interdisciplinarity is and how it is governed. Yet, I was also interested in the relation between the preoccupation with interdisciplinarity in the social sciences and in educational reform. I was intrigued by how the practical governing of interdisciplinarity with the Danish high school reform both spurred accusations of the overwhelming bureaucracy interdisciplinarity required, and the suspicion that it was translating postmodern ideas into educational arrangements.

The primary aim of this thesis has been to offer an understanding of what characterized the governing of interdisciplinarity in Danish high school education after 2005. Pursuing the question of *how interdisciplinarity was configured* in the aftermaths of this reform through historical and ethnographic studies, I have looked towards the practical arrangements of interdisciplinarity unfolding the specific stakes and translations to elucidate what characterized the governing of interdisciplinarity around this time.

In this way, the thesis has called attention to the ways in which interdisciplinarity is governed as at once a practical and a historical matter, whose specific stakes and translations need to be taken into consideration. Indeed, the central argument of the thesis is that interdisciplinarity is largely misapprehended if perceived as a definite concept or method, but should be approached as a contingent configuration whose particular manifestation is an outcome of specific historico-practical stakes and translations. I argue that we need to consider interdisciplinarity as related to a certain problematization of disciplinary arrangements, and the way it is governed as embedded in specific practical arrangements that may entangle rather diverse sets of techniques and ideas.

Arranged as a *re-routing* endeavor, my aim with this thesis has been to unsettle and complicate our understanding of interdisciplinarity more broadly, by looking at those concrete practical arrangements and techniques involved in its governance in the context of the Danish high school. The overall argument of the thesis is that the governing of interdisciplinarity in Danish high school education after 2005 entangles ideas and

techniques, which have historically been at odds. The thesis has shown that the governing of interdisciplinarity after 2005 is an outcome of a series of translations and entanglements coupling progressive ideas and techniques to ideas of innovation and economic growth, and to arrangements of performance-efficiency and techniques of measurement. More specifically, these studies have shown how a series of progressive movements put interdisciplinarity on the agenda as a critique of prevailing disciplinary arrangements of knowledge-making and education. These movements problematized prevailing disciplinary arrangements for creating conforming and docile students, being too concerned with scholastic effectiveness and productive outcomes. Yet, they were nonetheless soon followed by a mobilization of the idea of interdisciplinarity for aims of economic development, effectiveness and productivity. In this way, resources formulated in these moments of problematization came to re-appear in engagements with interdisciplinarity concerned with economic development, effectiveness and productivity. In other words, these historico-practical interrogations show that interdisciplinarity today is configured in ways that entangle techniques and practical arrangements of different times and with different rationalities and motifs.

In this way, the thesis offers a *re-description* of the governing of interdisciplinarity in Danish high school education through which we may begin to appreciate what about the post-2005 practical arrangements sparked such controversies and so perplexed Danish high school teachers. Considering interdisciplinarity as a configuration that entangles ideas and techniques with quite dissimilar rationalities allows for an understanding of this sticky situation of the predicament of interdisciplinarity after 2005.

Moreover, the re-routings of this thesis also include engagements with interdisciplinarity and their transformation beyond Danish education, placing the Danish case in a larger dynamic of critical engagements with disciplines and their disciplining mechanisms. Including debates within the field of Science and Technologies Studies in this picture allows for a contemplation of the interdisciplinary dispositions in the analytical approach that inspire the very conclusions of the thesis. Through these analyses, the thesis shows that interdisciplinarity has been repeatedly evoked as part of a problematization of standardized educational processes with definite learning objectives and directly applicable outcomes, but nevertheless have also been subsequently seized as a prominent model for furthering industrial innovation and performance-efficiency. As such, these

inquiries beyond the Danish high school setting sheds light on how resources meant as critiques of disciplinary arrangements are reappearing in arrangements not unlike those they were initially intended to replace. In particular, the thesis points to the way in which a motif of transgressing disciplines and confronting prevailing categories formulated in the social sciences and shaping the field of STS in the aftermaths of 1968 now circulates widely in connection to aims of innovation and effective problem-solving.

This displacement calls for a moment of reflection on the performativity of the social sciences and humanities, and on the predicament concerning their role in a continuous re-organization of knowledge-making. Indeed, current preoccupations with interdisciplinarity seem to overlook these translations of previous critiques implied in how interdisciplinarity is imagined and practically organized today. While most literature is beginning to refer to interdisciplinarity being a century old preoccupation, not much discussion exists on what was at stake when someone called out for interdisciplinarity a century ago; what proclaiming the need for interdisciplinarity was pointing towards, what practical arrangements these people were intending as an alternative to prevailing forms of disciplining, and how it may differ from today. Given that these first engagements were reflecting efforts with democratizing and fostering critical thinking, perhaps the time has come for a profound rethinking of the aims – as well as of the means of interdisciplinarity.

The point of this thesis, then, has been to broaden the discussion about interdisciplinarity, not by rendering it less practical or historical, but by placing the practical arrangements in a larger historical contemplation of the ways we organize knowledge-making and educational systems today, and how the social sciences participate in that organization.

In the first chapter, which traced a genealogy of interdisciplinarity, I laid the foundations on which the thesis would re-describe interdisciplinarity in Danish high school education, but also provided a basis for rethinking the very notion of interdisciplinarity and contemplating the role of social sciences in giving shape to ideas and practices of interdisciplinarity. The chapter began by unfolding the dispositions in John Dewey's problematization of disciplinary arrangements and his alternative "New Education." It did so as to be able to show the influence of John Dewey's writings on the configurations of interdisciplinarity in Danish high school education, and to understand its translations and displacements. Next, the chapter scrutinized the notion of

interdisciplinarity, examining its proliferations and appropriations in different contexts to argue for a recognition that this notion is able to translate from one set of problems, prospects and specific arrangements into another. Following the route of this notion through the controversies and engagements with interdisciplinarity arising in France and surrounding Latour's writings, the chapter also addressed the interdisciplinary dispositions used in this study's analytical approach, but equally importantly also considered their affiliation with a rising understanding of transdisciplinarity as an effective means of managing complexity by having science, technology and society jointly solve problems. As such, this chapter brought a larger context of interdisciplinarity into view, one from which to reflect on its origins, its translatability and its bearings in Science and Technology Studies (STS).

Moving on from establishing an understanding that interdisciplinarity can translate into different arrangements and political agendas, Part I took up the thread of John Dewey's problematization of disciplinary arrangements to examine the history of interdisciplinarity and its reconfigurations in Danish high school education. In this three-chapter genealogical study, I pointed to the reconfigurations of interdisciplinarity since its emergence in 1960, thus uncovering the changes in how disciplinary arrangements were problematized and what problems and solutions appeared under the rubric of interdisciplinarity. In the first of these chapters, I showed how the first engagements with interdisciplinarity were inspired by ideas of progressive education and by efforts to democratize the education system and its educational methods in the years following World War II, an aim to be achieved through arrangements seen to foster unity, independence and critical thinking. In Chapter 3, the second of the three chapters, I went on to show that in the context of 1968, interdisciplinarity was key to a new preoccupation with re-defining the premises and organization of education. I showed that interdisciplinarity at this time was connected to a problematization whereby disciplines were seen to reproduce bourgeois knowledge, as well as to the possibility that experimental, participatory and consciousness-raising pedagogies could be emancipatory, as epitomized in the technique of problem-oriented project work.

Examining the preoccupation with interdisciplinarity in the context of the 2005 reform, I then finally showed how both the problems and solutions, rationalities and practical arrangements of interdisciplinarity have changed remarkably, with

interdisciplinarity now appearing in connection with ideas about innovation and competition in a global knowledge economy, and in conjunction with new arrangements of accountability and performance management. Thus, although the remnants of previous ideas and techniques were clear, this new configuration emerging indicates how larger trends in education has had an impact, thus connecting interdisciplinarity to motifs of industrial innovation and performance efficiency.

In Part II, I examined the implications of this new configuration in practice, to this end inquiring into the practical arrangements, contradictions and sticky entanglements involved in the day-to-day governing of interdisciplinarity in Danish high school education after 2005. Through these analyses based on everyday interactions as well as on archival work, I showed how progressive ideas advancing independent and critical thinking and experimental and participatory arrangements of education were entangled with a discourse on innovation, arrangements of performance efficiency and measurement and techniques of visibility. In the first of these chapters, I examined how interdisciplinarity was governed in day-to-day practice, focusing on the disciplines and work with developing their core. I showed this work to involve relating to disciplines as viewpoints entailing a process of abstracting and molding a field of knowledge into an applicable and distinct perspective. In the second of these chapters, I examined the practical arrangements of problem-centered project work in this moment, showing how interdisciplinary project work was characterized by the replication of certain problems, whose primary quality was to allow two specific disciplines to be applied and combined. While these two chapters suggested a tendency of accountability in the practical governance of interdisciplinarity, the third of the chapters, Chapter 7 examined the somewhat surprising fact that an assessment tool was deployed as a template for structuring interdisciplinary project assignments. I argued that the prominence of this assessment tool is telling of how interdisciplinarity at this time entangles ideals of open-ended modes of inquiry with new techniques of measurement and performance-efficiency.

Uncovering the history of interdisciplinarity in Danish high school education and offering ethnographic analyses of the sticky practical arrangements of interdisciplinarity after 2005, thus exposes the entanglement of progressive ideas of independent and critical thinking and the specific experimental and participatory arrangements associated with it to discourses on innovation and new arrangements of performance-efficiency.

Showing these entanglements, I have added nuances to the question teachers raise about "what" they were "doing" in Danish high school education after the interdisciplinary reform. My point is that interdisciplinarity itself was not to blame for accusations that it had created a bureaucratic monster, but rather the specific entanglements of progressive educational techniques with newly emerging visibility and accountability of its practical arrangements after 2005. Indeed, the predicament of interdisciplinarity today is connected to the bundling of these different motifs that historically have been at odds.

This also means that if – as some teachers have been arguing – introducing interdisciplinarity with the 2005 reform seems like a sociological misconception, or even a postmodern form of knowledge, then its configuration is in some ways far more spectacular, bringing, as it does, progressive educational methods formulated at the turn of the last century together with standardized arrangements attuned towards more performance-efficiency through techniques of visibility and measurement.

In other words, these analyses have shown that another picture gets painted when we consider the governing of interdisciplinarity from the angle of the practical arrangements involved, a picture depicting how neither initial intentions nor singular political programs are alone in constituting how interdisciplinarity takes effect. The thesis thus argues that when we put the practical governing of interdisciplinarity at the center, focusing on the defining techniques and practices, we come to see that many more kinds of actors are indispensable in the final outcome and actualization of interdisciplinarity. Indeed, if the practical arrangements of interdisciplinarity are at the core of what interdisciplinarity is, of how it is configured, then they must be understood as political moves. They constitute a point from which to rethink the category of interdisciplinarity, but also what we want to do with it.

The predicament of interdisciplinarity

Today, interdisciplinarity plays a pivotal role in how the institutions of our cultures produce truth. Not only is interdisciplinarity treated as a skill or attitude in education, the notion of interdisciplinarity also frames how research is defined and arranged. While an emphasis on the prospects of interdisciplinary arrangements is hardly new – its dating back to the very coining of the term in the 1920s – the widespread confidence in the idea

raises questions about the dynamic through which interdisciplinarity circulates and changes form and about where the social sciences figure in this dynamic.

Although this thesis has primarily aimed to elucidate the predicament of interdisciplinarity in the case of the Danish high school today, the entanglements I have pointed to also reflect a larger set of questions about the dynamics of the critique of disciplinary arrangements and indeed of the role the social sciences and humanities play in this critique and their implications as regards the ongoing re-organization of knowledge-making. The larger concern of this thesis has thus been to come to grips with the current pervasiveness of interdisciplinarity – that is, to grasp a sense of the stakes at play in the current interdisciplinarity preoccupation across education and the social sciences. I have based these inquiries on the situation of "seen twice" – a somewhat perplexing situation whereby interdisciplinarity appeared as a prominent assumption not only in Danish high school education and research but also in the very dispositions of Latour's translational sociology that informed this thesis's analyses.

Rather than examining the preoccupation with interdisciplinarity as a phenomenon outside the history and practice of the humanities or social sciences, I have sought to include social science's engagements with interdisciplinarity and to indicate their effects (cf. Mitchell 2002:7). In particular, I have traced the origin of the inspiration for interdisciplinarity in Danish high school education, thus showing these sources to stem from efforts beyond the narrow scope of education. Moreover, I have examined engagements with interdisciplinarity surrounding Latour's "processual and ontological transdisciplinarity" (Alliez 2015). My intention with this was not so much a reflexive questioning the assumptions of Latour's program in order to establish the premises of the knowledge production itself. Rather, I wanted to examine how this theoretical apparatus, too, was a product of a socio-historical moment and itself prone to be deployed for purposes other than originally intended. My goal in such an examination was to create a moment of reflection on the very role of the social sciences and their critical efforts.

Inquiring into interdisciplinarity in the context of the USA at the turn of the 20th century and of France from the 1950s onwards, this thesis has offered a look into a wider dynamics of interdisciplinarity. The exploration in the American context afforded a historical view of how engagements with interdisciplinarity have implied a critique of prevailing disciplinary arrangements – and indeed of how such arrangements has

impacted disciplining. Yet, it also became clear that the notion of interdisciplinarity was deployed time and again for new agendas.

Moreover, the examination of interdisciplinarity in France showed how a drive to break with and transgress prevailing disciplinary arrangements characterized the preoccupation with transdisciplinarity during the events of 1968, confronting their role as vessels of truth and of power in regulating how we think and act. Yet, from the 1990s this drive to transgress prevailing disciplinary arrangements and the categories they circulate was indeed mobilized into a new way of describing transdisciplinarity as having a productive potential.

While calls for inter- and transdisciplinarity in the 1990s resembled the revolutionary or postmodern critiques of the 1960s and 1970s preoccupied with tearing down rigid disciplinary structures and problematizing the institution of the university as the major force of knowledge production, they were at the same time pointing to transdisciplinarity as an effective means of problem-solving and a stimulus for industrial innovation and economic growth.

This preoccupation with transdisciplinarity in the 1990s, thus, reflected a change of motif whereby the problematization of prevailing disciplinary arrangements and categories, which had in the 1970s been connected to critiques of efficiency and productivity (cf. Foucautlt 1995[1975]) was now re-appearing with promises of just that: more efficient and productive modes of problem-solving. This new dominant motif of interdisciplinarity – now primarily called "transdisciplinarity" – I argue, folds together techniques and practices that hold rationalities of both a critique of effectiveness and an impetus to standardize and be efficacious.

Examining interdisciplinarity within and outside Danish high school education in the past 100 years shows that even though engagements with interdisciplinarity arised as part of a problematization of prevailing forms of disciplining for creating conforming and productive subjects, it was later mobilized for aims of economic development and innovation.

More specifically, the analyses throughout the thesis reveal how resources meant as critiques of disciplinary arrangements, such as Dewey's problematizations or those formulated by French movements around 1968, later resurfaced in arrangements of instrumental performance efficiency much like those they were problematizing.

The picture that emerges from these studies, then, is one of a perpetual dynamic of changing motifs in the engagements with interdisciplinarity over the last century. On the one hand, interdisciplinarity has emerged time and again with progressive movements that have called for interdisciplinarity as a critique of prevailing disciplinary arrangements of education and knowledge-making for creating docile and conforming students looking too much to scholastic effectiveness and productive outcomes. On the other hand, this critique was soon followed by a new mobilization of the idea for aims of effectiveness and productivity. Including these inquiries beyond the Danish high school thus serves to show how resources meant as critiques of disciplinary arrangements have reappeared in arrangements not unlike those they purported to replace.

A key argument of the thesis is thus that the predicament of interdisciplinarity is due to this dynamics through which techniques that were formulated as alternatives to performance-efficient arrangements were later entangled with performance-efficient arrangements. In my view, the current preoccupation with the productive potentials of transdisciplinarity is an example of this dynamic – a dynamic that not only concerns our understanding of education but also calls into question the performativity of the social sciences. Indeed, the mobilization of Latour's analyses in the engagement with formulating a new transdisciplinarity potential that I discussed in chapter 1 suggests a predicament, not only of interdisciplinarity, but also reflects a predicament in which the social sciences find themselves more broadly. It indicates a failure, one might say, or an ungovernable dynamic of critical intervention. Indeed, critical efforts aimed at a non-totalizing, open-ended inquiry even in their most irreductive and non-categorizing forms can end up in unexpected places (Latour 2004).

In reflecting on the above predicament, I would like to revisit what anthropologist Gregory Bateson expressed in one moment of interdisciplinary engagement pertaining to 1968, and in another concerning the Macy conferences in which he participated during World War II. More specifically, he discusses a paper written by Margaret Mead, who also attended these interdisciplinary conferences. In this paper, Bateson directs attention to Mead's points about a discrepancy – a basic and fundamental discrepancy – that exists between the way social engineering manipulates people to achieve a planned blueprint society and the ideals of democracy, which embody the "supreme worth and moral responsibility of the individual human person". What Bateson wants to consider is the

predicament of the social sciences, as the knowledge they foster is deployed for other purposes. As such, he calls attention to the change of motif from one of democracy to one of instrumentality:

> The two conflicting motifs have long been implicit in our culture, science has had instrumental leanings since before the Industrial Revolution, and emphasis upon individual worth and responsibility is even older. The threat of conflict between the two motifs has only come recently, with increasing consciousness of, and emphasis upon, the democratic motif and simultaneous spread of the instrumental motif. Finally, the conflict is now a life-or-death struggle over the role, which the social sciences shall play in the ordering of human relationships. It is hardly an exaggeration to say that this war is ideologically about just this—the role of the social sciences. Are we to reserve the techniques and the right to manipulate people as the privilege of a few planning, goal-oriented, and power-hungry individuals, to whom the instrumentality of science makes a natural appeal? Now that we have the techniques, are we, in cold blood, going to treat people as things? Or what are we going to do with these techniques? Let us try to surmount this additional source of difficulty by turning the tools of science upon this habit of instrumental thought and upon the new habit which Dr. Mead envisages—the habit which looks for "direction" and "value" in the chosen act, rather than in defined goals. (Bateson 1987[1972]:167-168)

More generally, I contend that the predicament arising from interdisciplinarity lies not in its fluid or contingent character, but in the change of motif. More specifically, my historical excavations have not only shown how interdisciplinarity has changed problems and solutions but also how it has changed motif from a concern with democracy to other instrumental motifs such as economic viability and efficiency.

Thus, considering interdisciplinarity in terms of its particular stakes and translations offers a window into both current tendencies in education governance and the role of critique in this endeavor. This approach uncovers the need to reflect on whether the forms of knowledge we have inherited still serve their initial purposes, whether other purposes have subsequently replaced them or whether they serve any purpose at all (cf. Camic & Joas 2004:8).

Taken as a whole, this thesis thus offers an unconventional approach to interdisciplinarity that focuses on the specific stakes and translations involved in the ways it is governed. By examining interdisciplinarity as a problematization whose actualization depends on concrete practical and technical arrangements, this thesis has enabled one to

think of interdisciplinarity in terms of its translations and transformations into configurations that could well serve purposes opposite to those intended. As such, my aim is not to deprive interdisciplinarity of its current paradigmatic status, but rather to call for a careful consideration of the motifs, direction and values of its specific configuration.

Rethinking interdisciplinarity

Calls for more interdisciplinarity or better interdisciplinary coordination and collaboration are coming from every corner. As I have shown in this thesis, interdisciplinarity has now regained favor as a means of engaging with the transformation of scientific research and education. This tendency has taken hold in state policies as well as in programs promoted through international agencies like the OECD and UNESCO. This growing preoccupation with interdisciplinarity spurred Danish high school teachers to raise questions about the tenets and arrangements of interdisciplinarity, a trend also emerging in many other arenas.

As we ponder how to respond to this current preoccupation with interdisciplinarity, our attention is necessarily drawn to the problems, weaknesses and shortcomings of existing practices and rearrangements. As I showed in the introduction, interdisciplinarity tends to be discussed from an instrumental angle aimed at finding ways of overcoming interdisciplinary obstacles or identifying classifications that could provide new models for improvement. Current literature leans strongly towards making a clear distinction between inter-, multi- and transdisciplinarity, thus indicating that a greater degree of disciplinary integration is needed, or perhaps more radical ideas about how disciplines can be transgressed. At the same time, there is a growing call for interdisciplinarity indicators and models that can resolve today's dilemmas.

Yet, rather, than going into a mode of fixing through more integration or different models, we might also pause for a moment to rethink the very notion of interdisciplinarity, and what governing interdisciplinarity means. With this study of the particular practices and techniques through which interdisciplinarity takes form in Danish high school education, I am not claiming to provide general answers as to how to best organize interdisciplinarity. Nevertheless, in the light of the analyses of this thesis, it should now be clear that practicing interdisciplinarity involves much more than what can be summed up as a specific mode or degree through which two disciplines are related. Indeed, as this

thesis has consistently shown, interdisciplinarity is neither solid nor ubiquitous, but is rather a contingent fluctuating phenomenon apt to drift from one arrangement with a specific set of problems and possibilities to another – even into arrangements and expressions serving purposes other than those originally intended.

As such, I am proposing that interdisciplinarity be viewed as less a matter of relating two or more disciplines via a concern with the mode or degree of this relation, and more one of the governance implied in its arrangements.

In particular, I suggest that we might benefit from considering the etymological connection between discipline and disciplining. That is, that we pay attention to interdisciplinarity as not only concerning how knowledge is arranged in fields or subjects, but also involves issues of governance. In other words, that we begin to think of the forms of regulation implied in its practical arrangements. I thus propose that we start thinking about interdisciplinarity as an engagement *with problematizing prevailing disciplinary arrangements* and for a start notice what is at stake in situations of such problematization, when individuals or collectives point to interdisciplinarity as an alternative solution. However, we should also pay attention to the mundane techniques and practices through which interdisciplinarity is manifested and actualized. These can often be found in more obscure corners of day-to-day arrangements, may resemble technicalities and might not result from an explicit plan or even be written down. Nevertheless, they are important, because just as disciplines can be seen as a mechanism of regulating thought and action by imposing a set of practical norms on the mind and body, so can specific arrangements of interdisciplinarity.

This thesis thus presents another way of approaching interdisciplinarity. Rather than offering a new model, I have sought to understand and draw attention to the techniques and practices through which interdisciplinarity takes effect. I have suggested that interdisciplinarity is ultimately not as much a matter of models or concepts as it is a set of arrangements, practices and techniques – techniques that are often overlooked, but are actually more interesting, delicate and have a greater transformative potential than we may realize.

The larger message of this thesis is thus that the governance of interdisciplinarity is not merely dependent on what is written in one policy program, but on everyday standards, lived action, modes of asking questions. I, thus, argue for a focus on

interdisciplinarity, which pays attention to the stakes and translations of the concrete practical arrangements through which interdisciplinarity is governed and actualized in particular ways. Indeed, we have much to gain by paying attention to how concepts, techniques and theories transform as they move and become incorporated into new arrangements. With this in mind, we can remain open to exploring spaces for change that might otherwise be unthinkable.

Abstracts

Governing interdisciplinarity: Stakes and translations of interdisciplinarity in Danish high school education

English abstract

This thesis examines how interdisciplinarity is governed in Danish high school education. It takes its point of departure in the storms over the practical governance following a reform of Danish high school education in 2005 that introduced interdisciplinarity as a key organizing principle. Asking how interdisciplinarity is configured in the Danish high school in the wake of this reform, the thesis interrogates the specific stakes and translations involved in its governance. It does so by way of historical and ethnographic inquiries into the ideas, practical arrangements and techniques that characterized the particular configuration of interdisciplinarity at this time.

The thesis first elucidates the particular configuration of interdisciplinarity after 2005 by tracing the reconfigurations of interdisciplinarity in relation to shifting historical problematizations of disciplinary arrangements since its first institutionalization in 1960. It shows the emergence of interdisciplinarity to be inspired by ideas of progressive education and efforts to democratize education through arrangements, which were seen to foster unity and independent thinking. In this moment, interdisciplinarity was actualized through a book in the History of European Ideas.

The thesis further shows that interdisciplinarity in the context of 1968 emerged as part of an anti-authoritarian and emancipatory concern with education and didactics as a way of intervening in society. Interdisciplinarity in this moment took form through a technique called problem-oriented project work and was connected to a critique of disciplines for reproducing bourgeois knowledge and to potentials of raising consciousness by connecting the individual experience to societal structures.

Moving to the context of 2005, the thesis points to the conspicuous changes in the problematizations and rationalities surrounding interdisciplinarity, as interdisciplinarity at this time appeared in connection to notions of competencies, innovation and

competition in a global knowledge economy, and in conjunction with new arrangements of accountability and performance government.

Examining ethnographically the day-to-day governing of interdisciplinarity in Danish high school education after 2005, the thesis more closely investigates the concrete techniques and arrangements through which interdisciplinarity is governed in practice and their implications. It shows that interdisciplinarity entangles progressive techniques of problem-orientation with ideas of innovation, and arrangements of accountability and performance management.

Through these historical and ethnographic contemplations, the thesis thus demonstrates how the governing of interdisciplinarity in Danish high school education after 2005 entangles ideas and techniques, which have historically been at odds. The overall argument is that interdisciplinarity in this moment connects resources of previous critiques of standardized learning processes with definite learning objectives and directly applicable outcomes with new arrangements of accountability and performance management. The point of this thesis, then, is to broaden the discussion about interdisciplinarity by placing the practical arrangements through which interdisciplinarity is governed in a larger historico-practical contemplation.

Dansk resumé

Styringen af tværfaglighed: Indsatser og translationer af tværfaglighed i gymnasiet

Denne afhandling undersøger styringen af tværfaglighed i det danske gymnasium. Dens afsæt er gymnasiereformen i 2005 og de kritikker introduktionen af tværfaglighed affødte. Med et fokus på, hvad der karakteriserer den særlige konfiguration af tværfaglighed, der opstod i kølvandet på denne reform, stiller afhandlingen skarpt på de indsatser og translationer, betingelser og transformationer, der blev forbundet i dens praktiske styring. Det gør den gennem historiske og etnografiske undersøgelser af de ideer, praktiske arrangementer og teknikker, der var karakteristisk hvordan tværfaglighed blev konfigureret efter 2005.

Afhandlingen undersøger først, hvad der karakteriserer konfigurationen af tværfaglighed i det danske gymnasium efter 2005 gennem en sporing af tværfaglighedens forskellige konfigurationer i relation til skiftende historiske problematiseringer af

disciplinære arrangementer siden tværfaglighed først blev institutionaliseret i 1960. Disse undersøgelser peger på, at de første engagementer i tværfaglighed i Danmark var inspireret af reformpædagogiske idéer og bestræbelser på at demokratisere uddannelsessystemet og dets metoder gennem arrangementer, der sigtede på at skabe enhed og selvstændig tænkning. Her skulle tværfaglighed finde sted gennem en bog om De Europæiske Ideers Historie.

Afhandlingen viser videre, at ideen om tværfaglighed i årene efter 1968 blev forbundet med anti-autoritære og emancipatoriske engagementer i uddannelse og didaktik som en måde at intervenere i samfundet. Tværfaglighed tog nu form igennem problemorienteret projektarbejde og blev forbundet med fagkritik, der pegede på fag og discipliners rolle i at reproducere borgerlig viden samt til et potentiale om bevidstgørelse ved at forbinde individets erfaring med samfundsmæssige strukturer.

Således peger afhandlingen på de påfaldende forandringer i problematiseringer og rationaliteter omkring tværfaglighed, da 'fagligt samspil,' som det formelt hed, blev introduceret i 2005. Her blev tværfaglighed knyttet til ideer om innovation og konkurrence i en global vidensøkonomi, og diskuteret i forbindelse med nye arrangementer med fokus på kvalitetssikring og effektivisering gennem teknikker der skulle skabe gennemsigtighed og måle kompetence, bl.a. udløst af OECD's transnationale sammenligninger af nationale uddannelsessystemers performance.

Gennem etnografiske undersøgelser af det daglige arbejde med tværfaglighed i et gymnasium efter 2005 afsøger afhandlingen videre de konkrete teknikker og praktiske arrangementer, hvorigennem tværfaglighed blev styret i praksis samt deres implikationer. Disse undersøgelser viser, hvordan tværfaglighed i praksis forbinder reformpædagogiske teknikker og fagkritiske ideer med muligheder for innovation og teknikker til at synliggøre og måle præstationer.

Gennem disse historiske og etnografiske analyser udfordrer og komplicerer afhandlingen gængse forståelser af tværfaglighed, og viser at tværfaglighed kan tjene ganske andre formål end oprindeligt tiltænkt. Afhandlingens overordnede argument er således at konfigurationen af tværfaglighed i gymnasiet efter 2005 forbinder ideer og teknikker som historisk har været modsætninger, og at den praktiske styring af tværfaglighed i dag fortrænger tidligere problematiseringer af disciplinære arrangementer og deres kritik af standardiserede læreprocesser med definerede læringsmål og direkte

anvendelige resultater. Afhandlingens formål er således at løfte diskussionen om tværfaglighed ved at placere de praktiske arrangementer i en større historisk-praktisk overvejelse om de måder vi organiserer vores videnskabelse og uddannelsessystemer i dag.

Notes

Introduction

[1] All translations from Danish throughout the thesis are mine. Here the original Danish text says: "Et systembyggeri som gymnasiereformen hviler bevidst eller ubevidst på en række sociologiske antagelser om verden. Det kan dårligt være anderledes. Alligevel tror jeg, at arkitekterne har forsyndet sig imod fundamental sociologisk lærdom. Om patienten er rask eller syg, kan diskuteres, om kategorien i det hele taget er adækvat, *bør* diskuteres, men uomtvisteligt er det til gengæld, at det *postmoderne* var ment som en diagnose. Ikke en opfordring." (Møller 2009)

[2] Danske Gymnasier (2016:5, 8)

[3] "21st-century skills" typically refers to non-content-based knowledge such as collaboration, critical thinking, problem-solving and innovation said to matter in a successful life (cf. Trilling et al. 2009). These skills are often associated with interdisciplinarity or associated ideas of cross-professional collaboration (OECD 2005) or integrative learning (AAC&U 2007).

[4] But indeed, the preoccupation with interdisciplinarity also occurred in higher education, as documented in Sauzet (2015) and Lindvig (2017).

[5] These include, apart from the gymnasium, the technical upper-secondary schools (htx), and the business upper-secondary schools (hhx) as well as the 2-year gymnasium programs (2-årig stx, hf). What was later called the collaboration between disciplines and the interplay of disciplines replaced the notion of interdisciplinarity, which only figured in the early initiatives for a reform (eg. Undervisningsministeriet 1998:4), and also appeared in the primary and lower secondary school (folkeskole) reform of 1993 (Undervisningsministeriet 1993).

[6] The technical and business upper-secondary schools, it was argued, had already been subject to reforms in 1995 (Undervisningsministeriet 1999:3, Undervisningsministeriet 2003:6).

[7] In Danish, the distinction between university disciplines and school subjects is not marked by different concepts. They are both called "fag", which is also the term for "profession" and "occupation" (ODS 1922). While the term "disciplin" [discipline] in Danish refers to a branch of knowledge (Den Danske Ordbog 2017), and is also used to describe university disciplines, "fag" is the most common term for both a university discipline and a school subject (cf. Den Danske Ordbog 2017). Accordingly, "tværfaglighed" [interdisciplinarity] is a term used in universities, schools and professions, circulating specific techniques and modes of problematizing across many different domains.

[8] As with most reforms, this reform of the Danish *gymnasium* education had a multitude of objectives, of which interdisciplinarity or "disciplinary interplay" was only one, albeit a prominent one (Haue 2004:258). In chapter 5, I unfold these objectives in more detail.

[9] "Forandringer på arbejdsmarkedet samt ændringer i erhvervs-strukturer og jobindhold øger behovet for udvikling af evner til at arbejde selvstændigt, individuelt og i team, på tværs af fag og fagområder og med vægt på udvikling af både faglige og personlige kompetencer, bl.a. med innovation og iværksætterkultur som perspektiv. Disse forandringer stiller nye krav til undervisningens organisering og til arbejdsformerne." (Undervisningsministeriet 2003:11)

[10] This research was financed by the Danish Ministry of Education (Zeuner et al. 2006, 2007, 2008, 2010). The Department of Philosophy, Pedagogy and Religion Studies at the University of Southern Denmark dominates the knowledge production on and for the gymnasium education. Since 1999 it has hosted the mandatory pedagogical teacher training for gymnasium teachers who are otherwise trained in university disciplines (Haue 2005:326). Apart from research of this environment, a research project based at the Pedagogical Department of Aarhus University, Emdrup, has studied the high school reform (Bøje et al. 2007). Also, Bertelsen (2013), based in Copenhagen University, has studied student experiences in the gymnasium

after the reform. Bertelsen & Øland (2010:5) have pointed to a lack of what they call "critical" knowledge produced on gymnasium education.

[11] In Denmark, as elsewhere, this was largely influenced by the OECD's assessment and cross-national comparisons of student attainment through the PISA programs, although it has taken its own course (cf. Knudsen 2017, Høvsgaard 2017, Kelly et al. 2017, Ratner & Gad 2018, Staunæs 2018, Ydesen & Andreasen 2019). For discussions of these global trends, see, for example, Lingard et al. (2015), Sellar & Lingard (2013).

[12] This point is parallel to the debates in the field of educational policy on the workings and effects of national and transnational tools for governing education (cf. Ball 2003, Ball 2015, Gable & Lingard 2016, Rizvi & Lingard 2010).

[13] See, for example, Wright and Shore for a convincing argument for a Foucauldian approach to an anthropology of policy (1997).

[14] The replacement of the notion of "principal" [rektor] with "manager," [øverste leder] and teacher inspectors [inspektor] with "pedagogical manager" [pedagogisk leder] was instantiated in the gymnasium with the 2005 reform, but was part of a development of transforming the language and organization of the Danish public sector beginning in the late 1980s towards what has been called a "managerial state" (Pedersen 2004).

[15] Eg. Fieldnotes January 8, 2013 and March 1 2013.

[16] Andrew Barry and Georgina Born's introduction to the anthology on interdisciplinarity in research and science (2013) is a revised and extended version of their article from 2008.

[17] The journal *Futures* around the millennium was the key proponent for this framing of interdisciplinarity (cf. Buanes & Jentoft 2009), and interdisciplinarity similarly forms a central premise in the aims of the Journal of Integrative Environmental Sciences, founded in 2004.

[18] For discussions of this tendency of associating interdisciplinarity with innovation, see also Strathern (2004b:ix) Barry et al. (2008:24), and Osborne (2015:13).

[19] For example, through "collaborative laboratories with partners from private enterprise, politics, communities, NGOs and academia" (Scholz 2001).

[20] These taxonomies seem to have gained increasing importance in what appears to be a rising concern these days with evaluating and creating indicators for interdisciplinarity (cf. Carr et al. 2018, Huutoniemia et al. 2010, Mansilla & Gardner 2003)

[21] For a careful historical and conceptual consideration of the notion of transdisicplinarity, see Osborne (2015)

[22] This entrepreneurial rationale of creative destruction in the emphasis on transgression is but one tendency, another is theoretical physicist Basarab Nicolescu's more spiritual conceptualizations (Nicolescu 2008), which he has been advancing from Centre International de Recherches et Ètudes Transdisciplinaires CIRET, founded together with French philosopher and sociologist Edgar Morin and Portuguese artist Lima de Freitas (Ciret 1994).

[23] For their discussion of "new knowledge" see esp. Nowotny et al. (2001:55ff). For their discussion of socially "robust knowledge", rather than reliability, see esp. (Nowotny et al. (2001:166ff). For a critical discussion of this idea of "new knowledge" see Marilyn Strathern (2005b) and "robust knowledge" (Strathern 2006).

[24] The influence and effects of the narrative of a shift from Mode 1 to Mode 2" has been widely discussed over the last decades and forms a central concern in the framing of current social scientific studies of interdisciplinarity (cf. Barry et al. 2008:22-23, Barry & Born 2013:1-2, Strathern 2004b:70ff, 88ff; Strathern 2005b:466; Strathern 2006:193; Strathern 2007, Osborne 2015:12, Heilbron & Gringas 2015:6). This influence may also be related to Helga Nowotny's Presidency of the European Research Council 2010-2013. For a discussion of the influence of these ideas in Danish research policies, see, for example, Hansen (2011).

[25] Strathern refers to Gillian Beer (1996) in making this point about the self-conscious mixing of knowledges at stake in interdisciplinarity (Strathern 2004b:36).

[26] Frank (1988:92) cites G. E. Hale to C. D. Walcott, May 17, 1912, following Rexmond C. Cochrane (1978:327).

[27] See also Hacking for the advancement of a "historical ontology" based on Foucault's works, emphasizing a concern with "objects or their effects" somewhat akin to that of Latour (Hacking 2002:11). See Koopman (2015) for a discussion of its implications.

[28] For examples of Latour stating this influence, see Latour (1986b:14, 1988a:279n18, 1994:46, 1999:192) as well as the numerous references in the notes of his introduction to Actor-Network-Theory, Reassembling the Social (eg. 2005:76n90, 86n106, 161n201). This influence also appears in Latour's comment that his interest in studying science in the 1970s was an interest in studying modernity's most typical forms of "veridiction" with "the different modes of enunciation of truth, which made them so sure of themselves, so unassailable, so modern" (Latour 2001:138, 2013a:289). Affiliating the approach of Latour and Foucault seems to be common in France (cf. Le Galés 2016:509). There are, however, also differences. See Dean (1996:55ff) for a discussion and critique of the network approach of the sociology of translation to techniques vis a vis Foucault's approach to what Dean calls "technologies of government".

[29] The network [le réseau] is of course also a key concept in Foucault's work (cf. Foucault 2002:177).

[30] There are, however, also parallels between Latour's emphasis on translation and Foucault's analytical approach. See, for example, Foucault's consideration of "the *modes of translating* quantitative statements into qualitative formulations" in the Archaeology of Knowledge (Foucault 2002:65). Both refer to Michel Serres' work with this concept.

[31] In an auto-biographical paper, Latour writes that his concern with non-human action was inspired by semiotics and shaped by the collaboration with Paolo Fabbri and later Francoise Bastide on "material semiotics" (Latour 2013a:291, 296). The inspiration from J. L. Austin and his emphasis that words are performative as they "do" things in his famous piece How to do things with words" (Austin 1962 (1955) is also mentioned as a reference point by Latour (Latour 2010b:17).

[32] Latour himself argues in an autobiographical paper that their emphasis on non-human action was part of "an attack on [philosophical] epistemology" (Latour 2013a:295, cf. Latour 1988:6).

[33] The emphasis on local studies of matter, however, also has implications in respect to the study of techniques of governance. See Dean (1996:55ff) for a discussion and critique of the network approach of the sociology of translation vis-à-vis conceptualizing what he calls "technologies of government".

[34] The discussion of technique here is based on the French concept of "technique", which, however often appears in English translations as "technical skill" or "technology", as for example in Couze Venn's translation of Latour's work on the means and ends of "techniques" (Latour 2000, 2002) or the translations of Michel Foucault's writings of the technologies of the self [techniques de soi] (Foucault 1988). See Poster (2007) for a discussion of the relations and different meanings of technique and technology in French and English.

[35] One needs only to think of the national and transnational tools for governing education that have been discussed in the field of education policy in recent years (cf. Sellar & Lingard 2013).

[36] Note that the term "assemblage" does not appear in the original, but is a translation of "montage': "'Ce qui ressort très nettement de celles-ci, c'est que nous nous trouvons partout en présence de montages physio-psycho-sociologiques de séries d'actes. Ces actes sont plus ou moins habituels et plus ou moins anciens dans la vie de l'individu et dans l'histoire de la société." (Mauss 2002[1934]:21)

[37] I am referring to Latour's earlier work on techniques here, written in the heydays of actor-network theory, when asserting a symmetry between human and nonhuman actors and resurrecting the "missing masses" (1992) had the implication that "one cannot do the philosophy of techniques without extending existentialism to the practical realm of inert things" (1995:278). It should be noted, however, that Latour remarks on the significance of what he calls "technical ability" (2002:248), and he emphasizes intellectual technologies as being as important as gears and other technical artifacts. For example, in Reassembling the Social where he asserts that "[a]lthough there is no "underlying hidden structure this is not to say that there doesn't exist structuring templates circulating through channels most easily materialized by techniques—

paper techniques and, more generally, intellectual technologies being as important as gears, levers, and chemical bonds" (Latour 2005:196). The emphasis on "materiality" in his writings on techniques must, thus, also be seen in this light; as manifest "structuring templates" (cf. Latour 2013a:294). For a recent critical discussion on the "object-centered" tendencies in Latour's program, and how this tends to obscure "important ways in which human subjects employ things, effects and symbols beyond their simple, "empirical" existence", see Krarup & Blok (2011:46,42).

[38] Similar arguments about the transdisciplinary dispositions of the analytics of Foucault are highlighted at this time. For example, in Balibar, who argues that Foucault's concept of episteme performs "a transdisciplinary unification (inasmuch as an episteme does not describe a system of concepts and postulates which are axiomatic for one single discipline, but rather the invariant 'rationality', or the system of questions and notions which, at a certain moment, or in a certain historical period, command the development of several disciplines" (Balibar 2015:47). And Rimke (2010), who takes Foucault's genealogic approach as exemplary of her argument that "transgressing disciplinary boundaries has been at the heart of Sociology since its inception".

[39] Others problematize the relation between conceptual interventions and practical arrangements as a different failure. Take, for example, sociologist of education Stephen J. Ball, who notes that "critical researchers, apparently safely ensconced in the moral high ground, nonetheless make a livelihood trading in the artifacts of misery and broken dreams of practitioners" (Ball 2005 [1997]:9).

[40] A rich discussion of these points may be found in the special issue of *Theory Culture and Society* (2014, vol. 31), which considers Strathern's oevre, including her comparative mode of analysis – which is the topic of Eric Hirsch's contribution (Hirsch 2014). Strathern's way of reflecting on and critiquing Euro-American knowledge has inspired a range of scholars, most prominently perhaps in the recent developments of a "lateral" mode of analysis in the works of her former student Annelise Riles (2000, 2011) and Bill Maurer (2002, 2005) (cf. Jensen & Gad 2016). As anthropologist Ashley Lebner has noted in her edited volume on Strathern's work, Strathern's approach from the 1980s was inspired by Foucault's interventionist concern with rewriting, as well as with his focus on relations (Lebner 2017:12,32n16). Foucault's framing of anthropology as a "counter-science", also seems to have been a point of inspiration (Holbraad & Pedersen 2017:16, citing Foucault 1970:378). Any conceptual echo, such as with Foucault's notion of "lateral rapprochement" (Foucault 2002 [1969]:172) and "lateral" in the Order of Things (cf. 2005 [1966]:308, 372), then, is perhaps not entirely coincidental.

[41] Strathern calls this "counterview" or "counter-instance" in her book After Nature in relation to her efforts to put "the English at a distance", discussing English ideas of kinship and new reproductive technologies in relation to Trobiand kinship (cf. 1992:59).

Chapter 1

[42] Dewey (1907 [1899]:106-107)

[43] Latour (1993:5)

[44] For example, Wilhelm von Humboldt's visions for the university later founded in Berlin emphasized the need for the university to reflect "Life," by laying "open the whole body of learning and expound both the principles and the foundations of all knowledge" (Humboldt 1810, cited in Lyotard 1984 [1979]:34). A similar vision pervades Alexander von Humboldt's influential writings on nature and cosmos in the beginning of the 19th century (Walls et al. 2014:3). Moreover, as French sociologist Simon Laflamme notes, the critique that the subdivision of knowledge prevents individuals from acquiring a general education already appeared in Giambattista Vico's influential work The New Science from 1725 (Laflamme 2011:52).

[45] Graff makes no references, but this critique appears to be directed at Julie Thompson Klein's mention of Dewey and Whitehead's "progressive views" as the source of the preoccupation with interdisciplinarity in the USA (1990:24).

[46] For this debate on school discipline, see (nn. 1840) a debate later described as a controversy between the "Conservatives" and the "Progressives" in education (cf. Forster 1858:429).

[47] The emphasis on the problem also formed part of Dewey's concomitant philosophical deliberations, for example, in the 1896 essay called The Reflex Arc Concept in Psychology, in which Dewey proposed a unifying principle for psychology based on existence rather than on pre-defined entities, thus attacking the behavioral theory of stimulus and response for resting on predefined distinctions of mind and body and assumptions that action takes place in teleological stages of "sensation-followed-by-idea-followed-by-movement" rather than within one activity involving "cöordination" (Dewey 1896:358, cf. Mead 1900).
[48] Historican of education Michael Knoll in his historical overview of the project method points to the influence of Dewey as well as Fröbel (whom Dewey also discusses) on what became a world-famous article written by William H. Kilpatrick on "The Project Method" by Columbia's Teachers College from 1918. Kilpatrick defined the project broadly, calling it a "hearty purposeful act". (Knoll 1997, cf. Knoll 2014:664)
[49] Frank (1988:92) cites G. E. Hale on this to C. D. Walcott, May 17, 1912, following Rexmond C. Cochrane (1978:327) in The National Academy of Sciences: The First Hundred Years, 1863-1963.
[50] For a discussion of the relationship between John Dewey and Franz Boas, also called the founding father of anthropology in the USA, see Torres Colón & Hobbs (2015).
[51] Among other monographs, Thomas S. Kuhn's famous the Structure of Scientific Revolutions appeared in this series (1962).
[52] In Meynaud's article on mathematicians and power published in Revue Française de Science Politique, for example, he was drawing on what he called the excellent little book *La Cybernétique* by Georges Theodule Guilbaud [1954] (Maynaud 1959:359). Like his publication on the Technicians and Power, a couple of years earlier, he was addressing the problem of establishing an independent political science that could analyze the "real circles of power" (1957:37).
[53] For a discussion of Palmades oevre on which I am drawing here, see the special issue of Nouvelle revue de psychosociologie 2008 1(5).
[54] These included La psychotechnique [1948], La caractérologie (1968 [1949]), La psychothérapie [1951], Les méthodes en pédagogie (1968 [1953]). Palmade's interdisciplinary orientation later was reflected in the edited volume on the relationship between economics and the human sciences [sciences humaines] (Palmade 1967).
[55] This agenda of unifying the sciences, although re-emerging in the 1950s, was not new. It was, for example, central to the Italian-based journal *Scientia: International review of scientific synthesis,* founded in 1906 and aimed at treating "fundamental questions of all sciences" and offering a "synthesis and unification of knowledge" in a truly international collaboration (Scientia 1934:i).
[56] In French "traduction" and "réseau".
[57] The book was also reviewed by sociologist Bernard Barbar in the American Sociological Review, who noted that "Palmade's book is interesting, not least of all because it is not what one expects from France these days; it will [however] not seem so new to some Americans as it may to some French social scientists" (Barber 1962).
[58] But this critique of Roger's also suggests that he was not familiar with Palmade's other works on French capitalism and capitalists in the 19th century (Palmade 1961b).
[59] The following sections draw on searches in the National Library of France's database of online documents, Gallica, primarily for the notions of interdisciplinarité, pluridisciplinarité and interdisciplinaire, pluridisciplinaire, inter-disciplinarité, pluri-disciplinarité, inter-disciplinaire, pluri-disciplinaire.
[60] Althusser's argument was delivered as the introduction to the "Philosophy Course for Scientists" in October-November 1967 at the École Normale Supérieure (Althusser 1990:69).
[61] For another possible thread relating this problematization of disciplinary arrangements to Dewey's, see the argument of political scientist Samuel Renier that Foucault's *The Archeology of Knowledge* was of "pragmatic inspiration" in the Deweyan sense and inspired "heavily" by the books on Dewey and American Philosophy that Gérard Deledalle had gathered and given Foucault (Renier 2016:126, referencing Delledalle 2002:48).
[62] The centre Morin renamed was previously called *Centre d'Études de Communications de Masse*, and Roland Barthes was listed as directing a study in the list of the center's activities in 1972-1973, along with Georges Friedman, Gerard Genétte, Christian Metz, Eliseo Vernon and Edgar Morin himself (CETSAS 1974).
[63] In the 1998 UNESCO report, Julie Thompon Klein also mentioned this book as influential to the emergent agenda of transdisciplinarity (Klein 1998).
[64] On this point, they referenced Latour's paper in the popular Science Magazine (Latour 1998).

Part I

[65] In Danish: "Skolen er i sig selv et samfund en miniature, og derfor er det af afgørende betydning, at de unge også i dette samfund møder den demokratiske tradition og lærer, at deres opfattelse af, hvad der er sandhed, ikke skal bygges på lærerens autoritet, men må hvile på deres egne undersøgelser og slutninger." (Undervisningsministeriet 1960:4)

Chapter 2

[66] In Danish: "Omfattende og hastige forandringer i teknologi og videnskab skaber nye videns- og færdighedsområder, som skal medtænkes i mål og rammer for uddannelserne, fagene og undervisningen, og som øger behovet for at udvikle evner til at arbejde selvstændigt, både individuelt og i team, og på tværs af fag og fagområder. En øget internationalisering inden for teknologi, økonomi, videnskab, kultur og uddannelse indebærer også, at omlægninger af uddannelserne, udvikling af ny faglighed og relevante kompetencer, som matcher behovene i et videnssamfund, er helt afgørende for, at Danmark kan være i front." (Undervisningsministeriet 2003a:1)

[67] "Vi føler et behov for at komme med denne henvendelse, fordi vi er utrygge overfor fremtiden. Vi finder, at Danmark trods fremgang på nogle områder dog står i fare for at stagnere på mange andre. De vældige tekniske og videnskabelige omvæltninger, der er undervejs kan ved misbrug bringe mennesket i fare. Den tekniske udvikling har bevirket stigende produktion og har befriet befolkningens store flertal fra materiel nød. Uanset folkestyrets vækst er der dog hos det store flertal en følelse af magtesløshed overfor det mægtige teknisk-økonomiske-politiske maskineri, som menneskene ganske vist selv har sat i gang, men som de føler, at de ikke kan overskue og beherske. Vor ideverden præges i stigende grad af pressen, ugebladene, filmen, radioen og fjernsynet, og standardiseres på betydningsfulde områder af den kommercielle reklame og en småborgerlig angst for at afvige fra andre. Spørgsmålet er, om den øgede fritid og velstand, som forhåbentlig vil følge de tekniske fremskridts spor, skal resultere i yderligere vækst i det passive kulturliv eller i en aktivisering og selvstændiggørelse af det enkelte menneske. En forskydning i den sidste retning kan ikke forventes at komme af sig selv, men forudsætter en aktiv samfunds- og kulturpolitik sigtende på frigørelse af de menneskelige kræfter til kulturel selvvirksomhed. Og løsning af samfundsspørgsmålene. Vejen hertil er både en omfattende kulturreform og en grundlæggende forbedring af utilfredsstillende samfundsforhold. En kritik og reform af opdragelsen, skolen, pressen og folkeoplysningen er mere nødvendig end nogensinde. Det, der er behov for, er både et kulturprogram og et helhedssyn, der peger frem mod større kulturel aktivitet. Det er af afgørende betydning, at der foregår en skoledebat, der ikke begrænses til lærerorganisationer og folketing, men når ud til hele befolkningen. Skolesagen er hele samfundets sag, og der er grund til at gøre opmærksom på den store sociale og menneskelige betydning, som enhedsskolen må have. Det må dog ikke blot være skolens struktur, men i lige så høj grad dens målsætning, indhold og metoder, som tages op til kritisk revision." (Højby et al. 1957)

[68] As an aspect of this fight, the Minister of Education was accused of having kept secret to the Parliament reports by the inspectors of the high schools (Nordentoft 1958:2).

[69] These concerns with "democratising education" are particularly debated by the end of World War II (cf. Mønsted et al. 1945:217), but become the central concern of the Youth commissions appointed in the late 1940s (Ungdomskommissionen 1949:7 and 1951:36).

[70] In the 1960s and 1970s, the idea of the unity school continued to be a central concern of Sigurd Højby, who vainly worked for a reform (for a discussion cf. Rasmussen 1999:21, Haue 1999:407, 440ff). For an extensive treatment of these reform efforts, see Skovgaard-Petersen (1976 [1966]) and its relation to discussions of "unity" from the 1860s (1976:74-77).

[71] See De Coninck-Smith for the characterization of the Social-Democratic Party's "efforts to change the social character of the Danish high school system" (2008:233), while Harry Haue (2009) characterizes these efforts as a matter of expanding the uptake of students, creating an elite education for the masses.

[72] For detailed accounts of Højby's engagement in the high school, including his work towards creating a "unity school," see Larsen (1984) and Højby (1976).

[73] Although the government orders that contain the curriculum plans do not repeat the introductory discussions of aims and structure of the white paper (Undervisningsministeriet 1961), the white paper seems to have been distributed, as it is cited in local high school pamphlets (cf. Næstved high school 1964:4).

[74] The description of the branch of the social sciences is developed in collaboration with Erik Rasmussen who is also engaged in forming a new university discipline of Social Science at Aarhus University, literally called 'societal science.' The importance of developing an independent discipline of "societal science," which

had since 1906 been part of the teaching in history was being raised earlier in the 1950s (cf. Carstens 1952:127) and was also part of a reformist program of engendering a "public spirit" [samfundssind] through the pedagogic methods of what they called "The Societal School" [samfundsskolen] (cf. Mønsted et al. 1944:7, 1945:15,40, 119ff, Højby 1945a,b,c). Although the Branch high school was effectuated in 1963, the introduction of social science was postponed to 1967, as no teachers had yet been trained in this discipline (Undervisningsministeret 1960:161).

[75] "En befolkning sammensat af specialister, der betragter omverdenen ud fra snævert faglige synspunkter uden kendskab til og forståelse af den øvrige befolknings kår og anskuelser, har dårlige forudsætninger for at føre samfundet videre i samarbejde efter demokratiske principper"(Undervisningsministeriet 1960:16).

[76] These aims, however, go back to the Madvig reform of the 'grammar schools' [den lærde skole] in 1850, and they figured in Madvig's pedagogic dissertation of 1932 (Ræder & Larsen 1984, see also Haue 2003:15, 91ff.) Nissen (1968:58) points to how these two aims were at the centre of a debate about the higher school in the 1830s and 1840s.

[77] "Ligesom den bredere almendannelse kan give vigtige forudsætninger for fagstudiet, kan det mere specielle fagområde på gymnasiets linier give værdifulde bidrag til almendannelsen gennem den måde, hvorpå man uddyber faglige problemer, og gennem en sikrere vurdering af kundskabskilderne" (Undervisningsministeriet 1960:20).

[78] See also Haue for a more substantial analysis of the changes in the high school education in the 1960 reform, focusing on *'dannelse'* (Haue 1991:100, cf. Haue 2003), which may be translated as 'education,' however, rather than referring to formal institutions of education describes the process of formation or of 'being cultured,' somewhat similarly –and with a genealogy connected to the German concept of 'Bildung.' The transformations of the concept of 'dannelse' in relation to its emergence in the Danish high school through Madvig's reform in 1850 are discussed in Larsen (2006, see especially pp. 10-12).

[79] "Det er imidlertid klart, at ordet almendannelse ikke dækker over et én gang for alle fastlagt indhold. Måske var det i denne sammenhæng rimeligere at tale om en almen humanisme, bestemt ved en vis helhedsopfattelse af menneskets forhold over for kulturlivet og naturen og ved, at der i bestræbelserne på at fremføre træk af dette helhedsbillede bliver lagt vægt på at udvikle de unges modenhed, således at de forberedes til selvstændig handling og vurdering og indstilles på at leve i en verden med åbne udviklingsmuligheder" (Undervisningsministeriet 1960:21).

[80] "Et sådant helhedsbillede af menneskets plads i tilværelsen kan ikke på forsvarlig måde gives den enkelte elev, uden at den intellektuelle lødighed lider derved. Af hensyn hertil og til den efterfølgende faguddannelses krav og elevernes forskellige interesser og anlæg må gymnasieundervisningen til en vis grad specialiseres og differentieres. Men det er afgørende, at denne specialisering og differentiering sker på en sådan måde, at der herved ikke i elevernes bevidsthed fæstner sig indtryk af, at afgrænsede områder skulle kunne opfattes som fyldestgørende eller tilstrækkelige til forståelse af den menneskelige tilværelse." (Undervisningsministeriet 1960:21)

[81] "I det hele taget må udvalget anse det for formålstjenligt, at de anvendte undervisnings- og arbejdsformer i gymnasiet bliver så afvekslende og selvstændighedsfremmende som muligt, og at arbejdet lægges sådan til rette, at eleverne får den frihed og selvstændighed i arbejdet, som svarer til deres modenhed." (Undervisningsministeriet 1960:26).

[82] "Laboratoriearbejde har også tidligere været dyrket i gymnasiet, især i fysik og naturfag. Udvalget anser denne arbejds- form for meget værdifuld og anbefaler den derfor i en række fag. I den humanistiske faggruppe gælder det engelsk, tysk, historie og samfundsfag, i den matematisk-fysiske faggruppe fysik, kemi, geografi og biologi med biokemi" (Undervisningsministeriet 1960:155).

[83] For a discussion of the politics of the reserve of talent, including the governing of the committee prognosing the number of students, see Haue (2009:54-55).

[84] While introducing social science as an independent subject in the high school had been on the agenda for proponents of progressive education since the mid 1940 (cf. Carstens 1952, and see also Mønsted et al. 1945:136ff), this concern with a broader definition of humanism also reflects an engagement with emphasising the role of the natural sciences in the high school, as it was said to reflect the "unreasonable division, which is often installed" between the two cultures of the human and natural sciences. This position was held by the board member Mogens Pihl, and echoed the wordings of C.P. Snow's famous essay on the Two Cultures from 1959 (Pihl 1960a). For a discussion of how the debates of the natural sciences as humanism emerged in the 1950s, see Lynning (2005).

[85] "Forholdet mellem individ og samfund og forholdet mellem de enkelte individer i et demokratisk samfund rejser også problemer, der har tilknytning til skolen. De enkelte skal have så meget kendskab til biologi,

geografi, historie, økonomi, sociale forhold og samfundets funktioner, at de har forudsætninger for at tage kritisk stilling til offentlige anliggender og modstå propaganda ved at klargøre sig dens egentlige hensigter" (Undervisningsministeriet 1960:17).

[86] "I særlig grad er det betydningsfuldt, at skolen lærer de unge at forstå værdien af, at de lever i et land, der sikrer den enkelte borgers personlige frihed, og at de vil komme til at arbejde i et retssamfund. Skal disse goder bevares, må skolen søge at udvikle deres interesse for samfundsproblemer og deres evne til kritisk og selvstændigt at bedømme problemerne" (Undervisningsministeriet 1960:18).

[87] "Skolen er i sig selv et samfund en miniature, og derfor er det af afgørende betydning, at de unge også i dette lille samfund møder den demokratiske tradition og lærer, at deres opfattelse af, hvad der er sandhed, ikke skal bygge på lærerens autoritet, men hvile på deres egne undersøgelser og slutninger, og at regler og påbud ikke skal hæmme, men tværtimod sikre en fri debat og følelse af medansvar" (Undervisningsministeriet 1960:18).

[88] For an overview of how this engagement with reforming education played out in primary primary and lower secondary education, cf. Grinder-Hansen (2013). Also, note the descriptions of this development in the declared 'reformist' Georg Christensen (1952) as well as in the seminal work of Mønsted et al, (1945). Christensen sums up the various experiments with different forms of teaching since the 1920s (Christensen 1952:17ff). And Mønsted et al. discuss the Dalton Plan, the Winnetka Plan, the Work School and Activation Pedagogy as the most prominent "school ideas" with a "root in the 1920s thoughts of free school forms" (1945:201). The rector of the Danish Teachers' College G. J. Arvin also presents the 1920s as a period when the "understanding of the principles of the Work School made an impact in wide circles," which in addition to elementary skills of reading, writing and maths made "space for the students' independent work in school gardens, laboratories, workshops and libraries" (Arvin 1945:41).

[89] The ideas and methods related to the Dalton Plan were distributed through Simonsen (1930).

[90] The Winnetka plan was an experiment developed by Carleton Washburne, inspired by the educational philosophies of John Dewey and Francis Parker, and the "Winnetka technique" was introduced in Denmark from the late 1920 (cf. Bøgelund 1929; Washburne 1930, Larsen 1960:68) and distributed through the textbooks of principal Frk. Brøndsted (cf. Brøndsted 1932), and the translations and articles by teacher and from 1948 head of the first experimental school, Emdrupborg School, Anne Marie Nørvig (cf. Washburne 1937, Nørvig 1933). For an enthusiastic discussion regarding the possibilities of individualising teaching through Winnetka, see Sejerholt (1944). For a critical discussion of the Winnetka techniques, see Mønsted (1945:158ff). For a biography of Nørvig, see Gregersen (1984).

[91] The idea of "self-activity" [selvvirksomhed] was introduced in the high school 1935 (cf. Brøndsted 1945:35, Undervisningsministeriet 1960:14, Skovgaard-Petersen & Tortzen 2003:21) and was also made part of the descriptions for all subjects in the reform of the public school in 1937 (cf. Christensen 1952:20). While self-activity was a central idea of German pedagogue Friedrich Fröbel's, the descriptions in Austrian Elsa Köhler's book on activation pedagogy [aktivitetspedagogik] (1936) became central in relation to these reforms (Mønsted et al. 1945:154, Gad 1984).

[92] Cf. Højby's articles The Higher School and Democracy in the Newspaper Socialdemokraten (1945a, b, c), where he asserts that the "just view" which is "by now generally considered a guiding principle [namely] that any way to education should be open to anybody irrespective of gender, domicile and parents' social and economic position" is "just not right" as "only 3 percent of the academics come from working class or smallholder homes" (1945a).

[93] See also Holch (1992:65) and Haue (1991:100) for descriptions of the growing concern with teaching methods in the high school in these years.

[94] The concept of independence appears to emerge in Danish high school education through the reform of the grammar school in 1850, lead by minister of church, culture and education Johan Nicolai Madvig, perhaps related to Madvig's work as a professor of philology, which had focused on the writings of Cicero (Madvig 1932a, 1932b, 1932c, 1933, Ræder & Larsen 1984, cf. Larsen 2002:39). It appears in the regulations for the grammar school of 1845: "Den lærde Skoles Bestemmelse er at meddele de den betroede Disciple en med de aandelige Evners naturlige udvikling jævnsides fremskridende Undervisning i alle de Videnskabsfag, som maa anses for bedst skikkede til at uddanne Forstandsevnerne, at skærpe Dømmekraften og at vække og befæste erkendelse af og agtelse for Sandhed, Ret og Dyd, saa at de, naar de efter tilbagelagt Skolekursus gaar over til Universitetet, kunne være i Besiddelse af den grundige almindelige Dannelse og den Grad af aandelig Modenhed, som betinger det mere *selvstændige*, ved de akademiske Læreres Vejledning understøttede, Studium af de specielle Videnskabsfag, til hvilke den af dem valgte Livsbane maatte kalde dem." (Ny Collegial-Tidende 1845:721). And a similar concern with "self thinking" appears in the exam

description from 1850: "Kandidatens Evne til Selvtænkning og Færdighed i en god, klar og reen Fremstilling" (Bekendtgørelse 1850:133).

[95] "Det er i den personlige delagtighed i virkeligheden, vi søger det opdragende moment i gymnasiets undervisning; det er denne personlige engagerthed, vi tænker på, når vi taler om elevernes 'selvstændige arbejde med stoffet'" (Hastrup et al. 1958:12-13).

[96] "Udvalget har været opmærksom på den fare, som i denne henseende truer gymnasieundervisningens helhed, og har for at modvirke faren opbygget læseplanerne i de enkelte fag sådan, at fagene mest muligt støtter hinanden og indbyder til samarbejde" (Undervisningsministeriet 1960:24).

[97] "da det er nødvendigt i gymnasiet at gennemføre en betydelig fagspecialisering, er det uundgåeligt, at eleverne møder beslægtede tankegange ikke blot i forskellig sammenhæng, men også på vidt forskellige tidspunkter. Det kan føre til, at de har vanskeligt ved at se den forbindelse, der ofte er mellem fagene, og at de har svært ved at forstå, at enhver problemstilling først får virkeligt perspektiv, når den betragtes ud fra sine naturlige forudsætninger og sættes i relation til beslægtede tanker på andre områder" (Undervisningsministeriet 1960:106).

[98] The European History of Ideas was also translated into English, Norwegian and Swedish (Lund, Pihl & Sløk 1967, 1968, 1971).

[99] "Vi har flere gange tidligere fremhævet, at den forståelse af hvad kultur overhovedet er, som man i Europa efterhånden er nået frem til, har åbnet mulighed for, at man med langt større fordomsfrihed end nogensinde før kan møde fremmede kulturer. Der er ganske vist lang vej endnu. Det er en dyb menneskelig indstilling at tro, at kun ens eget er rigtigt, og at alt andet er 'underligt' og mindreværdigt. Men trods alle vanskeligheder er en ny indstilling ved at bane sig vej og det er en indstilling, som de ændrede forhold har gjort tvingende nødvendig." (Lund, Pihl & Sløk 1962:360)

[100] This is in line with Mogens Pihl's engagement with international cooperation relating to his work in UNESCO, an engagement which among other things materialized in his founding of the Danish Association for International Cooperation [Mellemfolkeligt Samvirke] together with Hal Koch (cf. Hansen 1984).

Chapter 3

[101] Det frie Gymnasium (1968). København: Det frie Gymnasium

[102] The preoccupation with project work and problem-orientation, also affected the reorganisation of the structures of governance and teaching in the established universities that followed the student riots of 1968 (cf. Michelsen 1978).

[103] According to education inspector Gullberg-Hansen, the Ministry of Education received 60-80 applications on experiments every year from the 130 high schools [gymnasiums], of which most were approved, resulting in around 50 reports for the Directorate of Gymnasiums and Hf (Gullberg-Hansen 1975:339).

[104] Published descriptions of experiments with interdisiplinarity organised as 'project work' include for example: Adrian (1977, 1979); Kreisberg (1977); Adrian & Mortensen (1979); Adrian et al. (1979); Brøndum et al. (1982:9); Det frie Gymnasium (1975, 1978); Hammelev et al. (1977), Herlev Gymnasium (1986:215); Jensen and Kreisberg (1977); Kristoffersen (1978:434); Marselisborg (1979:33), Henriksen (1980); Rødovre Statsskole (1980), Gentofte Statsskole (1981); Bjernum (1982); Hansen et al. (1982); Rødovre Gymnasium (1986).

[105] While The Free Gymnasium was a private initiative, the establishment of two other experimental schools, Herlev Statsskole and Avedøre Statsskole was initiated by the Ministry of Education (cf. The Free Gymnasium 1971:11). They were developed with a group formed by the Ministry of Education in 1968 aiming to discuss the prospects of establishing an experimental centre for working with high school education. In September 1969, the group gave its recommendations for making an experiment with school democracy – later to become Avedøre State School, as well as a pedagogical experimentation centre – later established as Herlev State School (Gullberg-Hansen 1973, Avedøre Statsskole 1980:10, Herlev Statsskole 1979:9).

[106] "Det er nødvendigt ved siden af kritiske (negative) strategier at opbygge positive teorier, der kan tjene som grundlag for en alternativ praksis – en rent "kritisk teori" er altså ikke tilstrækkeligt. Mere konkret: Der må udvikles en didaktisk praksis knyttet til arbejderklassens nuværende og fremtidige situation, og en dertil svarende didaktisk teori og bevidsthedssociologi. Konstruktiv/positiv opbygning af et alternativ til borgerlig videnskab. Dermed vil strategien formentlig både sprænge rammerne for humaniora og for akademiet – men det er nok <u>også</u> et nødvendigt mål for fagkritisk arbejde indenfor netop dette område." (Salling Olesen 1972:196-197). See also Venstresocialisterne (1974:76-77) for a discussion of the presumed effects of

levelling out elitist forms of knowledge of specific professions or disciplines by stressing general knowledge in the system of education.

[107] "Hvis man på forhånd politisk bestemmer, hvilke problemer der skal være udgangspunkt for en problemorienteret undervisning, og hvordan der skal arbejdes med problemerne, så har man nok overskredet de traditionelle faggrænser, men samtidig etableret nye bindinger, der på samme måde som de gamle vil stille sig i vejen for den akkomodative indlæring, der er forudsætningen for at udvikle den ønskede kreativitet og fleksibilitet." (Illeris 1974:69)

[108] This rejection of the disciplines not only takes draws on critical German sociology and didactics, but also on American pragmatist John Dewey's who in Illeris' reading: "rejected the selection [of material for teaching] based on scientific disciplines and problems, - 'The subject-matter, just as it is for the scientist, has no direct relationship to the child's present experience' (Dewey 1902:22-23, cited in Illeris 1974:156).

[109] "Fagopdelt og emneorienteret undervisning, der går ud fra en systematisk opbygning – der oftest er blevet til ved at systembyggerne selv har været gennem en masse problemløsningsprocesser – skaber let hos læseren en "udvendig" forståelse uden indsigt i de afgørende bagvedliggende strukturer, uden at det læste sættes ind i nogen overordnet samfundsmæssig sammenhæng." (Berthelsen et al. 1977:227)

[110] "Projektarbejdet er også med til at ophæve den undertrykkende opslidning mellem teori og praksis, mellem akademikere og jævne mennesker, mellem videnskabelighed og menneskelige handlinger. Projektarbejdet demonstrerer at alle er i stand til at opbygge teori og anvende den i deres daglige tilværelse i deres egen samfundsmæssige praksis." (Berthelsen et al. 1977:257)

[111] Such founding of a Danish "pedagogical-psychological institute" had been proposed in book The Democracy's School and Education by reformists Mønsted, Rosing and Vorbeck (1945:209).

[112] This was also the year when a proposal for a new teacher training program was passed in Parliament, which reasserted the importance of pedagogy in the Danish school teacher seminars (cf. Jolander 1966:33).

[113] "I den middelalderlige, autoritært bundne virkelighed var en autoritær skole passende – uddannelsesforløbet inddækkede og førte den enkelte frem til vedkommendes tilladte virkelighed. Men i den dynamiske virkelighed må skolen være dynamisk, hvis den skal føre sine elever frem til at bruge alle muligheder og udvikle sig sammen med de nye, kommende. Ellers er skolen en hæmmende instans – ikke blot for den enkelte, men for hele samfundet" (Hansen & Højmark 1968:25).

[114] The experiment was approved and funded by the Ministry of Education, and the presentation of the experiment was published in the Danish Ministry of Education's journal 'Education' in 1969 (Sinding 1969). The experiment ran for two years, involved 43 teachers and 400 students (ibid. 130).

[115] For a later discussion of the experiments (in Herlev State School), which places interdisciplinarity in a nexus between society and pedagogy, see Sparre (1980:504).

[116] Negt's book Soziologische Phantasie und exemplarisches Lernen, Zur Theorie der Arbeiterbildung was translated into Danish in 1975. It proposed a new, critical understanding of the idea of exemplaric learning for the education of the working class (Negt 1977).

[117] Læreren måtte gøre opmærksom på: "Der er ikke en eneste problemstilling – det er alt sammen *emner."* Og læreren fortsatte: "Men hvad er problemet" Hvorfor har I valgt dette ud? Hvad er det der er problemet i det? For hvem er det et problem? Læreren beordrede på håndfast vis alle grupperne i stedet til at starte med at skrive: *Det er et problem, at …* Langsomt begyndte eleverne at forstå og læreren gik videre: "Det er ikke nok, at det er et teoretisk problem, eller noget I har hørt om – hvordan ytrer problemet sig i virkeligheden – rent konkret? Og hvad betyder det for den enkelte af jer? Oplever I hver især at det er et personligt problem for jer, noget I hver især gerne vil være med til at bruge til og energi på at løse? Men selv om nogen af jer måske kommer ud at arbejde i den kemiske industri, er det heller ikke nok blot at opleve det som et personligt, privat problem. Det må også opleves som et logisk problem, hvor I kan trække linien fra jeres personlige motivation til det overordnede uddannelsesmæssige såvel som samfundsmæssige." (Berthelsen et al. 1977:228)

[118] "Fagopdelt og emneorienteret undervisning, der går ud fra en systematisk opbygning – der oftest er blevet til ved at systembyggerne selv har været gennem en masse problemløsningsprocesser – skaber let hos læseren en "udvendig" forståelse uden indsigt i de afgørende bagvedliggende strukturer, uden at det læste sættes ind i nogen overordnet samfundsmæssig sammenhæng." (Berthelsen et al. 1977:227)

[119] "Elevens opgave er ud fra et konkret problem at samle og sammenfatte viden på et stadig højere niveau og således blive i stand til at forstå og handle i stadig mere komplicerede og modsætningsfyldte situationer. Det er derfor vigtigt, at eleverne vælger reelt oplevede problemer med samfundsmæssigt perspektiv, der giver mulighed for at afdække væsentlige modsætninger og forhold på forskellige samfundsplaner" (Berthelsen et al. 1977:24).

Chapter 4

[120] Undervisningsministeriet (1997:31)
[121] "Formålet med uddannelsen er at forberede eleverne til videregående uddannelse, herunder at de tilegner sig almendannelse, viden og kompetencer gennem uddannelsens kombination af faglig bredde og dybde og gennem samspillet mellem fagene." (Undervisningsministeriet 2004:§1).
[122] "Almen studieforberedelse har til formål at udfordre elevernes kreative og innovative evner og deres kritiske sans i anvendelsen af faglig viden gennem fagligt samarbejde samt styrke deres evne til på et bredt fagligt og metodisk grundlag og i et fremtidsorienteret perspektiv at forholde sig reflekterende og ansvarligt til deres omverden og deres egen udvikling." (Undervisningsministeriet 2004b:bilag 9).
[123] "Studieplanen skal sikre, at der er tydelige mål for elevernes opbygning af faglige, almene og personlige kompetencer som forudsætning for faglig fordybelse, studiekompetence og personlig udvikling, jf. uddannelsens formål i kapitel 1." (Undervisningsministeriet 2004:§63).
[124] "Det er en erfaring, at i et videnssamfund som vores opstår de nye ideer, opdagelserne, på brudfladerne mellem fagene. Hvis vi ikke i gymnasiet er optaget af brydningerne i fagenes grænseland, så vil vi få problemer med at anvende de kandidater, der kommer ud af systemet" (Damgaard in Haue et al. 2003:13)
[125] In speech at the yearly meeting for hig school rectors in 1995, inspectors and the head of office in the Ministry of Education present the idea that "we have left the hierachical industrial society" as a general concern characterising the debate on the future of Danish education those years. This calls for new "solutions" in education, they assert, pointing out that the development might either be towards "a project-oriented and interdisciplinary school," or "a strengthening of the educational standards [fagligheden]" (Undervisningsministeriet 1995:1, 7, 22).
[126] Bloom's taxonomy also appears in the proliferation of university pedagogy and handbooks for students at this time (cf. Rienecker & Jørgensen 2005:58ff)
[127] "De faglige mål med almen studieforberedelse er, at eleverne skal kunne: – opnå viden om et emne ved at kombinere flere forskellige fag og faglige hovedområder – anvende forskellige metoder til at belyse et komplekst problem – forstå enkeltfaglig viden som bidrag til en sammenhængende verdensforståelse – vurdere, hvorledes et givet emne indgår i større historiske og/eller nutidige sammenhænge – vurdere forskellige fags og faglige metoders muligheder og begrænsninger – anvende indsigt i elementær videnskabsteori og videnskabelige ræsonnementer til at formulere og reflektere over problemstillinger af enkeltfaglig, flerfaglig og fællesfaglig karakter" (Undervisningsministeriet 2004b, bilag 9).

Part II

[128] Appleton High School is a pseudonym. Although the teachers and managers in this study have consented to my writing about them, some have asked to remain anonymous.

Chapter 5

[129] Fieldnotes Oct. 29, 2012. The core of the discipline is my translation of the notion of "fagets kerne" or "kernefaglighed."
[130] Fieldnotes Oct. 29, 2012.
[131] Fieldnotes, meeting Aug. 24, 2012
[132] Ethnographic interview Nov. 12, 2012
[133] Interview Dec. 5, 2012
[134] The direct translation of the core of the discipline is "fagets kerne" but the concern with the core of the disciplines is also reflected in the emergence of the concept of "fag-faglighed;" a concept which underlines the distinct characteristics of a discipline, as opposed to the broad use of "faglighed" which may also refer to "profession," "subject" or "professional standard."
[135] Neither of these new concepts relating to "fag" appear in the official Danish dictionaries (see ordnet.dk).
[136] This conceptualization seems to draw on Finkenthal (2001; cf. Kristensen 2007:72).
[137] Other reports included Undervisningsministeriet (2002, 2003c, 2003d, 2003e)
[138] Papers by scholars of pedagogy and didactics who had worked in interdisciplinarity had been invited to participate in conceptualizing and discussing the implications of core-disciplinarity (Undervisningsministeriet 2000:84-156, 161).

[139] ”Kernefaglighedsprojektet har således snæver sammenhæng med det perspektivrige projekt, hvor fagene udfordres til at definere, hvilke af deres indsigter, der i forhold til andre fag er nødvendige for at helheden i et vidensunivers eller en uddannelse ikke går tabt, for at kunne bidrage til den samfundsmæssige kompetenceudvikling - både på kort og langt sigt.” (Undervisningsministeriet 2000:22)
[140] Fieldnotes, March 1, 2013, observations of the supervision of the final exam in the interdisciplinary course General Study Preparation (AT-eksamen).
[141] Fieldnotes, Nov. 15, 2012, observations of the supervision of the interdisciplinary assignment Study Program Project (SRP).
[142] Formal interview Jan. 17, 2013.
[143] Ethnographic interview Nov. 12, 2012. Management meeting, Jan. 8, 2013.
[144] The Ministry of Education financed a development project 2010-2012, whose findings were shared in the national teaching site the EMU (see EMU 2012, Heimbürger 2012).
[145] Notes from meeting ”PR-møde,” Feb. 27, 2013.
[146] Notes from meeting ”PR-møde,” Feb. 27, 2013.
[147] Appleton High School agenda for PR meeting Sep. 11, 2013.
[148] Taking place within the framework of General Study Preparation (Almen Studieforberedelse).
[149] Fieldnotes, Sep. 18, 2013.
[150] Mail from SH February 17, 2013

Chapter 6

[151] Notes from ethnographic interview, February 19, 2013
[152]”Almen studieforberedelse har til formål at udfordre elevernes kreative og innovative evner og deres kritiske sans i anvendelsen af faglig viden gennem fagligt samarbejde samt styrke deres evne til på et bredt fagligt og metodisk grundlag og i et fremtidsorienteret perspektiv at forholde sig reflekterende og ansvarligt til deres omverden og deres egen udvikling.” (Undervisningsministeriet 2004b, bilag 9).
[153] Ethnographic interviews December 3 and 17, 2012.
[154] Ethnographic interview December 3, 2012.
[155] ”Vi har brug for et fælles begrebsapparat,” notes from meeting in AT-gruppe, November 22, 8:20-9:45.
[156] Notes from meeting in AT-gruppe, November 22, 8:20-9:45.
[157] Notes from ethnographic interview, February 19, 2013
[158]”Almen studieforberedelse har til formål at udfordre elevernes kreative og innovative evner og deres kritiske sans i anvendelsen af faglig viden gennem fagligt samarbejde samt styrke deres evne til på et bredt fagligt og metodisk grundlag og i et fremtidsorienteret perspektiv at forholde sig reflekterende og ansvarligt til deres omverden og deres egen udvikling.” (Undervisningsministeriet 2004b, bilag 9).
[159] Fieldnotes, January 28 2013
[160] This was for example expressed in a formal interview, Jan 17 and in an ethnographic interview Feb 23, 2013
[161] Fieldnotes Oct 29, Dec 10, Dec 17 2012

Chapter 7

[162] Interview January 17, 2013
[163] See Seaman (2011) for an historical account of the scholarly debates and revision of Bloom’s taxonomy.
[164] This scale was introduced in the gymnasium in 1963, introducing a longer description of each performance than the previous Ørsted scale, which attached adjectives ranging from “very poor” to “excellent” to numbers ranging from minus 23 to 8 (from 1943 -16 to 15). The scale introduced the concept of ”independence” in the characterisation of the two highest marks, encapsulating the emphasis on self-activity [selvvirksomhed] and anti-absolutism (Undervisningsministeriet 1963, Rindung 1963)
[165] In particular in the chapter by Reisby on ’objectives in teaching’ (1974).
[166] Roskilde University Centre was formed in 1972, following a decision in Parliament in 1970 (Slottved 2014).
[167] ”Hvad hjælper det med sådanne smukke formuleringer [om personlig udvikling, selvstændighed, ansvarsfølelse, kritisk sans] når eleverne faktisk, hvis læseplaner og eksamenskrav skal opfyldes, udvikles til at indordne sig, at konkurrere med kammeraterne, at blive uselvstændige og ukritiske?” (Berthelsen et al. 1977:18)

[168] Aalborg University Centre was formed in 1974 (Slottved 2012)
[169] Kvalitet der kan ses (Undervisningsministeriet 1998:1.3)
[170] "Vi [har] i forsøget på at løfte niveauet endnu mere, synliggjort og inddraget den Bloomske taksonomi med krav om redegørelse, analyse/sammenligning og vurdering og perspektivering i samme projekt." (Undervisningsministeriet 2001:77)
[171] EMU (nd.)
[172] E-mail correspondance with Hegner, April 2015.
[173] Eg. Formal interview, October 29 2012; observation: assesment of assignments November 6 2012; ethnographic interview, Friday Nov. 16 2012.
[174] Interview January 17, 2013
[175] Eg. Observation of supervision November 16 2012
[176] Ethnographic interview, dec. 13 2012
[177] Supervision November 6, 2012.
[178] Ethnographic interview December 13, 2012
[179] Ethnographic interview December 12, 2012
[180] Interview January 17, 2013

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