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Publication date:
2023

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

[Link to publication from Aalborg University](#)

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DISSERTATION SUBMITTED 2023

AALBORG UNIVERSITY
DENMARK

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June 2023

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BIO

I graduated with a master's degree in sports science, English literature, and cultural studies from Aalborg University in 2015. As part of my graduate studies, I also enrolled in courses at the University of Copenhagen and the University of Southern Denmark. Upon graduating, I was employed as a research assistant at the Center for Health Science Education and Problem-Based Learning. In 2016, I was admitted for Ph.D. studies at the Faculty of Medicine at Aalborg University. In 2019, I spent a semester at the University of Missouri, USA, where I enrolled in a course on narrative inquiry taught by renowned professor Candace Kuby, who also supervised my work while at MIZZOU. My main interests are new materialist and posthumanist theories, as well as innovative methodologies, including postqualitative inquiry and research-creation. My work has been published in journals such as *Human Arenas, Interdisciplinary Journal of PBL, Sport, Ethics and Philosophy,* and *Qualitative Inquiry.*

PAPERS INCLUDED FOR ASSESSMENT

In addition to the present text, this project includes the following papers:

Thorndahl, K., Agergaard, S., Stentoft, D., & Telléus, P. (Submitted). You have no right to remain silent: An agential realist take on silence in problem-based project work.

Thorndahl, K., & Frandsen, L. (2022). Supervision beyond borders: Perspectives on a mutual process of becoming in higher education. *Human Arenas 5,* 105–121.

Thorndahl, K., Kuby, C., Stentoft, D., & Telléus, P. (2023). Playful encounters with problematic paradoxes in problem-based project work: An impressionist expeculation in three parts. In L. Geberth and L. Woller (Eds.), *University in the 21st century* (pp. 191–205). Information Age Publishing.

Thorndahl, K., & Telléus, P. (Submitted). Tell-tale tables and other telling matter(s) for how matter comes to matter in and for PBL and problem-based project work.

CONTENT

SUMMARY IN ENGLISH

Problem-based learning (PBL) is an umbrella term under which many different local varieties of problem-based pedagogies can be included. Their differences notwithstanding, all varieties of PBL are pedagogical approaches in which an authentic problem, sometimes identified and articulated by the students themselves to ensure motivation, constitutes the point of departure for a minimally guided learning process during which students typically work in small groups supervised by a tutor or teacher who facilitates and scaffolds the students' learning process by asking open-ended questions instead of providing answers. In addition to teaching the specific content knowledge students need to acquire, problem-based approaches to learning frequently promise to improve students' abilities for critical thinking, collaboration, and self-directed learning.

Grounded in this way in humanist traditions, current framings of PBL in higher education and its theoretical underpinnings typically rely heavily on cognitivist ideas about learning and pedagogy and education more broadly. Such humanist and cognitivist framings cannot and do not take the broader material context of learning, pedagogy, and education into account when explaining how different pedagogies, policies, and forms of organization influence learning. Approaches to studying the complex phenomenon of learning and problem-based learning more specifically, therefore, often fail to consider the implications of the entanglement of learners with the materialities, objects, and bodies, whether human, nonhuman, or more-than-human, that populate the spaces, places, and environments in which teaching takes place and in which learning as a consequence is expected to happen.

The purpose of this project is twofold. Thus, while the main purpose is to explore what thinking with agential realism about PBL might produce, the secondary purpose is to use the insights yielded by the explorative efforts to contribute to a reimagining of PBL as a socially just pedagogy by producing an affirmative critique that might enable perceptions and practices, theories and research on PBL to be imagined and performed differently in the future.

Inspired by Karen Barad's agential realism and based on an affirmative critique of the conventional understanding of problem-based approaches to learning and the appertaining discourse on those same approaches' positive attributes as propagated in and by much of current research on problem-based pedagogies, this project seeks to build a platform for thinking anew about PBL in higher education.

Agential realism radically reconfigures what being human means due to its denunciation of the subject as unified and bounded. Indeed, in such a posthumanist perspective informed by a relational ethicoontoepistemological stance, humans are not understood as separately existing, autonomous subjects because there are no separately existing, autonomous subjects, according to this view. In contrast, while recognizing that we exist as both embodied and embedded within biological as well as technological worlds, posthumanist theory is undergirded by a relational ethicoontoepistemology that entails that humans, as well as nonhumans and more-than-humans, are intra-actively entangled to the extent that they only seemingly come to exist as separate entities when things, in the shape of subjects and objects, are temporarily fixed as such as parts of the world make themselves intelligible to one another.

Thinking in terms of a relational ethicoontoepistemology such as the one described here is bound to profoundly influence conceptions of the human, humanity, and human experience. But not only that. By implication, everything connected to these issues is also deeply affected when the understanding of these foundational categories changes. Thus, it follows that concepts such as learning, teaching, as well as education, more generally, inevitably shift and change in radical ways as they are reimagined and reconceptualized according to the agential realist position, no longer characterized by humanist notions of human exceptionalism and supremacy.

In keeping with the purpose and intentions as well as the theoretical premises of agential realism, the project is guided by the following research questions:

> **What can thinking about PBL with agential realism do to theories, practices, and research on PBL?**

This question can be divided into the following three questions:

1. What can thinking about PBL with agential realism do to theories on PBL?

2. What can thinking about PBL with agential realism do to practices of PBL?

3. What can thinking about PBL with agential realism do to research on PBL?

To try to answer this question and address the issues it raises about the perceptions, practices, theories, and research on PBL, I conducted three rounds of fieldwork with three groups of undergraduate students from three different study programs. The three rounds of fieldwork, along with a transformational experience of supervising a

graduate student's project, resulted in four papers, each of which yielded different insights into the perceptions and practices, theories and research on PBL.

The philosophical premises outlined above also govern the research endeavor itself, permeating everything from the methodological approach to the style of writing employed. This is to say that the style of writing employed throughout the present text is a direct consequence of the theoretical point of departure in an agential realist position in which research is understood as nonrepresentationalist and performative. As such, research in this vein is believed, like all other forms of knowing and knowledge-making, to generate new possibilities for experimentation while also creating entirely new forms of life that favor emergence and relational networks in which humans no longer take center stage but become in intra-active entanglements that involve the nonhuman and the more-than-human.

The approach employed to produce the textual products that inform the findings and conclusions of the present project may be characterized as an abductive bricolage approach in which participation was combined with conversation and observation in addition to experimentation and speculation. The field notes produced based on these activities were subsequently used to produce impressionist tales in an attempt to produce uncomfortable and unconventional writing to be used as a foundation for creating the kind of cartography that is able to critically confront taken-for-granted notions by disrupting the conventions of representation, interpretation, and subjectivity that usually inform qualitative inquiry thereby creating room for maneuver so that newness might emerge both in terms of the thinking and doing of PBL.

Inspired by observations in the field revealing that things that are not supposed to happen happen in PBL, the first of the four papers explores the apparent discrepancy between how PBL is described in theory and how it actually unfolds in practice. Employing an alternative strategy of creative meaning-making inspired by agential realism, the paper aims to point out that things that are not supposed to happen do happen in PBL. The purpose of directing attention to such problematic paradoxes should be seen as an attempt to try to rescue PBL from the kind of calcified, dogmatic thinking that seems prevalent in the literature in which many of the problems that can be discerned when involved in the actual practice of PBL are not described at all.

One example of something that plays a significant role in the practice of PBL but which I found to be underexposed in the literature is the phenomenon of silence. Moreover, in the rare cases when this issue is addressed, silent students are often construed as problematic in problem-based educational settings. The second paper explores how silence manifests and functions in PBL to try to complicate the common

understanding of silence. The second paper, therefore, aims to illustrate how the material-discursive entanglements that make up a particular higher education environment with all its various human, nonhuman, and more-than-human agencies can be understood to be collectively responsible and co-constitutive of the phenomenon of silence and how silence, in turn, reconfigures the material-discursive entanglements enacted by students and supervisors, pens and paper, birds and busses, etc.

To reconceptualize PBL in light of an agential realist stance entails that learning, pedagogy, and education be understood as relational phenomena. This effort, in turn, revealed another underexposed matter that matters in and for PBL, namely matter. This insight in and by itself demands that researchers sharpen their focus on how matter comes to matter in and for PBL. Thus, in the third paper, I show how matter plays a role in several crucial aspects of PBL as it is practiced in higher education.

To further explore how matter comes to matter in a specific context of higher education in which a problem-based approach is employed, two incidents described on the basis of the fieldwork are used to argue that the entangled nature and iterative enactment of the material conditions that characterize the institutional places, spaces, and matter(s) that make up the material culture of the university, are neither inert, neutral, nor aligned with the expressed image of the institution. On the contrary, the findings reveal that mundane things contribute to reinforcing an unequal, gendered hierarchy that keeps men in a hegemonic position even though they make up a minority of the population in the institutional context discussed.

Despite the problems pointed out by the first three papers, the fourth and final paper demonstrates that even within the confines of the neoliberal university, there is room for maneuvering to resist the status quo of commoditization and to carry out oppositional practices that may ultimately result in transformational learning for students as well as supervisors. Thus, the fourth paper shows how supervision can be imagined differently. Drawing on a patchwork of collaborative narratives written before, during, and after the fall semester of 2018 to describe a particular process of supervision that significantly affected both the student and the supervisor involved, the paper seeks to describe ways in which the relationship between supervisors and students may be performed differently. In conclusion, the fourth paper argues that it is necessary to let go of the rigid thinking and professional expectations about what proper supervision ought to be that confine supervision to a limited and limiting space in order to challenge hegemonic discourses and contest the legitimacy of the structures governing problem-based higher education today.

As the findings have made evident, gender, silence, materials, social status, academic capital, socioeconomic background, race, ethnicity, personality, time, the supervisor's attitude, and beliefs matter a lot in the actual practice of PBL. Nevertheless, these things are hardly ever mentioned in the traditional research literature. More importantly, they are never mentioned in study plans, curricula, and policy documents describing how PBL and supervision are to be carried out. Finally, these points are also rarely mentioned in the educational material used to prepare students for entering into the collaborative communities of practice of PBL.

At first blush, the events described in the impressionist tales may come across as nothing but peculiar oddities or, indeed, anomalies, not least because one has to look long and hard to find examples of descriptions of similar events and experiences in the existing literature on PBL. However, this may very well be due not to the fact that the events and experiences described are particularly rare but rather that they are only rarely described in the literature.

The pressure exerted by the marketized neoliberal system entails that most universities today are governed according to a corporate logic characterized by a firm focus on competition, consumerism, and commodification. To a great extent, the neoliberal logic has also come to characterize, if not control, research efforts directed as they often are toward efficiency, accountability, and evidence-based, quantifiable results.

My hope is that the text and the insights I present will function as a mapping of new thoughts about PBL while at the same time probing the cracks of this approach to learning in its present form so as to open up horizons for problem-based pedagogies-to-come. In the end, reconceptualizing PBL in this way may produce novel insights into a number of the most crucial aspects of problem-based education, including, but not limited to, curriculum, institutional policies, teaching, learning, and assessment.

RESUMÉ PÅ DANSK

Problembaseret læring (PBL) er et paraplybegreb, hvortil mange forskellige lokale varianter af problembaserede pædagogikker kan henregnes. På trods af deres forskelle er alle varianter af PBL pædagogiske tilgange, i hvilke et autentisk problem, nogle gange identificeret og formuleret af de studerende selv for at sikre motivation, udgør udgangspunktet for en minimalt styret læringsproces, hvor de studerende typisk arbejder i små grupper og vejledes af en vejleder, der faciliterer og stilladserer de studerendes læreproces ved at stille åbne spørgsmål i stedet for at give svar. Ud over at bibringe de studerende den specifikke viden, som de skal tilegne sig, siges PBL også at kunne bidrage til at udvikle og styrke studerendes evner til kritisk tænkning, samarbejde og selvstyret læring.

Det fremgår tydeligt af de begreber, der typisk anvendes til at beskrive problembaserede tilgange til læring, at de er funderet i en bestemt opfattelse af mennesket. Fordi målet om at fremme udviklingen af kritisk tænkende, samarbejdende og selvstyrende individer ligger implicit i den problembaserede tilgang til læring, er PBL tæt knyttet til ideer om individuel subjektivitet, bevidsthed, rationalitet og autonomi. Sådanne tilgange til læring er således gennemsyret af antropocentriske og humanistiske ideer om, hvad det vil sige at være menneske.

Fordi PBL som de fleste andre pædagogiske tilgange (i en vestlig kontekst) er baseret på humanistiske traditioner, er de nuværende former for PBL på videregående uddannelser og dets teoretiske fundament typisk kraftigt informeret af kognitivistiske ideer om læring og pædagogik såvel som uddannelse mere bredt. Sådanne humanistiske og kognitivistiske rammer kan ikke og tager ikke den bredere materielle kontekst, som læring, pædagogik og uddannelse foregår i i betragtning, når forskere af denne observans forsøger at forklare, hvordan forskellige pædagogikker, politikker og organisationsformer påvirker læring. Tilgange til at studere det komplekse fænomen læring og problembaseret læring mere specifikt, undlader derfor ofte at overveje implikationerne af de studerendes sammenfiltring med de materialiteter, objekter og kroppe, hvad enten de er menneskelige, ikke-menneskelige eller mere-end-menneskelige, der bliver til som de rum, steder og miljøer, hvor undervisningen foregår, og hvor læring som konsekvens forventes at ske.

Formålet med dette projekt er dobbelt. Mens hovedformålet er at udforske, hvad tænkning med agential realisme om PBL kan bibringe, er det sekundære formål at bruge de indsigter, som de eksplorative bestræbelser giver, til en gentænkning af PBL

som en socialt retfærdig pædagogik ved hjælp af en affirmativ kritisk læsning af de antagelser, som for nuværende informerer PBL, og derigennem gøre det muligt at forestille sig teorier, praksisser og forskning om PBL anderledes i fremtiden.

Inspireret af Karen Barads agentiale realisme og baseret på en kritik af den konventionelle forståelse af problembaserede tilgange til læring og den tilhørende diskurs om disse tilganges positive egenskaber som er udbredt i meget af den nuværende forskning om problembaseret pædagogik, søger dette projekt at opbygge en platform for en gentænkning af PBL på de videregående uddannelser.

Agential realisme rekonfigurerer radikalt, hvad det vil sige at være menneske i kraft af denne positions afvisning af idéen om et entydigt og afgrænset subjekt. I et sådant performativt posthumanistisk perspektiv, der er baseret på en relationel etikoontoepistemologisk indstilling, forstås mennesker (og alt andet) ikke som separat eksisterende, autonome subjekter eller objekter, fordi der ganske enkelt ikke eksisterer separat eksisterende, autonome subjekter og objekter ifølge denne opfattelse. Dog anerkendes det, at vi (og med "vi" menes såvel menneskelige som ikke-menneskelige og mere-end-menneskelige agentialiteter) skabes i intra-aktive tilblivelsesprocesser, som gør, at vi bliver til som kropsliggjorte og situerede, det vil sige som specifikke legemer indlejret i bestemte sammenhænge og vilkår, som også udelukkende bliver til som sådan i kraft af de indbyrdes relationer, som de indgår i, idet relationer forstås som ontologisk primære, det vil sige som det, der går forud for relata. Posthumanistisk teori understøttet af en relationel etikoontoepistemologi indebærer således, at mennesker, såvel som ikke-mennesker og mere-end-mennesker, er intra-aktivt viklet sammen i relationelle tilblivelsesprocesser i en sådan grad, at vi kun tilsyneladende bliver til som separate entiteter, når (al)ting, i form af subjekter og objekter, midlertidigt fikseres som sådan, når dele af verden gør sig forståelige for andre dele af verden.

At tænke med en relationel etikoontoepistemologi som den, der er beskrevet her, vil utvivlsomt have stor indflydelse på opfattelser af mennesket, menneskeheden og den menneskelige erfaring. Desuden bliver alt, hvad der på en eller anden måde er forbundet med spørgsmålene vedrørende sådanne opfattelser også dybt påvirket, når forståelsen af disse grundlæggende kategorier ændres. Det følger således, at begreber som læring, undervisning såvel som uddannelse mere generelt, uundgåeligt skifter karakter og ændres radikalt, efterhånden som de genskabes og rekonceptualiseres i overensstemmelse med den agential-realistiske position, der ikke er præget af humanistiske forestillinger om menneskelig exceptionalisme og overherredømme. I forlængelse heraf søger jeg med dette projekt at belyse følgende forskningsspørgsmål:

> *Hvad kan tænkning om PBL med agential realisme gøre ved teorier, praksisser og forskning i PBL?*

Dette spørgsmål kan opdeles i følgende tre spørgsmål:

1. Hvad kan tænkning om PBL med agential realisme gøre ved teorier om PBL?

2. Hvad kan tænkning om PBL med agential realisme gøre ved praksisser for PBL?

3. Hvad kan tænkning om PBL med agential realisme gøre ved forskning i PBL?

For at forsøge at besvare dette spørgsmål og adressere de problemstillinger, det rejser omkring teorier, praksis og forskning om PBL, gennemførte jeg tre runder feltarbejde med tre grupper af bachelorstuderende fra tre forskellige uddannelser. Sammen med en transformativ oplevelse af at vejlede en kandidatstuderendes projekt, resulterede feltarbejdet i fire artikler, som hver bidrager med forskellige indsigter i PBL-teori, PBL-praksis samt forskning i PBL.

De filosofiske præmisser skitseret ovenfor styrer også selve forskningsindsatsen og gennemsyrer alt fra den metodiske tilgang til den anvendte skrivestil. Med andre ord er den skrivestil, der anvendes gennem denne tekst, en direkte konsekvens af det agential realistiske udgangspunkt som beskrevet af Karen Barad, hvori forskning forstås som non/repræsentationalistisk og performativ. Som sådan forstås forskning i forlængelse heraf, ligesom alle andre former for viden og videnskabelse, som en praksis, der har til formål at skabe nye muligheder for eksperimenter og samtidig skabe nye relationelle forståelser og livsformer, hvor mennesker ikke længere er i centrum, men hvor mennesker ligesom alt andet bliver til i intra-aktive forviklinger, der involverer det ikke-menneskelige og det mere-end-menneskelige.

Den tilgang, der anvendes til at fremstille de tekster, der danner grundlag for resultaterne og konklusionerne i dette projekt, kan karakteriseres som en abduktiv bricolage-tilgang, hvor deltagelse blev kombineret med samtale og observation i tillæg til eksperimenter og spekulation. De feltnoter, der blev produceret baseret på disse aktiviteter, blev efterfølgende brugt til at producere impressionistiske fortællinger i et forsøg på at producere ubehagelige og ukonventionelle tekster, der kan bruges som grundlag for at skabe den slags kartografi, der er i stand til kritisk at konfrontere vanemæssige forestillinger ved at forstyrre de konventioner om repræsentation, fortolkning og subjektivitet, der sædvanligvis informerer kvalitativ forskning. På den måde søger artiklen at skabe et rum hvori der kan opstå såvel nye tanker om som måder at praktisere PBL på.

Inspireret af observationer i felten, der afslører, at ting, der ikke burde ske i PBL alligevel sker, udforsker den første af de fire artikler den tilsyneladende uoverensstemmelse mellem, hvordan PBL beskrives i teorien, og hvordan denne pædagogiske tilgang rent faktisk udfolder sig i praksis. Ved at anvende en alternativ strategi for kreativ meningsskabelse inspireret af agential realisme, har artiklen til formål at påpege, at ting, der ikke formodes at ske, sker i PBL. At rette opmærksomheden mod sådanne problematiske paradokser skal ses som et forsøg på at forsøge at redde PBL fra den dogmatiske tænkning, der synes fremherskende i litteraturen, hvor mange af de problemer, der kan ses i praksis, slet ikke er beskrevet.

Et eksempel på noget, der spiller en væsentlig rolle i og for PBL, men som jeg fandt var undereksponeret i litteraturen, er fænomenet tavshed. Dertil fandt jeg, at i de sjældne tilfælde, hvor dette problem behandles, opfattes tavse studerende ofte som problematiske i problembaserede uddannelsesmiljøer. Den anden artikel undersøger, hvordan stilhed manifesterer sig og fungerer i PBL for at forsøge at komplicere den almindelige forståelse af stilhed. Den anden artikel har derfor til formål at illustrere, hvordan de materiale-diskursive forviklinger, der udgør et bestemt videregående uddannelsesmiljø med alle dets forskellige menneskelige, ikke-menneskelige og mere-end-menneskelige agenciteter, kan forstås som værende kollektivt ansvarlige og samskabende faktorer for fænomenet stilhed, og hvordan stilhed på sin side rekonfigurerer de materielt-diskursive forviklinger, som studerende og vejledere, kuglepenne og papir, fugle og busser, mv. udgør.

At rekonceptualisere PBL i lyset af en agential realistisk position indebærer, at læring, pædagogik og uddannelse forstås som relationelle fænomener. Denne indsats afslørede til gengæld et andet undereksponeret forhold, der betyder noget i og for PBL, nemlig det materielle. Denne indsigt kræver i sig selv, at forskere skærper deres fokus på, hvordan materielle forhold får betydning i og for PBL. I den tredje artikel viser jeg således, hvordan materielle forhold spiller en afgørende rolle i og for flere aspekter af PBL, som denne pædagogiske tilgang praktiseres på de videregående uddannelser.

For yderligere at udforske, hvordan det materielle kommer til at betyde noget (i begge dets mulige betydninger) i en specifik kontekst af videregående uddannelse, hvor der anvendes en problembaseret tilgang, bruges to hændelser beskrevet på baggrund af feltarbejdet til at argumentere for, at den sammenfiltrede natur og iterative udformning af de materielle betingelser, som karakteriserer de institutionelle steder, rum og materialer, der udgør universitetets materielle kultur, hverken er inaktive, neutrale eller sågar på linje med det institutionens filosofi. Tværtimod afslører resultaterne, at materielle forhold bidrager til at forstærke et ulige, kønsbestemt

hierarki, der holder mænd i en hegemonisk position, selvom de udgør en minoritet i den diskuterede institutionelle kontekst.

På trods af de problemer, som de første tre artikler påpeger, viser den fjerde og sidste artikel, at selv inden for rammerne af det neoliberale universitet er der plads til at manøvrere på måder, der udfordrer status quo gennem oppositionelle praksisser, der i sidste ende kan resultere i transformativ læring for studerende såvel som vejledere. Således viser den fjerde artikel, hvordan PBL-vejledning kan tænkes anderledes. Med udgangspunkt i en broget samling af fortællinger skrevet i samarbejde før, under og efter efterårssemesteret 2018 beskrives en særlig vejledningsproces, der i væsentlig grad påvirkede både den studerende og den involverede vejleder. Artiklen søger dermed at beskrive måder, hvorpå forholdet mellem vejledere og studerende kan gøres anderledes. Afslutningsvis argumenteres der i den fjerde artikel for, at det er nødvendigt at give slip på den rigide tænkning og professionelle forventninger om, hvad god vejledning er og bør være, idet sådanne forestillinger i vid udstrækning begrænser vejledning til et begrænset og begrænsende rum, hvorfra det kun vanskeligt lader sig gøre at udfordre hegemoniske diskurser og anfægte legitimiteten af de strukturer der er styrende for PBL på videregående uddannelser i dag.

Som resultaterne i de fire artikler tydeligt viser, betyder køn, tavshed, materialer, social status, akademisk kapital, socioøkonomisk status, personlighed, tid, vejlederens holdning og overbevisning meget i den faktiske praksis af PBL. Ikke desto mindre bliver disse ting næsten aldrig nævnt i den traditionelle forskningslitteratur. Derudover nævnes de stort set heller ikke i studieplaner, studieordninger og politiske dokumenter, der beskriver, hvordan PBL og vejledning skal udføres. Endelig er disse punkter også sjældent nævnt i det undervisningsmateriale, der bruges til at forberede de studerende til at indgå i samarbejdsrelationer omkring PBL.

Ved første øjekast kan de begivenheder, der beskrives i de impressionistiske fortællinger, fremstå som intet andet end ejendommelige mærkværdigheder eller anomalier, ikke mindst fordi man skal lede længe efter at finde eksempler på beskrivelser af lignende begivenheder og oplevelser i den eksisterende litteratur om PBL. Det behøver dog ikke at skyldes, at de beskrevne begivenheder og oplevelser faktisk er særligt sjældne, men derimod at de kun sjældent er beskrives i litteraturen.

Det pres, som det neoliberale system udøver, medfører, at de fleste universiteter i dag styres efter en virksomhedslogik præget af et fast fokus på konkurrence og profit. Således er den neoliberale logik i høj grad også kommet til at karakterisere, hvis ikke kontrollere, forskningsindsatser som i dag ofte rettes ensidigt mod effektivitet og evidens i form af kvantificerbare resultater.

Mit håb er, at denne tekst og de indsigter, jeg præsenterer, vil fungere som en kortlægning af nye tanker om PBL, samtidig med at den undersøger sprækkerne i denne tilgang til læring i sin nuværende form for at åbne horisonter for nye måder at gøre problembaseret pædagogik på. I sidste ende kan en sådan gentænkning af PBL bidrage til at skabe ny indsigt i en række af de mest afgørende aspekter af problembaseret uddannelse, herunder, men ikke begrænset til, læseplaner, institutionelle politikker, undervisning, læring og evaluering.

ACKNOWLEDGMENTS AND APOLOGIES

Doing things with words

Where do I begin? Of course, before I can decide on this matter and proceed to write up an answer, I have already begun. In fact, I have always already begun in the sense that a text like this, or any text for that matter, cannot be said to have a definitive point of departure, not one that it is possible to define anyway. In that sense, this beginning, "like all beginnings, is always already threaded through with anticipation of where it is going but will never simply reach and of a past that has yet to come" (Barad, 2010, p. 244).

But let's return to my initial question: "Where do I begin?" As I type up the question once again, this time several lines from the top of the page, I see what I have just written about the impossibility of locating a fixed starting point literally materializing before my eyes. Indeed, even before I can articulate the question in writing for the first time, the little black letters and the gaps of contrasting white that contribute to their meaning-making ability have already crept up on me and begun accumulating on this page and the ones preceding it. The growing number of lines testifies to the fact that the text has already moved far away from the artificial point of departure that the first black "N" of the title on the front page represents. And so, once I reach the end of the first sentence of the first section and hit the two keys that result in a question mark—the question mark that was supposed to mark the beginning of the text—the text has already taken on a life of its own. I feel like I am losing control, and the more I try to regain it, the more text I generate and the less power I seem to have. There is something uncanny about this kind of textual autopoiesis. I cannot seem to stop the flow (of matter) no matter what I do. Marks and traces have already been generated and left on bodies, not least since the algorithms controlling my word processing software have already set in motion massive swarms of ones and zeros in the binary code of the data highway somewhere in the mysterious, ephemeral depths of cyberspace, and I can neither stop them in their tracks nor change their trajectories. Nor can I erase them. And lo and behold: We are already on several pages from the first.

What is ironic, although perhaps befitting, considering the particular posthumanist preoccupations of this project is the way the initial question might also be read differently. Thus, if only the intonation or, in this case, when it is communicated in writing, the graphical representation of the question is altered to read: "Where do *I*

begin?" a new meaning emerges. Perhaps this is how you already read and understood the question in the first place. There is no way of knowing. In any case, reading the question like that—emphasizing the personal pronoun, "I," instead of the interrogative, "where"—causes the meaning of the question to shift in the sense that it relinquishes its focus on location in favor of one that is more concerned with the extension of an individual (human) entity. Either way, *this* is certainly *not where* I began. Nevertheless, it would seem that I have begun and that this is how I ended up not beginning. As for the second version of the question about where *I* begin, I will delay my response to that question until I have had a chance to discuss in more detail the agential realist point of departure I think with in this project.

Despite my initial question about my own beginning or where to begin, there is, of course, no "I" in Ph.D. to put it in the popular vernacular, and so, like a book, a Ph.D. project attributing its textual manifestations to one individual is to overlook significant relations and matters. Indeed, paraphrasing Deleuze and Guattari (2013), since each of us is several, there is always already quite a crowd involved in any act of doing anything, including writing.

That said, it is hard to account for all the help, advice, and inspiration I have generously received along the way of the haphazardly assembled itinerary guiding my Ph.D. journey, which has led me this way and that, resulting in numerous delays, not all of which have been equally productive, although they have been educational. But just as the task of counting the number of dead ends and detours would be impossible, accounting for the exact number of human, nonhuman, and more-than-human helpers who have generously assisted and guided me on my not-so-linear path from admission to submission seems utterly unmanageable. And even if I were somehow capable of quantifying the exact number of helpers I believe to have encountered, that number would say nothing about the kind (of) help they provided, nor would it say anything about how grateful and privileged I feel to have received it. At this point, I must admit that I never used to read acknowledgments, not until I had to write some myself and found out how hard it is. What is not hard, however, is to be thankful, and I have a lot to be thankful for!

In particular, I want to thank the three groups of undergraduate students and their supervisors for letting me tag along. Furthermore, I want to thank my fellow students in the narrative inquiry course at the University of Missouri. Lauren, Helen, Traci, Erin, Nicole, J.P., Christina, Leah, Shane, Christian, and Hanna: Thank you for all the fun discussions we had. Thank you, Candace, for welcoming me to Mizzou and introducing the three of us to Carlann and Nick. We enjoyed the time we spent in Missouri so much and hope we will soon be able to meet again. I also wish to say thank you to the Sport and Social Issues group at the Department of Health Science

and Technology for welcoming me when I was suddenly left with nowhere to go, and special thanks to Britta, John, Armando, Tine, Sissel, Lotte, Verena, Christian, Sine, Nalini, and Sanne: Thank you for your kind support and encouragement.

From outside my academic bubble, I want to express my gratitude to Luffe, Røde, and Louis for your unconditional love and affection, to Ann Katrine and Bjørn for valuable conversations, good food, and food for thought, and to "seniordelegationen" for understanding even when you did not. I'm sorry to have messed up the Christmas card for 2021. Thank you for visiting us in the U.S. For Tuesday and Wednesday night dinners that I hope remain in fashion for many years. Thank you for Christmases at Klostermarken and summer days spent on Egholm. Thank you, Brian, for always giving me such positive and encouraging feedback no matter what I'd written. I'm too shy to mention which writer you compared me to, but I can't think of a compliment I'd rather have had.

I also want to say a big thank you to my academic friends and supervisors. Ida: I feel so lucky to have met you, and even if I'm still not sure I understand the concept of haecceity or know how to pronounce it, for that matter, I have learned a great deal from and with you. I admire your powerful, killjoy ways of feminist becoming with the world. Thank you, Nicolaj. Despite your obsession with carrots and your compulsive desk adjustment habits, you made "værelset" such a fun, relaxed, and welcoming space. I enjoyed every single day we spent there. Thank you, Kalle, for your friendship, for trips to San Francisco and Urbana, for your unconventional approach to academia, countless laughs, and for contributing to making "værelset" the best office space one could imagine even though Nicolaj and I did think that three would be a crowd before you moved in. Thank you, Jaan. Some people are lucky to win the lottery, which is probably nice, but the luckiest people of all are those who suddenly find themselves blessed with a superstar professor of cultural psychology living in the apartment downstairs! Thank you for all your advice and encouragement, for texts and publishing opportunities, for tolerating Luffe's visits, and not least for all the wonderful snacks from all around the world. I have no doubt that the Estonian liquor is what finally got me over the finish line! Thank you, Simon D., for your friendship, for collaborative writing experiences, and for the many delicious meals you've cooked. Thank you, Lasse, for your gut feelings and for having the courage to listen to them. Thank you for always seeing the beauty in crazy ideas, sharing of papers, discussions, messy writing, readings, re-readings, re-re-readings, late-night application writing, pizzas, strange talks, laughs, and cries, and and and… Who would have thought that roaming the hallways of the university buildings could lead to this? And just so you know, you were never a lab rat to me! Thank you, Simon T., for your cantankerous personality and for always disagreeing. There's nothing like having an invigorating two-hour quarrel about where to place a comma and the dramatic shift of

meaning that might ensue. Thank you for reading and re-reading countless versions of an endless list of chapters and paper manuscripts. Thank you, Diana, for making it all possible and for taking a chance on me. I hope that even though it did not turn out as you had imagined or expected, you will appreciate the final result despite the winding road. I still owe you a bottle of champagne. I know you probably imagined I would have paid you back for the one we shared in Zürich in 2016 a lot sooner, but I trust you agree that it's never too late for champagne.

And last but not least, thank you, Patrik! While it may seem a rather strange thing to say to someone who prides himself on *not* being a teacher, I will nevertheless say that you are indeed a great teacher, that is, "a tough guy who cares deeply about something that is hard to understand" (Maclean, 2008, p. 11). I hope you know that I mean it as a compliment when I say I think this quote epitomizes how I see you. Thank you for the long talks, lots of inspiration, laughs, sharing of frustrations, and revolutionary ideas, for your immense patience, for frequently reminding me of the importance of the pre-Socratic philosophers (I'm still not entirely sure who they were), for tolerating my naïve questions about this and that and calling it equal and dialogic thinking. If nothing else, I hope I may have given you occasion and cause to laugh a little more than you would otherwise have had. I greatly value your input and feedback, even when I object and come across as obstinate and argumentative. I assure you that I have nothing but the deepest respect for you, and I'm so grateful that you agreed to supervise the final phase of my project.

Finally, the most tested, tried, and tired: Søren and Asta. This is where language seems to reach its limit. No words, no matter how eloquently combined, can describe how much I love you and owe you. Thank you for holding on and hands. Without you, there would be no reason, no light, no matter, no way, and no hands to hold.

To Asta

When I was in first grade, one of my teachers, Mr. C, of whom I was both exceedingly fond and afraid, would often solemnly declare that the sole purpose of first grade is for students to learn to be able to understand and respond appropriately to teachers' instructions and announcements when given to *groups* of students rather than to each student individually. This statement would typically be uttered in a tired tone and accompanied by a dramatic sigh of exasperation whenever a student would venture to ask a question that Mr. C felt he had already answered, not by addressing each student individually in turn but rather by addressing all sixteen of us at once.

I presume that Mr. C's reason for repeating this dictum over and over again must have been that he considered this skill to be a crucial prerequisite for learning. More specifically, he must have expected, and rightly so, the majority of the teaching we would encounter in the years of education still ahead of us to be guided by a traditional notion of teaching and learning in which the teacher plays the leading part, decides what is relevant and right, and conducts the vast majority of teaching by imparting content to classes of students in plenum.

And sure enough, Mr. C's prediction about how my classmates and I would be taught everything we were supposed to learn turned out to be surprisingly accurate, corresponding closely to what would transpire during the next fourteen years of education. I thank God I learned how to take in and respond to instructions imparted in plenum in Mr. C's class since the kind of teaching I encountered would typically involve a teacher giving instructions while standing in front of a blackboard, behind a desk, chalk in hand, ready to produce notes that my fellow students and I would do our best to copy down in our notebooks.

This lecturing type of teaching continued to be the norm for what I was exposed to all the way through high school. In fact, from what I could gather based on my own, albeit limited, experience, this type of teaching was prevalent not only among teachers in Denmark but also among teachers elsewhere, such as in the U.S., where I spent a year as a foreign exchange student.

I readily admit that my expectations of what high school in the U.S. would be like might have been slightly influenced by the impression given off by the movie *Dead*

Poets Society from 1989, starring Robin Williams as the charismatic Mr. Keating. But at Norwich High School in rural upstate New York, there was no Mr. Keating declaring, "Now, in my class, you will learn to think for yourselves again!" There was no standing on desks, we didn't read poems by Walt Whitman, and we didn't go for walks outside our designated classrooms without a signed hall pass, let alone outside the school building to let Nature inspire us, nor were we ever asked to huddle up around a teacher reciting poetry, and we certainly never ripped pages out of textbooks. Rather, the teachers at Norwich High School appeared to have received the same training as the teachers I had known in Denmark since their ways of teaching were practically identical. To my mind at the time, therefore, this was simply how teaching was done. This was how teachers, no matter what cultural context they happened to be part of, were supposed to teach, and therefore that was how they taught. This way was *the* way—the one and only, absolutely fixed and inevitable. I never questioned this didactic when I was on the receiving end of it. In fact, I didn't give it a second thought since it never even occurred to me that learning could be facilitated differently, that is, that there might be an alternative to the lecturing style of teaching.

Despite the monotonous lecturing approach used by most of the teachers I met on my way through the educational system, I *do* feel like I managed to pick up quite a bit, to learn something that is, in addition to the lesson I learned in Mr. C's first-grade class. Nevertheless, I am not entirely convinced that *what* I learned about Newton's laws, Australian geography, differential equations, the Cuban missile crisis, German grammar, ancient Greek art, and the function of the mitochondria, in addition to many other things, were actually the *right* things, nor perhaps even the most important ones.

Hence, it was not a big stretch for me to sympathize with the views of Richard Paul, a leading scholar on critical thinking, when I read a paper in which he contends that it is no surprise that the lecture-and-drill-based models that have been in use for generations do not result in students learning what is actually much more important than trivial knowledge about Newton's laws, Australian geography, differential equations, the Cuban missile crisis, German grammar, ancient Greek art, and the function of the mitochondria, namely what Paul (1989) has dubbed *independent critical thinking*, which he claims is crucial to all substantial learning.

According to Paul (1989), the importance of independent critical thinking can hardly be overstated. Indeed, if there is to be any hope at all of solving the complex social, political, and environmental problems facing us at this moment in history, real and significant changes need to be made, not least in and to the outdated ways in which education is typically practiced according to a didactic theory of knowledge and learning based on the assumption that students need to be taught *what* to think rather than *how* to think. Paul complains that this scholastically dominant didactic theory

gives rise to an extremely unfortunate situation with dire consequences for contemporary educational contexts in which

> Students memorize and reiterate domain-specific details. Teachers lecture and drill. Active integration of the students' daily non-academic experiences is rare. Little time is spent stimulating student questions. Students are not typically encouraged to doubt what they are told in the classroom or what is written in their texts. Students' personal points of view or philosophies of life are considered largely irrelevant to education. Classrooms with teachers talking and students listening are the rule. Dense and typically speedy coverage of content is typically followed by content-specific testing. Interdisciplinary synthesis is ordinarily viewed as a personal responsibility of the student and is not routinely tested. Technical specialization is considered the natural goal of schooling and correlated with getting a job. (Paul, 1989, pp. 199)

The result, Paul concludes, is that the current status quo of education does not promote the development of critical minds and persons. Quite the opposite! Due to the way they have been indoctrinated in and by formal education, most people are, in fact, miserably ill-prepared to understand and deal with the massive multi-dimensional and logically messy challenges and demands facing us all in this day in age, not to mention the unforeseen, as of yet unimaginable, problems yet-to-come.

INTRODUCTION

Aims and cuts, hopes and questions

In thinking with Karen Barad's agential realism (Barad, 2003; 2007; 2010; 2014) and based on an affirmative critique of conventional understandings of problem-based approaches to learning and the appertaining discourse advertising their positive attributes, this project seeks to build a platform for thinking anew about problem-based learning (PBL) in higher education. In order for such a platform to be able to serve its intended purposes, it needs to be flexible enough to accommodate wild and creative experimentation yet sturdy enough to function as a launching pad from which the results of such experimental endeavors in the shape of new and alternative ideas for thinking and doing PBL may take flight.

This project is thus meant as a cartography, that is, as a theoretically based and politically informed reading of the present, which may reveal points of conflict as well as lines where tension and dissent can happen and inspire change (Braidotti, 2013). My hope is that my project and the insights I present can function as a map mapping new thoughts about PBL while at the same time probing the cracks of this approach to learning in its present form so as to open up horizons for problem-based pedagogies yet-to-come. The ideas and thoughts presented here are thus both critical responses to the present state of PBL, as well as dreams for a different future.

To start the process that I hope will result in positive changes, I look for the cracks in the educational fabric that is PBL. Let me explain how and why. I look for what is strange, out of place and order, and for the unexpected events that occur even though they were not supposed to. In that sense, I begin in a way similar to that of Dolphijn (2021), who states that he begins "from the cracks that break open the present, that allow for all sorts of wild and untamed forms of unforseenness" (p. 9). Hence, I look to break open the cracks in the fabric of PBL because I suspect such cracks to be ripe with potential for change and for imagining how things could be different from the way they currently are.

In line with the intentions outlined above, the aim of this project is threefold. The first aim is to *describe* what and how conceptualizations of PBL manifest in a particular higher education context. The second aim is to *think with* agential realism to explore how such a position might affect how and what it is possible to think about the assumptions undergirding conceptualizations of PBL. Finally, inspired by

agential realism, the third aim is to *fabulate*, that is, to imagine what a problem-based pedagogy yet-to-come might look like. While the three aims outlined here differ in terms of what is required to fulfill them, taken together, they contribute to an attempt "to produce different knowledge and to produce knowledge differently" (Lather, 2001, p. 200).

Found[1] research questions

In my quest to achieve the aims outlined above, I have crafted the following question:

> **What can thinking about PBL with agential realism do to theories, practices, and research on PBL?**

This question can be divided into the following three questions:

1. What can thinking about PBL with agential realism do to theories on PBL?

2. What can thinking about PBL with agential realism do to practices of PBL?

3. What can thinking about PBL with agential realism do to research on PBL?

These questions call for a critical discussion of the conventional understandings of PBL as an approach to learning inspired by constructivist ideas as well as an exploration of how problem-based pedagogies are currently thought and done. Furthermore, the questions require an exploration of the potential of these pedagogies to become other than they currently are when re-imagined and re-configured in light of Barad's agential realist position and examples of phEmaterialist scholarship capable of disrupting the normative status quo.

These aims, in turn, along with the appertaining methodological considerations and moves, translate into a cartographic exercise in which both the constraints and the

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[1] I think of the research questions as *found* in a sense similar to the way in which the phenomenon of *found poetry* is understood as poems that have been created using words and phrases selected and rearranged from the texts one has encountered in one's surroundings. Since my surroundings have been heavily populated by academic texts on posthumanist thinking, I have used these texts as spaces in which to scavenge for the components of the assemblages that constitute the research questions presented here.

productive potential of power (Kuntz, 2019) are mapped to expose how power relations produce entrapment as well as empowerment.

The value of thinking (about) PBL with agential realism

We live in an era burdened by serious crises affecting every aspect and kind of life on the planet. While few fail to face up to the fact that dealing effectively with the consequences of the environmental, economic, political, and psychological crises we experience will require massive and drastic changes, real change seems to escape us. If there is to be any hope of a better future, or perhaps of any future whatsoever, our ways of life need to be profoundly recalibrated. In the greater scheme of things, the value of trying to reconfigure PBL by thinking this pedagogy with agential realism may *prima facie* appear insignificant, if not utterly pointless, given the nature and magnitude of the challenges we face. Nevertheless, the value of an exploration such as the one that constitutes this project lies in its potential to transform our thinking. The purpose of trying to develop a socially just problem-based pedagogy is not merely to try to improve conditions within institutions of higher education; rather, in the grand scheme of things, we ought to strive for such pedagogies because they promise to prompt radical social change on a larger scale as well. Thus, this project is at least implicitly a way of addressing some of the severe problems confronting us in the Anthropocene.

In that sense, much of this kappa hinges on the notion of PBL as an educational strategy with an immanent, yet-to-be-realized potential for becoming what phEmaterialist scholars have called a *socially just pedagogy.* But that is not all. Because my project is not merely out to describe and explain what already is but rather strives to become a transformative force in and by itself capable of contributing to the bringing about of positive change, thinking about PBL with agential realism also entails a different view of research, one in which research is not a quest for neutrality, distance, and detachment. Rather,

> This logic of action locates validity not with the accuracy of representations, but in the specific character of the futurities enabled and disabled by the ontologically generative action of inquiry. (Pratt & Rosiek, 2023, p. 1)

As a diffractive methodology, research performed as thinking with agential realism is performed with a view to transforming, that is, to make a difference that matters, to use Barad's (2007) expression. Thus, such research is understood *not* as

> a set of "things" one does but an ecology; a relational set in excess of the actualized experience. Data can no longer be something to be consumed and

coded, or even understood, but made edgy; materialized through the production of something new. Materialist methodologies require that we co-compose ourselves *with* data-in-the-making. (Springgay & Zaliwska, 2015, p. 142)

Such efforts, according to Kuntz, "make available newly possible futures" in which opportunities are created, thereby making it possible to refuse "enclosures of normative claims on living" while exploring "the threshold towards what might yet be" (Kuntz, 2019, p. 9). But these ideas and approaches weren't always part of the plan. Far from it!

I came to agential realism because there was something that did not make sense and could not be explained, something that could not be said or written within the confines of the conventional theories and with the traditional methods usually employed to examine the practices of PBL. In the field, I experienced things outside the grasp of any of the theories I had encountered. Surprising things that were not supposed to happen, and yet they did. With this image of PBL in mind, when the larger project of which this kappa is but one part was launched in 2016, it was based on what seemed at the time of its kick-off like a fairly simple and straightforward idea about PBL and critical thinking. Thus, in its early stages, the stated purpose of my project was to explore *how* PBL contributes to the development of students' competencies for critical thinking.

Since the connection between PBL and critical thinking is frequently mentioned in the scholarly literature on PBL whenever the advantages of this pedagogical approach are described, I assumed from the get-go *that* PBL does indeed contribute to the development of students' competencies for critical thinking. All that was missing seemed to be detailed descriptions of *how* PBL leads to the development of critical thinking. Such descriptions, I imagined, could be produced with the help of an ethnographic approach, that is, by observing students in their natural setting as they worked on problem-based projects. Taking critical thinking as my empirical object, at this stage, I readily expected that it would be possible to study the connection between PBL and critical thinking empirically. Before embarking on the fieldwork, however, I conducted a scoping review (Thorndahl & Stentoft, 2020) to explore how critical thinking is conceptualized in the research literature about PBL. The scoping review showed that even within a rather limited sample of the research literature, the concept of critical thinking is understood in a number of different ways, leading, in turn, to a variety of competing conclusions about how it may be taught. Nevertheless, the studies reviewed seemed to agree *that* PBL fosters critical thinking even though precise definitions of this concept were mostly absent.

During what I admittedly found to be a tedious process of mapping and describing different conceptualizations of critical thinking in the research literature on PBL, I started getting cold feet. At first, my frustrations centered on many researchers failing to explicate what they understood critical thinking to be. Indeed, it quickly dawned on me that while critical thinking is frequently hailed as an important educational goal, there is a conspicuous lack of clarity about what exactly constitutes critical thinking, just as different scholars have differing opinions.

Although, on the face of it, this finding seemed like a perfectly good result, I started having doubts about my project, not least because my descriptions of the review process did not do justice to the complexity of the work I had done. In fact, they seemed dishonest, cloaked as they were in the guise of tidy objectivity. To try to remedy some of the problematic aspects that I felt stifled the findings of the scoping review, I actively experimented with an alternative format meant to expose some of the messiness of the review process. I wanted to deconstruct the premises of my study and lay bare some of the numerous and often quite arbitrary choices I had had to make during the review process. In the end, however, when I had run out of compelling arguments and when my courage failed me, instead of insisting on what I felt would have been the right thing to do, I reluctantly ended up submitting the neat version of the paper because I needed the paper to be published to meet the formal requirements for Ph.D. by publication. But my doubts would not be curbed. Rather, they seemed to take root in my mind until they practically overshadowed all other ideas.

Having submitted the scoping review, I tried to put it behind me as I began the second part of the study. In this part of the study, I intended to perform three exploratory ethnographic studies to investigate and describe how critical thinking takes place in three different groups of undergraduate students carrying out semester-long problem-based projects at Aalborg University. Once again, I (naïvely) imagined that I would be able to conduct a classic ethnographic study based on observations of and interviews with students and supervisors, which would eventually allow me to say something substantial about what "naturalistic" critical thinking looks like and how to facilitate its development and/or improvement in the most effective way. Despite having what seemed to me a detailed and adequate description of how to go about generating, analyzing, and representing the kind of empirical material that would produce the desired results, it wasn't long, however, before I realized that things would probably not go as smoothly as I had anticipated. And so I desperately started looking for new ways of doing and thinking about research when I accidentally came across Taylor's (2017b) article called "Rethinking the empirical in higher education: Post-qualitative inquiry as a less comfortable social science," in which she submits that we need

to write inventively in order to undo the 'God-trick,' the presumption of objectivity, or the view from nowhere; instead, to recognize the partiality of our knowing, acknowledge that which is beyond our interpretation, and appreciate our situatedness and uncertainty. (p. 313)

From there, one article led to another, and before I knew it, it was too late to turn back, and so I feel like I was drawn to agential realism. (As I write this sentence, my word processing program objects to my use of a passive construction to describe how I became interested in Barad's position. However, in this case, this is, in fact, the most accurate way to describe what happened. It certainly did not feel like I actively and deliberately chose this direction of study. Rather, it seemed to impose itself on me). At this point, the story about how I "found my people" (thank you, Patrik, for that phrase) in agential realism and phEmaterialisms could be extended considerably by adding details upon details describing the numerous events that have influenced my nomadic journey, but I think what I have already related will suffice.

Outline

Each of the six chapters, along with the five intramezzos, the overture, the coda, and the two notes, as well as the two Haiku poems, each contributes in different ways to support the overall argument I present about how thinking with agential realism about PBL affects theory, practice, and research on PBL. Thus, while each of the six regular chapters contributes some minor part towards the ultimate goal of addressing at least tentatively the issues raised by the research question, the intramezzos and the remaining minor parts of this text make use of a variety of different forms to try to supplement the main chapters with a more creative, performative perspective that is encouraged within the paradigm to which my project can be said to belong. Thus, the intramezzos function to provide and add new and sometimes unexpected, although related perspectives on the issues dealt with in the six chapters by exploring them from a more personal or creative angle. Furthermore, the intramezzos also chronicle a nonlinear journey through several differently planted landscapes overgrown with various forms of theoretical, practical, and experiential vegetation, making different lines of flight possible while eliminating others.

In Chapter 1, I provide a detailed description and discussion of some of the most prominent trends and challenges affecting higher education today both in terms of what it is, what it might become, and what it ought to be and become in the age of liquid modernity when a sense of profound uncertainty seems particularly prevalent. In particular, this chapter highlights how the neoliberal logic of competition, corporatization, commodification, and consumerism poses a serious challenge, if not a threat to the survival of higher education as we know it. In effect, then, this chapter

is intended to describe the point of departure from which my project begins in the shape of a problem we are faced with at this time.

In Chapter 2, I outline and discuss one of the possible solutions to the problem described in Chapter 1. Thus, in this chapter, I explain the basic premises of PBL with a specific focus on how PBL is done at Aalborg University in Denmark, where the fieldwork that resulted in the four papers and this kappa took place. Furthermore, Chapter 2 also includes a discussion of the potential emphasized by some proponents of PBL for contributing to substantial societal changes, in line with some of its proponents who have suggested that PBL can be used to educate and motivate students to become conscientious critical change agents.

In Chapter 3, I account for my understanding and application of what I have chosen to call the paradigmatic position of agential realism to which I adhere. Indeed, this chapter can be said to be dedicated to a discussion of which and how, in Barad's (2007) words, certain apparatuses, in the shape of the material-discursive practices that enact determinacy within the phenomena they contribute to producing, work with regards to conceptualizations and practices of PBL at Aalborg University. The aim of this chapter, then, is to describe a radically different way of thinking about ourselves and how we live to begin to address the underlying issues that have caused the severe problems we have to face at this time. In other words, to change the current conditions, we must understand how we ended up in this situation. A possible answer to this question might involve pointing to the way in which anthropocentrism and humanist ideas have come to dominate western thinking with dire consequences.

In Chapter 4, I situate my project in the field of phEmaterialist scholarship and review three texts that deal with agential realism, the first two in relation to PBL and the third in relation to learning more generally. While three may seem a rather limited number of papers to review, I believe my approach to be both sensible and justified because of the specific purpose of reviewing those three papers. Indeed, by exploring the positions expressed in the three papers, I am able to explore the potential of posthumanist positions for identifying matters of importance in and for higher education and to place in relief the insights brought to the fore in and by my project. Additionally, my approach makes it possible to show where, how, and why thinking with agential realism about PBL in higher education corresponds and differs from the insights produced by other scholars.

In Chapter 5, I use a highly unconventional form to describe the ways in which I have produced and used the textual products that inform the insights presented in this text and the four papers, which may be described as an abductive bricolage approach in which participation was combined with conversation and observation in addition to

experimentation and speculation and in which the fieldnotes produced on the basis of these activities were subsequently used to write impressionist tales in an attempt to produce uncomfortable and unconventional writing. These textual products have then been used as a foundation for critically confronting taken-for-granted notions by disrupting the conventions of representation, interpretation, and subjectivity that usually inform qualitative inquiry, thereby creating room for maneuver so that newness might emerge both in terms of thinking and doing PBL. At the same time, this chapter is also meant as a (sarcastic?) comment on the way in which methods are often, in the words of Law (2004), allowed to gain a kind of hegemonic monopoly on research, which suffocates any attempts at thinking.

In Chapter 6, I present a discussion of the implications of thinking about PBL with agential realism. This discussion then involves revisiting some of the most significant arguments and conclusions of the four papers on which my project is based. Finally, I conclude by fabulating on what a problem-based, socially just pedagogy might entail in practice.

In the end, my project may be seen as an attempt at practicing a responsible and response-able approach to research, among other things, by employing a variety of styles of writing which I consider a choice in keeping with Barad's relational ethicoontoepistemological position. Hence, I argue that while we cannot choose what the world is, we can choose how we describe it. That way, we can contribute to the production of increased possibilities and response-able practice, and so one could argue that I have tried to create what MacLure (2021) has called a "(non)space where thought, action, politics, aesthetics, ethics, and technique mutually unfold and elaborate one another" (p. xii).

In addition to this kappa, my project counts among its textual outputs the following four research papers, each of which serves to illuminate some specific aspect of one or more of the issues raised by the research questions from different perspectives and with different foci.

> Fugue (noun): a musical composition in which one or two themes are repeated or imitated by successively entering voices and contrapuntally developed in a continuous interweaving of the voice parts (*Merriam-Webster* n.d.)

Despite the image evoked by the title on the cover, this kappa is not about fugues or any other form of musical expression. It is, however, about problem-based learning (PBL) and what thinking about this phenomenon with agential realism can do. To explain my use of musical terms in the title of this kappa, let me just say this: I thought it would be appropriate to use the English equivalent of a common Danish expression, which reads "at spille på alle tangenter," which, if translated directly into English, would read "to play on all keys" as in keys on a piano, that is. Since I could not find this expression in any of the dictionaries available to me, I started looking for an English phrase that would at least come close to conveying a similar meaning. When I eventually found a relative of the Danish expression, I was surprised to find that the expression one would use in English is "to pull out all the stops." As a non-native English speaker, the wording of this expression felt disappointing to me at first because it seemed to lack completely the musical connotation evoked by its Danish cousin. Another Google search later, I was pleasantly surprised, however, when I learned that the "stops" that figure in the English expression are not, as I had seen them in my mind's eye, bright orange traffic cones, but rather the physical stop knobs of a pipe organ! So to pull out all the stops does indeed contain the musical connotation I thought had been lost in translation before realizing what the stops really were. Incidentally, the famous composer Johann Sebastian Bach who secured fame by composing fugues, is also said to have had a curious predilection for pulling out all the stops when testing pipe organs.

ON ANOTHER NOTE

Emulating Édouard Louis[2]

I've been told that academic writing should never attempt to be aesthetically pleasing, only clear and concise, but still, in this case, I *am* writing to please and to prove something at that.

I've been told that academic writing should never involve writing about the writer's own idiosyncratic whims and fancies, but to be honest, I don't understand why not. Isn't all writing a kind of sedimented concentrate of all the entangled assemblages of every whim and fancy that ever existed?

I've been told that academic writing should never resemble literature, nor should it refer to what the writer feels, but since I've already transgressed far into that prohibited area of personal and emotional involvement, I might as well keep it up. At least that way, my text and I will be consistent.

I've been told that academic writing should never resemble a political manifesto. In fact, researchers would be better served by eliminating any and all traces of what is or might be taken by others to be political, but I adamantly insist that nothing is ever outside politics. Neutrality is merely a cloak masking researchers' affiliation with the hegemonic scientific and political paradigm.

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[2] While the content of the text on this page and the next has been adjusted to fit my purposes, its form and style has been constructed by closely emulating an excerpt from Édouard Louis' excellent book, *A Woman's Battles and Transformations*.

Because I know now that what is called academic writing has been constructed against lives and writing like mine. Because I know, from here on, that to write in this style, and to write about its benefits, is to write against academic writing.

I've been told that academic writing should never employ second-person pronouns as addressing the reader directly is seen as too informal. Do you agree? (Adapted from Louis, 2022, pp. 12)

CHAPTER 1

Higher education in the 21st century

One of the most, if not *the* most, salient characteristic of the era in which we currently find ourselves, sometimes referred to as the Anthropocene, is uncertainty. Indeed, people[3] seem to experience (a) profound (sense of) uncertainty so prevalent that it seems to influence every aspect and sphere of life in late modernity (Bauman, 2007). Not surprisingly, this situation has consequences for all aspects of life, including higher education. Thus, it is not hard to see that the uncertainty about what the future will be like makes it particularly difficult to pinpoint what knowledge, skills, and competencies it will be useful to acquire to cope in the world of tomorrow. How, after all, will you know beforehand if the knowledge, skills, and competencies acquired through education in the present will be worth the effort needed to acquire them when it is impossible to predict what the future will be like? However, or perhaps, therefore, what does appear certain is the continued importance of education. This may seem counter-intuitive when the uncertainty of future demands is factored in. Nevertheless, and despite doubts of the kind described above, higher education is frequently counted among the solutions to both the problems of the present and the future, a sentiment repeated time and time again by global agencies such as UNESCO, United Nations

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[3] Most scholars stress the fact that the same events are experienced differently by people living in different geographical locations and under different political conditions. For example, Bauman emphasizes that his observations and the descriptive power of his theory about how people experience life in late modernity are limited since they apply only to the so-called developed part of the world (Bauman, 2007). Nevertheless, one might easily forget this reservation once theories of what life in the globalized world of late modernity is like are unfolded. To remind us of the different impact of global events on different people, Braidotti (2019b) issues a stark warning when she submits that

> Any awareness of a shared predicament such as the posthuman convergence runs the risk of being reduced, in terms of both intellectual understanding and practical outreach, in over-hasty reformulations of a pan-humanity bonded in fear. Such a gesture wipes complexity out of the picture, namely the awareness of how both the fourth industrial revolution and the sixth extinction impact differentially upon different categories, classes and groups of humans and non-humans, depending on their geo-political locations and perspectives. Fear of extinction alone is not credible as a unifying factor, considering the degrees of higher mortality and vulnerability suffered by sexualized, colonized, indigenous and naturalized 'others'. (p. 71)

Educational, Scientific, and Cultural Organization, and the World Bank. Hence, according to UNESCO, for example, higher education plays an important role in the world today because it is

> a rich cultural and scientific asset which enables personal development and promotes economic, technological and social change. It promotes the exchange of knowledge, research and innovation and equips students with the skills needed to meet ever changing labour markets. (UNESCO 2022)

According to the latest estimate by the World Bank, 220 million students are enrolled in higher or tertiary[4] education worldwide. This number has increased drastically in recent years, which, according to the World Bank, is cause for celebration, not least because, similar to UNESCO, the World Bank submits that

> Tertiary education is instrumental in fostering growth, reducing poverty, and boosting shared prosperity. A highly skilled workforce, with lifelong access to a solid post-secondary education, is a prerequisite for innovation and growth: well-educated people are more employable and productive, earn higher wages, and cope with economic shocks better. (*World Bank* n.d.)

It's all good!

The optimistic vibe conveyed by the picture of higher education painted by UNESCO and the World Bank also seems to be reflected by universities themselves, not least in the rhetoric used by many a university president, leader, vice-chancellor, and rector around the world who contribute to the rosy image when they make positive statements praising contemporary institutions of higher education. The following statement about higher education, made by Professor Glyn Davis in 2010 while serving as vice-chancellor of the University of Melbourne, may be taken as a case in point: "We have in our midst an array of institutions committed to higher education, filled with great minds, devoted to teaching, engagement and research" (Davis as cited in Connell, 2019, p. 4).

On the face of it, positive sentiments such as those expressed in Professor Davis's statement seems strongly corroborated by what can be derived from the official

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[4] The term *tertiary education* is used here to refer to all formal education that takes place at schools and institutions such as public and private universities, colleges, technical training institutes, and vocational schools, that provide education at a more advanced level than that of secondary education which is equivalent to the level of high school (*World Bank* n.d.).

websites of universities, not least the photos used to showcase what being a student is like. Indeed, a random search of university websites seems to confirm this claim. For example, on the website for the University of Missouri at https://www.missouri.edu/, one is greeted by images of engaged- and good-looking students, all smiles, beautiful buildings on which the sun shines generously, and animated, albeit mostly male, professors speaking in lecture halls in front of audiences of attentive listeners. For a similar continental example of particular relevance to my project, visit the website of Aalborg University at https://www.aau.dk/, at which similar images may be found.

The visually pleasing images on universities' color-coordinated websites are often accompanied by statements about what these institutions aim for. Thus, on Aalborg University's website, for example, we find the following mission statement:

> At AAU, we believe that knowledge can and must change the world. Our search for knowledge always starts and ends in interaction with the outside world, oriented towards real problems and the missions that must be lifted in collaboration to achieve sustainable solutions. These missions constitute the driving force behind our work. (*AAU* n.d., my translation)

In the U.S. context, it is more common to encounter so-called diversity statements affirming that the institution is committed to an ethical code of diversity and equity. Thus, on the website of Princeton University, for example, one is met by the following decree:

> Princeton University believes that commitment to principles of fairness and respect for all is favorable to the free and open exchange of ideas, and the University seeks to reach out as widely as possible in order to attract the ablest individuals as students, faculty, and staff. In applying this policy, the University is committed to nondiscrimination on the basis of personal beliefs or characteristics such as political views, religion, national or ethnic origin, race, color, sex, sexual orientation, gender identity or expression, pregnancy, age, marital or domestic partnership status, veteran status, disability, genetic information and/or other characteristics protected by applicable law in any phase of its education or employment programs or activities. (*Princeton University* n.d.)

The message these images and statements seem to convey is that higher education is exciting, pleasant, and enjoyable—and sometimes even fun! Indeed, any signs that could have revealed to the users of the websites that any serious higher education will inevitably require "laborious effort of deliberation, interrogation, and cognitive self-revision" (Rider, 2018, p. 17) on the part of the student are conspicuous by their

absence, just as ominous words of warning issued by scholars of higher education such as Barnett (1990) are nowhere to be found, leaving prospective students blissfully ignorant of the fact that

> A genuine higher learning is subversive in the sense of subverting the student's taken-for-granted world, including the world of endeavour, scholarship, calculation or creativity, into which he or she has been initiated. A genuine higher education is unsettling; it is not meant to be a cosy experience. It is disturbing because, ultimately, the student comes to see that things could always be other than they are. A higher education experience is not complete unless the student realizes that, no matter how much effort is put in, or how much library research, there are no final answers. Indeed, the realization should come that there are all sorts of rival positions, and that there is no absolute way of choosing between them. (p. 155)

Isn't it ironic?

Taking the impression left by the positive discourse on higher education into account, it seems ironic that current epistemic and economic conditions have resulted in higher education today being imbued through and through with the logic of neoliberalism, which scholars on the subject have long lamented. Indeed, strong criticism has been leveled against the neoliberal university, especially over the past couple of decades when critics inside universities have spoken of a long list of severe problems haunting institutions of higher education. According to Connell (2019), this list includes "outdated pedagogy, exploitation of young staff, distorted and even faked research, outrageous fees, outrageous pay for top managers, corporate rip-offs, corruption, sexism, racism, and mickey-mouse degrees" (p. 2).

Moreover, governed as it is by neoliberalist values of accountability, competition, progress, development, individualism, and efficiency, among others, it is evident in both the thinking on and doing of contemporary higher education that education has come to be understood as a means for students to acquire transferable skills and competencies to increase their so-called employability. In that sense, university degrees have been commodified, that is, they have taken on the guise of a currency in the global marketplace. The same tendency can also be discerned in the common (mis)understanding of regarding students as customers and institutions of higher education as for-profit businesses (Gravett et al., 2020). According to Apple (1995), it is clear that knowledge has become a kind of capital, a commodity that can be managed and distributed, bought, and sold by educational institutions in a manner similar to that of economic institutions when managing and distributing financial

capital. But not only that. The commodification of knowledge also renders certain kinds of knowledge more valuable than others. Apple (2012) writes that

> knowledge is actually used as a commodity in our economy. It has become increasingly obvious that the integration of university life into the industrial project has had profound effects. What counts as important knowledge is increasingly being defined as that and only that knowledge which is technically and economically "productive." (p. xxx)

The problems that ensue from the situation within higher education described above are grave and many, cf., for example, Gray van Heerden (2018) who states that the influence of neoliberal thinking on higher education is problematic, not least because "the commodification of knowledge and application of neoliberal principles and practices have rendered universities and colleges uniform, capitalist enterprises, marked by structural violence, binary organisation and the bottom line" (p. 17).

It's not all good, and we're in deep s...!

While Gray van Heerden's critique is certainly scathing, some scholars have gone even further in their lament of higher education today, suggesting that the dire straits of higher education can actually be *blamed* for our inability to mitigate "warfare, global warming, social and ecological injustices, domestic violence, loss of habitat, racism, economic despair, loss of the commons, etc." (Four Arrows, 2008, p. 1).

Even though the expressed views of UNESCO and the World Bank about the role and value of higher education as they are presented in the statements above may appear as if it were an undeniable matter of fact *that* higher education enables personal development and promotes economic, technological, and social change and growth, in reality, things are vastly more complicated! I, therefore, proceed to further oppugn the seductive certainty with which the World Bank and UNESCO's claims about the role and value of higher education are made. Indeed, considering the number and complexity of the challenges of the late modern context in which higher education must operate at this time, none of the outcomes mentioned by the World Bank and UNESCO, that is, neither personal development nor economic, technological, and social change and growth, may, in fact, be guaranteed as an inevitable result of higher education. Furthermore, even the description of higher education as an asset can and should be questioned since describing higher education simply as an asset that can be employed in the quest to solve the world's gravest problems fails to take into account the fact that higher education is simultaneously part of the solution and part of the nexus of problems that need solving. The double role of higher education adds another layer of complexity to the discussion of its role and value and calls for a more nuanced

understanding of its role in the 21st century than the ones supplied by the World Bank and UNESCO.

To explain why it is hard to guarantee that promises of the kind made by the World Bank and UNESCO will come true, we might invoke Hartmut Rosa's contention about the crises of late modernity. According to Rosa (2019), late modernity is characterized by four crises: (1) an economic crisis, (2) an environmental crisis, (3) a crisis of democracy, and (4) a psychological crisis. As a consequence of these crises, the context in which higher education has to operate is home to a host of serious problems that have either been brought about or exacerbated by the crises. These include, in no particular order, such problems as climate change, droughts, floods, extreme weather, rising sea levels, war, pandemics, poverty, hunger, political and religious extremism, polarization, social inequality, human rights violations, terrorism, civic unrest, apathy, conspiracy theories, fake news, burnout, anxiety, dangerous use of new technologies, fascism, diminishment of welfare systems, social insecurity, destruction of natural habitats, extinction of species, threats against democracy, corruption, hopelessness, gender-based violence, systemic racism, xenophobia, homophobia, police brutality, unfair taxation, nationalism, hatred, resource scarcity, fear, denial of science, genocide, epistemicide, nuclear threats, intolerance, oppression, depression, populism, etc.

Since my point is merely to convey a sense of how pervasive the combined effects of the crises identified by Rosa (2019) are in order to show the depth of the problems higher education is called upon to address, there is no need to categorize or elaborate on the individual problems at this point. In sum, the list illustrates that when the aspects of advanced capitalism combine with the geo-political instability caused by the consequences of climate change, each seemingly exacerbating the harmful effects of the other, serious crises ensue. Thus, I suggest that the statements made by the World Bank and UNESCO about the role and value of higher education need to be understood in light of the current state of the world in which we are facing the perilous consequences of a long list of serious problems. Listing (some of) these problems serves to remind us of the gloomy prospects for the future while also highlighting why it is not enough for higher education to enable personal development and prepare individual students to enter the ever-changing labor market, and finally, why, to some, the statements made by the World Bank and UNESCO about what can be achieved with and through higher education, may appear like wishful thinking more than anything else. However, because our contemporary reality is tainted by severe and intertwined problems threatening the very survival of everything on the planet, there can be little doubt that transforming such wishful thinking into tangible reality remains important. In short, we need contemporary higher education to do more if there is to be any hope of preventing the disasters already visible on the horizon.

My point here is not intended as a reactionary comment on the status quo or a call to restore the ways of the past. Rather, I list these problems for two other reasons, the first of which is to make explicit the reasons why the World Bank and UNESCO describe the role and value of higher education to be the promotion of economic, technological, and social growth and change via the exchange of knowledge, research, and innovation. Indeed, the focus on these specific roles and values emerges out of an urgent need to address the environmental, technological, and societal threats we are currently experiencing, and so if higher education is to remain relevant, it is of paramount importance that it is able to address the issues that trouble the present. The second reason for bringing the list of problems to the fore is that it serves to remind us why this need for economic, technological, and social growth and change exists in the first place. The list, in other words, expounds on what higher education is up against, so to speak, while alerting us to the enormous magnitude of the task before us.

As this section has already made clear, the romantic notion about the endless potential of higher education to alleviate a host of societal ails reproduced by various stakeholders such as the World Bank and UNESCO is not accepted without objection by all parties involved in the practice, research, development, policymaking, and thinking about higher education. Far from it! In fact, sentiments similar to the ones expressed by professor of higher education at Lancaster University, Paul Ashwin, in the following statement that contradicts the rosy picture of higher education painted by the World Bank and UNESCO, are surprisingly common:

> There are many grandiose claims for the importance of a university education. Sometimes, for example, higher education is seen as the way to transform society. However, higher education is far more likely to reflect and reproduce inequalities in society than it is to transform them. (Ashwin, 2020, pp. 4)

But how might we go about alleviating these problems of higher education? How might we do higher education differently in ways that contribute to easing, if not solving, the social, environmental, and economic problems we face rather than exacerbating them? These questions remain to be answered. But before we can make any attempts at answering them, we will need to attend to the issue of purpose and to spell out not only *what* we see the purpose of higher education to be but also *why,* which requires a more profound engagement with our own most basic assumptions and values.

A question of purpose?

The purpose of higher education is a normative question with far-reaching ethical, political, pedagogical, and educational implications[5]. My reason for mentioning purpose here is that it is closely related to the questions about the role and value as well as the state and function of higher education. Furthermore, highlighting the normative nature of the question of purpose opens up possibilities for engaging critically with higher education. In that sense, my project displays the kind of critical attitude or negativity which is meant to disrupt the status quo as it "aims to unmask the lies of the established disorder that appears as transparently normal" (Haraway, 1994, p. 62).

The profound sense of uncertainty described in the first section of this chapter is one reason it is impossible to compile a comprehensive list of all the different purposes of higher education. Add to that the fact that different people are bound to have different opinions based on different assumptions about what matters and what does not, and you quickly realize that the question about the purpose of higher education constitutes a supercomplex issue. Confirming the fact that the question of purpose cannot be comprehensively addressed, let alone simply answered once and for all, Barnett (2015) contends that in order to arrive at what can never be a comprehensive but

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[5] I stress the need to address the issue of purpose in this context because, without a clear stance on this matter, it is impossible to see how and why my study matters! That said, I have three reasons for engaging with issues related to the purpose of higher education. First, addressing this issue of the purpose of higher education makes it possible to gain a clearer view of what is at stake in and for higher education. Indeed, if we imagine higher education to be a means for refiguring the world towards desired ends through the materialization of specific hopes and visions, contingent on, among other things, political positions, and values, then it makes an immense difference *what* hopes and visions we have for the future, just as it matters a great deal how we figure the purpose of higher education. Second, by explicating how the purpose of higher education is espoused and enacted in theory and practice, we get a better view of what problems might arise. Third, clarifying the overall purpose of higher education may inspire ideas about what difference PBL might make in this context. The focus on purpose can thus be explained with reference to the fact that without some idea about what we consider the purpose of higher education to be, it will be impossible not only to determine and describe the role of PBL in and for higher education; rather, it will also prove difficult to justify the use of PBL at all since we will not have a clear idea of what it is we want this pedagogical approach to do or do better than traditional lecture-based approaches. Thus, we must have some idea about where we want to go, how we want to get there, and finally, why we want to go there.

merely adequate understanding of the purposes of higher education, several questions need to be asked. To get this process off the ground, Barnett (2015) asks,

> Is the university to be a site of democratic rights, of societal enlightenment, of knowledge production for a technological society, of inculcating skills for the workplace, of personal transformation or of critical analysis? Is it to get by through its own wits, transforming itself to take on the image of any client or state agency that comes its way or is it to maintain some kind of allegiance to a sense of an enduring entity? Are its internal processes to be characterised by tight managerial disciplines that enable it to live 'in the real world' or is it to forge, within itself, a new kind of organic community? (p. 152)

Answers to these questions are bound to differ depending on one's beliefs and opinions, not only about higher education, the nature of learning, the institution of the university, and the production of knowledge, but also about society, the relationship between the state and citizen agency, democracy, knowledge, skill, competency, work, economic growth, and critique to mention a few. The result is that several different understandings of what the purpose of higher education is and ought to be in the 21st century compete to gain discursive hegemony.

That said, many scholars seem to agree that one purpose seems more dominant than the others at present. Thus, even though there are many different kinds of institutions of higher education, in capitalist societies, they are all, whether public or private, professional or academic, essentially corporations (Waite & Waite, 2021). What this means is that, due to the specific neoliberal conditions of advanced capitalism, institutions of higher education are governed and function according to a corporate logic in the sense that they compete to attract customers (students) whose needs and demands dictate what kind of products (degrees) they will have on offer. Thus, if students' primary motivation for enrolling in higher education is the expectation that a university degree or similar will open the door to high-paying jobs, employability will inevitably play an important role in their decisions about education. What students look for, in turn, is controlled by similar neoliberal logic to what employers and corporations look for in employees. In such a neoliberal climate, the purpose of higher education seems quite clearly to be the training and conditioning of the kind of workforce required to keep the system of advanced capitalism running (Apple, 2012; Ashwin, 2020; Giroux, 2015; 2020; 2022). In keeping with this notion of the consequences of neoliberal higher education, Giroux (2015) contends that

> Higher education is an important sphere that has historically supported a democratic public culture by infusing students with moral and political agency, critical thinking, and public values. But higher education, like American

popular culture, is now in the grip of state-supported corporate power that seeks to reproduce and reward an orientation to the world infused with authoritarian ideas, practices, and principles. (p. 101)

As a prominent proponent of the idea that the purpose of education in general and higher education, in particular, ought to greatly exceed that of employability through the acquisition of specialized knowledge, skills, and competencies, Giroux (2020) holds that education, and a particular kind of education at that, is essential if there is to be any hope of preserving the democratic values and institutions that sustain modern democracies. Giroux (2020) writes,

> No democratic society can survive without a formative culture shaped by pedagogical practices capable of creating the conditions for producing citizens who are critical, self-reflective, knowledgeable, and willing to make moral judgments and act in socially responsible ways. (p. 1)

The problem that haunts Giroux's idea about the connection between what Giroux calls a formative culture of pedagogical practices, of which higher education must be assumed to be a part, and the necessary conditions required for sustaining democracy is that there seem to be serious challenges in producing the kinds of citizens who are critical, self-reflective, knowledgeable enough to be able to make moral judgments and act in socially responsible ways and who will thus be capable of and willing to sustain democracy.

The problem described by Giroux is not new. As early as 1989, Paul (1989) supplies a serious critique of what goes on within higher education. Indeed, according to Paul

> Students, on the whole, do not learn how to work by, or think for, themselves. They do not learn how to gather, analyze, synthesize and assess information. They do not learn how to analyze the diverse logic of the questions and problems they face and hence how to adjust their thinking to those problems. They do not learn how to enter sympathetically into the thinking of others nor how to deal rationally with conflicting points of view. They do not learn to become critical readers, writers, speakers, and listeners. They do not learn how to use their native languages clearly, precisely, or persuasively. They do not, therefore, become 'literate,' in the proper sense of the word. (Paul, 1989, p. 197)

Even though it has been more than thirty years since Paul's paper about education's ability to promote students' critical thinking was published, his descriptions and

appeals still appear relevant and remarkably up-to-date, especially when read alongside more recent critiques such as Giroux's, for example.

If we accept Giroux's contention about the role and importance of education to sustain democratic societies and read it against Gray van Heerden, Four Arrows, Connell, and Paul's pessimistic description of the negative results brought about by contemporary education, a rather grim picture of what the future might bring, looms up. Following Giroux, Gray van Heerden, Four Arrows, Connell, and Paul, the failure of current education to teach students how to think for themselves leaves them without the abilities to be critical, self-reflective, and knowledgeable in the sense emphasized by Giroux as the prerequisite for democracy. Thus, if the scholars mentioned here are right about the role of education in the reproduction of democratic values and institutions and about the educational system being in a deplorable state that renders it unable to facilitate the kind of learning that is necessary for students to become active and responsible citizens where does that leave us? And more importantly: What can be done about it?

INTRACEPTION

Academic liaisons

Not until I started university in the year 2000 and first encountered PBL in the shape of problem-based project work at Aalborg University did it occur to me that teaching and learning might be understood and practiced in an altogether different way than the one I had grown accustomed to during my years of primary and secondary education. Nevertheless, it was certainly not love at first sight between PBL and me when we were first introduced to each other. On the contrary, I was quite reluctant to embrace its ideas of collaboration and self-directed learning, perhaps primarily because they seemed to make the road to attaining good grades unnecessarily difficult to traverse. Moreover, my loveless relationship with PBL was also, I suspect, a consequence of having developed romantic feelings for the antithesis of PBL, the lecture. I adored the lectures in the huge lecture hall with the red bleacher seating. Based almost entirely on what I had seen in American movies such as *Good Will Hunting,* I quickly decided that lectures are what academia is made of. "This is what university is all about," I thought to myself, while listening to those divine creatures of wisdom in the shape of genius professors and brilliant graduate students who graced us with their presence in the magical auditorium. With their never-ending cascades of exotic new words like "poststructuralism," "paradigm," "epistemology," and "milieu," the latter of which was always pronounced in a way that left the audience thoroughly convinced about the speaker's supreme mastery of the French language; they seemed inexhaustible sources of new and exciting knowledge. Hence, in my early days as a university student, I tried frantically to capture and freeze everything they said by filling an astronomical number of notebooks with illegible scribbles of half-finished sentences.

My infatuation with lectures lasted about six months, after which my fascination gradually faded until we finally reached the point when a breakup was inevitable. My love affair with lectures then came to a sudden end when I managed to convince myself that they were a waste of time and stopped attending them altogether. At first, I blamed my loss of interest in the lectures on the demigods I used to worship. "They are incompetent," I thought. "Why can't they make Thomas Aquinas and Hobbes' Leviathan and postmodernist American fiction more interesting?" In the back of my mind, however, other questions were brewing. Maybe my ability to respond to messages from a single teacher to a crowd of students was not as finely honed as I

thought after all. Maybe I had failed to learn the most important lesson of first grade that Mr. C had tried so hard to teach.

CHAPTER 2

PBL to the rescue?

As Chapter 1 has already demonstrated, higher education is deeply implicated with the conditions of advanced capitalism, so much so, in fact, that the possibilities for escaping or even resisting its influence constitute a very serious, if not insurmountable, challenge. Indeed, because neoliberalist ideas permeate every institution of higher education as well as all aspects of culture and society more generally, the neoliberal raison d'etre of economic growth is often taken for granted as if it were a given or a law of nature even within institutions of higher education.

Another problem evident in higher education is the one pointed out by Paul (1989), who explicitly articulates the problem of students' learning or lack thereof, a problem which, according to Paul, is closely associated with traditional ways of teaching. In keeping with the idea that what is most important in education is not teaching students *what* to think, but rather *how* to think, Paul stresses the importance of such skills as independent learning and thinking and the ability to work with others whose opinions might differ from one's own as an alternative to what is known as rote learning of content knowledge. However, to accommodate Paul's call for a different approach to education writ large, and to wrest higher education from the iron grip of neoliberalism so as to transform the current situation, would seem to require an altogether new and different way of thinking and doing higher education.

One example of a new way of thinking about education that has been suggested is what Paul (1989) himself has referred to as the emerging critical theory of knowledge, learning, and literacy. In line with this understanding, an educated, literate person is fundamentally thought of not as "a repository of content analogous to an encyclopedia or a data bank" (Paul, 1989, p. 201) but rather as "a repository of strategies, principles, concepts, and insights embedded in processes of thought rather than in atomic facts" (Paul, 1989, p. 201). This view of what constitutes the main goal for educational efforts entails a significant shift of focus when the importance of knowledge is downplayed in favor of a much more pronounced interest in developing students' skills and competencies.

Although all education always involves some measure of content knowledge, Paul's understanding of what constitutes good education, that is, education with an enhanced focus on skills and competencies, seems to resonate with recent trends in the field of

higher education and especially with problem-based approaches to learning such as PBL that are said to have the potential

> to promote complex, integrative and possibly transformative learning that can mobilize productive and creative capacities in the individual and combine into personal learning as the learners re-think themselves in relation to the problem field and the context of learning. (Hüttel & Gnaur, 2017, p. 2)

Thus, incidentally, the skills and competencies highlighted by Paul seem to correspond quite neatly to the skills and competencies often said to be promoted by PBL. Indeed, in further support of this view of PBL, according to Jensen and Krogh (2017), because PBL engages students in several mutually dependent activities and processes designed to teach subject-related content, in addition to generic academic competencies, PBL is well-suited to facilitate the development of students' abilities for critical thinking, collaboration, and self-directed learning while also improving their creative capacities and innovation potential (Hüttel & Gnaur, 2017).

Despite the negative depiction of the state of higher education, some scholars remain hopeful, cf., for example, the following statement made by Barnett (2021), who counters the depressing thoughts left by the pessimistic description of the destructive power of neoliberalism by reminding us of the possibilities for change that still exist:

> But there is also potential for pedagogical revolutions. Think of the emergence of PBL, which found its way early into medical schools (Barrows and Tamblyn, 1980). This represented a fundamental shift not just pedagogically but in what it was to be a doctor. The doctor's professionalism was no longer felt to lie in the application of knowledge to situations that presented themselves. (pp. 3)

What is particularly interesting for our purposes here, of course, is the fact that Barnett specifically mentions the emergence of PBL as that which gives cause for hope, and so if his words can be taken as an indication of future developments, the fact that PBL is steadily gaining acceptance and spreading to more institutions seems to bode well for higher education. In addition to Barnett, other scholars such as Kek and Huijser (2011), for example, have also advocated for the use of PBL in higher education. In fact, according to Kek and Huijser (2017), PBL might even be used as an antidote to the pervasive experience of uncertainty so pronounced in today's world since it can become a

> catalyst in enabling dispositions, knowledge and skills of students that become habitual, like second nature, to them when they live in a world characterised

by uncertainties; in other words, an enabler of a *way-of-being* – through minds, hearts and actions. (p. 4)

What is PBL?

PBL may be described as an approach to learning in which an authentic problem (Hmelo-Silver, 2004), sometimes identified and articulated by the students themselves to ensure motivation (Szulevicz & Jensen, 2013), constitutes the point of departure for a minimally-guided, active, and student-centered learning process (Coffin, 2011; Norman & Schmidt, 1992) during which students typically work in small groups supervised by a teacher who facilitates and scaffolds the students' learning process by asking open-ended questions instead of providing answers (Szulevicz & Jensen, 2013).

Inspired by an eclectic mix of theoretical positions such as constructivist theories of learning, John Dewey's ideas about experiential learning and progressive education, Oskar Negt's critical educational concept of exemplarity, and Thomas Ziehe's concepts of cultural liberation and malleability, as well as American humanist psychology and pedagogy (Andersen, 2017; Kolmos et al., 2004), PBL is an umbrella term under which many different local varieties can be included (Barrows, 1986; Helle, Tynjälä, & Olkinuora, 2006). The numerous possibilities of combining these theoretical positions in proportions relative to how each is understood and valued in different educational contexts render PBL a particularly versatile and, therefore, attractive pedagogy (De Graaff & Kolmos, 2003).

Despite the acclaim frequently bestowed upon PBL by its supporters, there are numerous unresolved controversies connected with practically every aspect of this pedagogical approach, and it is often encumbered by questions related to everything from its origins and philosophical underpinnings to details of how to implement it in practice in a variety of different educational and cultural contexts. But before I get to the discussion of what PBL can do, let me start by briefly outlining the basic ideas about what PBL is, as they are commonly expressed in introductory literature as well as research.

Different varieties of PBL are used in different places depending on the educational culture, traditions, and infrastructure of particular institutions. Not least because there are so many different kinds of PBL that differ not only in terms of the way they unfold in particular educational and cultural contexts but also in terms of their theoretical points of departure, i.e., with regards to the theoretical assumptions about learning on which they are based, PBL cannot be said to be just one thing that can be defined once and for all. Indeed, David Boud and Howard Barrows, the two scholars often credited

with the invention of PBL, have argued that PBL should not be considered a particular method of learning but rather learning that has several different forms (Savin-Baden & Howell Major, 2004).

In PBL, an authentic problem, sometimes identified and articulated by the students themselves to ensure motivation, constitutes the point of departure for a minimally guided learning process during which students typically work in small groups supervised by a teacher who facilitates and scaffolds the students' learning process by asking open-ended questions instead of providing answers. Working in groups with a supervisor makes PBL an effective approach to learning because it engages students in group discussions and encourages collaboration (Hung, 2011). Thus, PBL is often described as a student-centered approach.

According to Kek and Huijser (2011), the main reason why problem-based approaches to learning facilitate the development of skills such as critical thinking and collaboration while enhancing motivation and self-direction is that it allows and encourages students to actively engage with the knowledge they encounter while also providing them with a space in which they can reflect on the knowledge they have acquired and where they can practice thinking by themselves. Furthermore, a feature often emphasized as particularly salient in PBL is that it can enhance students' motivation (Hmelo-Silver, 2004; Savery, 2006) because it makes learning more enjoyable (Antepohl & Herzig, 1999; Woodward, 1997).

PBL history and the Aalborg PBL model

Even though the name "PBL" was not coined until half a decade later, PBL was originally developed as an approach to medical education at McMaster University in Canada in 1969 in response to reports showing medical education to be poorly run by the private medical schools in the U.S. and Canada at the beginning of the twentieth century (Flexner, 1910). In addition, other later reports also showed that although medical education had been transferred to universities, the traditional pedagogical approaches used to educate students did not adequately prepare them for their future roles as physicians.

Later on, in the 1970s, problem-based approaches were adopted or developed independently by other universities around the world, and according to Buchardt (2017), PBL is now considered among the most significant pedagogical innovations of that time. In their very infancy, the newly developed problem-based pedagogies were highly political as their proponents advocated their use in higher education as a means of social criticism that was to form a response to what they saw as the oppressive structures of society in general and educational institutions due, in

particular, to the way students were conditioned through subject-based, teacher-led, authoritative teaching (Servant-Miklos, 2018).

Inaugurated in 1974, Aalborg University is one of a group of relatively young reform universities, such as Maastricht University in the Netherlands, Linköping University in Sweden, and the Polytechnic University of Singapore, to mention a few that have adopted PBL institution-wide in slightly different local versions as their preferred pedagogical approach.

In the official material from Aalborg University describing the educational vision of the institution, the following six principles of The Aalborg PBL Model are presented as the basis for the problem-based approach to learning at Aalborg University:

1. A problem constitutes the point of departure.

   An authentic problem, that is, a scientific problem with relevance for the academic discipline to which the students belong as well as for the world outside academia, constitutes the point of departure in and for problem-based project work. While the problem is frequently described as the point of departure in problem-based project work when students are allowed to identify and formulate problems on their own as part of the learning process, this phase which leads to the articulation of a problem, typically requires substantial effort and time, and so the problem analysis, which precedes the problem, is actually what comes first.

2. Projects are organized in groups.

   Most projects are organized as group projects to encourage the development of students' competencies for collaboration. Group sizes may vary from two to seven students depending on the semester, the total number of students, and the number of supervisors available.

3. Projects are supported by courses.

   At Aalborg University, a typical semester will consist of 15 ECTS project work in addition to 15 ECTS course work so that students spend approximately half their time on their projects. The courses are supposed to support the project work, but the course work is examined and evaluated separately, most often on an individual basis.

4. Projects are collaborative, involving students, supervisors, and sometimes external partners.

   While projects always involve a group of students or a single student and a supervisor, external partners with specialized expertise or a particular interest in the problem explored in a given project may also be included.

5. Projects must be exemplary.

   That projects must be exemplary means that the students should be able to translate the knowledge, skills, and competencies gleaned from a particular project to other but similar contexts beyond the specific project work.

6. Students are responsible for their own learning.

   It is up to the students themselves to manage their time and the group work and to plan out the process leading from problem to finished product in the shape of a project report. In that sense, students need to reflect on their learning processes, just as they have to handle whatever problems arise during project work by themselves. (*Aalborg University* 2014)

As mentioned above, several strategies for implementing PBL have been developed (Barrows, 1986; Helle, Tynjälä, & Olkinuora, 2006). These approaches include case-based learning and project-organized learning as well as a number of combinations such as problem-based and project-organized learning, the latter of which is the preferred pedagogical approach employed at Aalborg University, although case-based learning is also used to a lesser extent, for example in the medical program.

Theoretical foundations and assumptions of PBL

Anyone who has attempted to untangle how different theoretical paradigms have influenced the many different understandings of PBL will likely be surprised by the lack of a coherent narrative describing this pedagogical approach's origins and intellectual history. This sentiment is reflected in Servant's (2016) description of how she came to realize that the task of producing an unambiguous account of the intellectual origins of PBL is impossible, which led her to propose a more pragmatic approach:

   Without reverting to the 'philosophy-led-to-PBL' fallacy, I saw instead the advent of PBL as a process of clashes between ideas and practices, spawning

>   new ideas which in turn spawned new practices over a couple of decades, in
>   what was more of a constructed mosaic than a golden standard. (p. 4)

Just as PBL may be seen to draw inspiration from several different epistemological
traditions, it is also influenced by a number of different theories of learning, ranging
from behaviorism to constructivism and experiential learning (Savin-Baden & Howell
Major, 2004). While such an eclectic collection of ideas and theories may appear
motley if not incommensurate at first blush, despite their apparent differences, these
understandings all share important foundational assumptions about learning. Thus,
what unites these different positions is that all of them are concerned with *individuals'*
knowledge, skills, and competencies. Hence, although the theoretical assumptions
informing PBL can hardly be summarized under a single heading, many scholars see
PBL as based on constructivist theories of learning and cognitivist psychology (cf.,
for example, Hmelo-Silver, 2004; Hung, 2011; Norman & Schmidt, 1992; Savin-
Baden & Howell Major, 2004; Schmidt, 1993; Schmidt et al., 1989; Servant-Miklos,
2018). This focus on the individual learner is still highly evident in the way PBL is
understood and described today when PBL is still focused primarily on the individual
learner and her learning.

At other times, problem-based approaches to learning are described as critical
pedagogical approaches focused on promoting emancipatory values and democracy,
cf., for example, Qvist (2006) and Buchardt (2017) by engaging students through
dialogue, mentoring, formative evaluation, and self-reflection among others.

From Freire to PBL for sustainability

As problem-based approaches to learning have become increasingly popular across
the globe, with more and more institutions adopting and adapting such approaches to
learning to the specific requirements of different local contexts, educational
researchers have begun to focus on problem-based approaches' potential to do even
more in addition to fostering employable, democratic citizens. Like other educational
projects, PBL is informed by the educative project of western schooling in that it is
"founded on an individualized, cognitivist, developmentalist narrative; it privileges
ends over means and seems ever more tied into the production of competitive forms
of neoliberal credentialism" (Taylor, 2019a, p. 40). However, a new trend of so-called
conscientization has recently developed within PBL. Thus, inspired by the ideas of
critical pedagogy, some researchers argue that PBL may also stimulate the
development of conscientization in students, supporting and encouraging them to
become so-called critical change agents who, in addition to being responsible,
democratically oriented, and employable citizens, are capable and willing to challenge
the status quo by identifying and engaging with the severe issues of social injustice

and ecological disaster facing contemporary societies, cf., for example, Bertel et al. (2020). Following Freire, Hamington (2021) states that critical pedagogy is an essential step towards less oppressive, more liberatory thinking about teaching and learning. Critical pedagogy "challenges authoritative models and reveals how oppression can originate in mental and epistemological structures derived from educational practices" (Hamington, 2021, p. 38). Indeed, critical pedagogy and Freire's ideas about conscientization and how the emancipatory potential of education might be brought to fruition if teachers and students (are encouraged to) engage with the social issues that pervade and control their lives and possibilities challenge the unequal and oppressive forces of the status quo (Freire, 1970/1993). In relation to problem-based approaches to learning, conscientization is used to refer to the use of such approaches as a means to raise critical consciousness around issues such as sustainability, climate, equity, and social justice:

> Rather than simply an 'effective teaching strategy' PBL is increasingly seen as a pedagogy for students to engage as critical change agents with complex real-world grand challenges. (Bertel et al., 2020, n.p)

In keeping with this idea, new ways of thinking about education informed by alternative understandings of the foundational premises underlying ideas about what learning is, how education works, how it is and ought to be practiced, and what it might become with a changed perspective and theoretical point of departure are beginning to emerge. These ideas

> are visions of PBL models that move beyond a narrow focus on disciplinary competences and employability towards an aim of engaging students as critical learners and change agents who develop the competences to actively participate and function in an increasingly complex, global and network-based society. (Bertel et al., 2020, n.p)

This new trend in PBL seems to go beyond the narrow focus on knowledge, skills, and competencies of more traditional approaches concerned mainly with developing employability. In their capacity as critical change agents, students will be capable and willing to actively confront the major challenges they will face in the future of a complex, global and network-based society.

Drawing on Freire's concept of conscientization is not something that can be done casually, however, as the critical theory out of which this concept has emerged is "a philosophy of praxis in which theory is formulated through action and further refined and developed in a continuous loop" (Kincheloe et al., 2018, p. 238). Furthermore, the praxis that results is neither neutral nor innocent; rather, it is meant to lead to social

transformation, to revolution even! When conscientization is used in the service of "sustainability, climate, equity and social justice," however, its revolutionary potential is diluted and seems almost to have been forgotten or ignored. In a sense, when employed in the service of such fashionable topics as sustainability, climate, equity, and social justice, there is a risk that the concept of conscientization will lose its transformational potential as a consequence of having become domesticated in order to fit the capitalist hegemony's neoliberal logic and agenda. Thus, instead of providing a space for resistance and opposition, conscientization as a result of PBL in the context of the neoliberal university becomes yet another building block in the construction and maintenance of the global industrial capitalism that governs educational efforts today as these issues are used as an integrated part of the branding strategies of the corporatized institutions of higher education.

Praise and problems for PBL

PBL proponents frequently praise this pedagogical approach for its positive results. Recall, for example, Barnett's optimistic statement about PBL quoted at the beginning of this chapter in which he commended PBL for its revolutionary potential or the following tribute to PBL by the former rector and pro-rector of Aalborg University, Finn Kjærsdam and Inger Askehave, in the preface to an anthology about PBL principles and methodologies in a Danish and global perspective:

> Through the years, thousands of students have graduated from Aalborg University, bringing with them a unique set of skills, including an unsurpassed ability to address the challenges of today's society. And to faculty members it has been a joy to witness the way PBL lives on in the minds of the graduates and continues to play a key role in the way AAU graduates deal with work-related problems in their professional lives. (Kjærsdam & Askehave, 2013, p. 7)

Despite the praise, one major problem that can be said to haunt problem-based pedagogies is that the traditional conceptualization of PBL as a progressive, student-centered pedagogy based on constructivist learning principles, however progressive it may seem, is still an ideology that adheres to a humanist position. How can that be a problem? Humanizing education, after all, is good because it involves recognizing fundamental, inalienable human rights afforded (some) humans in their capacity of being human. Importantly, however, according to Snaza (2015),

> Critiquing dehumanization by asserting that the same people excluded from the category of "the human" are really human does nothing to disrupt the structure of educational humanism. It does not challenge the possibility and

necessity of making a determination of whom or what will count as a proper subject of politics. As long as that determination is merely altered (however progressive and universalist its motivations), the structural possibility of dehumanization is always already present. (p. 26)

Before concluding this chapter, I want to briefly attend to a question asked by two PBL researchers from Aalborg University. In a paper from 2017, Hüttel and Gnaur turn the PBL process, which is typically imagined to proceed from the articulation of a problem to the presentation of a solution or answer, upside-down when they ask: If PBL is the answer, then what is the problem? I think it is quite obvious that *the* problem, that is, the most critical problem we are faced with at this time, is closely related to the challenges discussed in Chapter 1 that have emerged as a consequence of what Rosa (2019) has described as four intertwined crises of late modernity. While Rosa's list of crises includes the economic, the environmental, the democratic, and the psychological, based on the points presented in Chapter 1, there might be grounds for adding yet another crisis to Rosa's list, namely the educational crisis. As is the case with each of the other crises, the educational crisis can be said to have been brought about by a complex interplay of numerous underlying problems that cannot be confined and isolated to the educational sphere, deeply intertwined as they are in the nexus of problems out of which the crises arise. However insurmountable the task of addressing these crises and their undergirding problems may seem, doing so is nevertheless the most important task of our time and all our efforts, including educational efforts, should be directed accordingly. Therefore, as I see it, the problem that PBL ought to be the answer to might be formulated thus: What kinds of educational efforts may contribute to alleviating both the effects and the foundational assumptions, material conditions, hegemonic discourses, and systemic structures whose entangled dynamism has produced and continue to reproduce and exacerbate the social, political, and ecological problems currently threatening to obliterate a very significant part of the planet's lifeforms? If the most obvious answer to that question were PBL, there would indeed be good reasons to make every effort to practice and promote it. Unfortunately, as I have argued in this chapter, and despite many a splendid toast to the capacity of PBL to be part of the answer we so desperately need, things are not nearly as simple as that!

INTRAJECTION

Lost en route to agential realism

> Memory is not a record of a fixed past that can ever be fully or simply erased, written over, or recovered (that is, taken away or taken back into one's possession, as if it were a thing that can be owned). And remembering is not a replay of a string of moments, but an enlivening and reconfiguring of past and future that is larger than any individual. (Barad, 2007, p. ix)

Linghede (2018) and Lather (2007) both recognize the value of getting lost. Indeed, allowing oneself to get lost can be a way of coming to know, according to these authors. In the clear light of hindsight and rationalization, I believe that I have also learned during my time as a Ph.D. student to appreciate the surprising gains and insights that can sometimes (although not always!) be gleaned from venturing into unchartered terrain and getting lost. Thus, in addition to the trepidation, irritation, and exhaustion one might feel at the mere thought of having to change one's mind and direction, embarking on new adventures that can lead to experiences of not knowing in advance what one might meet, what new ideas might emerge, and what insights will be produced as one proceeds to lay the tracks as one goes and to map the topography of an unfamiliar landscape, can prove truly rewarding and enlightening.

Let's do the time warp again!

It's early spring in 1997, ten years prior to the publication of Karen Barad's seminal work, *Meeting the Universe Halfway,* in which they briefly mention quantum cryptography, I'm in London on a field trip with my high school class. While these things, quantum cryptography and a high school field trip, may seem unrelated, in this case, they happen to be connected, if only in a rather loose sense.

As part of the educational program, which is supervised by our eccentric physics teacher, we are invited to join him on a day trip to Oxford, approximately 80 kilometers north of London. Here, at the world-famous University of Oxford, he has arranged a meeting with one of his former students pursuing graduate studies in physics at the prestigious academic institution. His field of research, we are told, is quantum cryptography.

Once we arrive at our destination around noon, we stroll for a couple of hours between the imposing architectural wonders of the university. By some divine intervention, it isn't raining as it usually does in England, and we take in the sights of the Radcliffe Camera, the circular Bodleian library, the Bridge of Sighs, and the Divinity School, disturbed only by the cool breeze of March. We also wander the enclosed courtyards between the buildings of Trinity College with our necks bent backward in the most awkward of uncomfortable positions that only the most dedicated tourists are capable of enduring for extended periods when confronted with Gothic cathedrals.

When we finally locate the small seminar room inside a surprisingly insipid modern-looking grey building, Rasmus, the Ph.D. student, has already set up his computer and is ready to present his project to our group of ten already overstimulated high schoolers and one extremely excited physics teacher. The room turns out to be too small for our group as it is only meant to seat ten people, and so our physics teacher ends up having to sit on a table. The unfortunate shortage of chairs, however, in no way dampens his excitement, which manifests in him swinging his dangling legs incessantly back and forth as he listens to Rasmus' talk.

Let's do the time warp again!

Back at my desk in 2023, Barad's words resonate with my attempt at providing a performative account of the point I have wanted to illustrate here when they write that

> entanglements are highly specific configurations and it is very hard work building apparatuses to study them, in part because they change with each intra-action. In fact it is not so much that they change from one moment to the next or from one place to another, but that space, time, and matter do not exist prior to the intra-actions that reconstitute entanglements. Hence, it is possible for entangled relationalities to make connections between entities that do not appear to be proximate in space and time. (Barad, 2007, p. 74)

London. Aalborg. 1997. 2023. Rasmus. Karen. Quantum cryptography. Agential realism. Physics. Ph.D. What we might have imagined as different points in time, different geographical locations, and unrelated topics suddenly come to matter as they are entangled and enlivened in writing, as marks are left on bodies, as differences that make a difference.

That said, aside from Rasmus saying something about the many useful purposes for which quantum cryptography can be used (I only vaguely recall something about code-making and code-breaking), I didn't understand a word of what he said even

though he did give his talk in our shared mother tongue, Danish, and so those dangling physics teacher legs are what I remember most vividly. Talk about lost!

CHAPTER 3

Framing agential realism

Rumor has it that a particularly difficult and, therefore, dreaded task involved when producing texts of this kind is writing the chapter intended to situate one's contribution in relation to the foundational matters of ontology and epistemology—the ones that one believes in and believes to be underpinning one's work. However, judging by what I have been able to gather from other texts of a similar kind, it seems that such a chapter is a required and necessary component of this particular academic discipline that few have found good reasons for omitting. Thus, full of dread, in this chapter, I explicate and explain my position on said foundational matters, and indeed, if Barad's view can be taken as an indication of whether to engage with issues related to ontology and epistemology, the following quote leaves little doubt about the importance of the task. Indeed, Barad (1998) state the matter succinctly when they submit that

> However strong one's dislike of metaphysics, it cannot be banished, and so it is ignored at one's peril. How reality is understood matters. There are risks entailed in putting forward an ontology: making metaphysical assumptions explicit exposes the exclusions upon which any given conception of reality is based. (p. 103)

While Barad's assertion certainly does nothing to alleviate the sense of dread I feel—I still dread writing this chapter as much as the next student—I nevertheless accept its necessity, significance, and importance for my project as a whole. In fact, in the case of my project, (writing) this chapter may even constitute a particularly important task due to the manner in which I have phrased my main research question! Thus, in my

project, agential realism is not only a theoretical framework[6] or perspective from which to investigate the specifics of my research interest. Rather, as I understand it, agential realism is simultaneously the paradigmatic position, that is, the fundamental ontological and epistemological understandings that inform every aspect of my study, from my choice of methods to the way I go about presenting what I have learned. In that sense, the theoretical framework has merged with my position on paradigmatic matters as a direct consequence of both the form and content of my overall research question. To put it more succinctly, since my project aims to investigate what thinking with agential realism can do to understandings and practices, theories and research on PBL, agential realism plays a double role as theory and theory of science. It follows that what I attempt to do here may be characterized as a kind of thinking with theory (Jackson & Mazzei, 2023).

Following these introductory remarks, this chapter comprises four parts, the first of which is dedicated to describing and explaining the agential realist position that informs my project. Next, to prepare the ground for the discussion of how thinking with agential realism affects practices, theories, and research on PBL in Chapter 6, I proceed to provide a brief explanation of how I understand seven concepts I consider key for Barad's profound rethinking of a number of foundational issues including, but not limited to, ontology, epistemology, and ethics. For each of the seven concepts, I attempt to explain not only what these novel concepts *mean* but also what they *do*. In the following section, I try to justify "my choice" of agential realism as my paradigmatic point of departure for thinking about PBL in the context of higher education. Before finally concluding the chapter, I broadly address the implications of thinking with agential realism. In particular, I briefly touch upon the consequences that ensue from starting from an agential realist position for understandings of subject, object, knowing, and being. Derived issues and questions related more specifically to learning in general and problem-based learning in particular, as well as education, are taken up in Chapter 6, in which I point out how the fundamental changes that thinking

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[6] Another point to be stressed here is the fact that understanding agential realism as a theory in the conventional sense of that word might not be viable. In a paper from 2021, Barad explain that

> agential realism is not a theory of the world in the way we usually mean that. When speaking about theory it is often assumed to be that which describes the world. The aim, in this view, is to write a theory that captures the world. This is not how I see it, as it implies that theorizing is outside the world, rather than being part of what the world *does*. It also holds the assumption that the world *is* (in) a particular way. Part of what I am doing is making a point that theorizing is a matter of already engaging as part *of* the world (not even *with* the world). (Barad & Gandorfer, 2021, p. 16)

with agential realism effects in our understanding of a number of foundational issues with respect to the world, knowledge, and human being, among others, come to profoundly affect our understandings and conceptualizations of learning, and thereby our thinking about pedagogical matters writ large. And so, with these points in mind, and however dreadful the task may appear, I acknowledge that it cannot be avoided, nor can it be put off any longer. It is something that must be done. Now.

Heeding the call for a counterscience

"What would practices of research look like that were a response to the call of the wholly other?" This is the central question explored in Patti Lather's frequently cited book, *Getting Lost: Feminist Efforts Toward a Double(d) Science.* In addition to exploring this question using deconstruction as both methodology and mode of representation, Lather calls for a new and different kind of scientific practice or, borrowing from Foucault, a counterscience. According to Lather (2007), a counterscience is "a science that takes values and power seriously" (p. 60), and she tries to bring such a counterscience to fruition, beginning with a reading of Nietzsche which suggests that

> all the disguised theologisms of our modern secular faith in science begin to announce themselves as ghosts we thought we had been rid of. If science, too, can be seen as a piety, what comes after the necessary nihilism that accompanies the breakdown of Enlightenment rationality at the end of modernity and its belief in perfectability and progress and anthropomorphism? Between the impossible dream of certainty and an interminable deconstruction, what might this less ascetic science look like? In search of practices that demolish great illusions, a contrary-wise praxis that enables the working through that allows one to go on, what would practices look like that hold the limits of our knowing as a good thing? (Lather, 2007, p. 60)

Although it can hardly be the case that *Meeting the Universe Halfway* was written in response to Lather's call since both books were published in the same year, Lather and Barad certainly seem to be interested in similar issues, among them the creation of a new kind of scientific practice. Indeed, as the next section makes evident, Barad's agential realist position may, in fact, be seen as a possible answer to Lather's question.

A brief introduction to agential realist thought

Coined by Karen Barad in the mid-1990s (Barad, 1996), the term agential realism first appeared in scholarly literature when Barad employed it to initiate a radical rethinking of a host of foundational issues based on a transdisciplinary attempt in which insights

from quantum mechanics were read alongside ideas from philosophy, feminist theory, and science and technology studies. The intent behind Barad's rethinking was to begin to move our understanding and habitual ways of thinking away from the anthropocentric, dualist, representationalist, and humanist ways in which we have grown accustomed to thinking about ourselves, the world, and our role in it.

Together with a family of related positions such as new materialism, actor-network theory, object-oriented ontology, and critical posthumanism, agential realism has evolved as part of the so-called ontological turn in reaction to earlier turns, among them the cultural turn and the linguistic turn, as well as in response to the crisis of representation in the humanities and social sciences (Coole & Frost, 2010; Fox & Alldred, 2016; St. Pierre, 2013; St. Pierre et al., 2016). Emerging as a collection of ideas and theories emphasizing the significance and influence of ontological matters in a wide spectrum of human and social sciences, the collective name, the ontological turn, can be defined as a particular orientation leading scholars to pursue an interest in the ways in which the world exists while attending to the task of describing empirically how different aspects of the world, such as matter, time, space, and agency, are constituted (Zembylas, 2017). More specifically, according to Zembylas (2017), four themes characterize theories and approaches inspired by the ontological turn. These four themes are (1) interest in objects and artifacts, (2) rejection of representationalism, (3) adoption of a posthumanist ontology, and (4) politicizing of ontology.

Since the turns preceding the ontological turn were heavily inspired by poststructuralist ideas and postmodernism, they resulted in a keen interest in the significance and influence of language and discourse, so much so that Barad (2007) lament that

> Language has been granted too much power. The linguistic turn, the semiotic turn, the interpretative turn, the cultural turn: it seems that at every turn lately every "thing"—even materiality—is turned into a matter of language or some other form of cultural representation. (p. 132)

However, in the wake of the ontological turn, scholarly interest in materiality has been (re)kindled to the extent that there is now talk about a host of related turns, such as the material turn, the posthuman turn, the speculative turn, and the aesthetic turn to mention a few which can be seen to manifest within the human and social sciences, most notably within qualitative research. Thus, each of the latter turns, along with Barad's agential realist position, have helped fertilize the ground for nascent ideas and new kinds of inquiry to gain a foothold as alternatives to the representationalist beliefs

that inform social constructionist[7] as well as traditional positivist and realist positions and still govern many a qualitative research endeavor today. Indeed, with their agential realist position, Barad have contributed significantly towards the goal of producing a new paradigm of thinking capable of accommodating the kind of counterscience called for by Lather because agential realism constitutes an attempt to depose and dispose of the sovereign human subject and the view that such a subject can place itself outside events, observing the world from a distance.

Instead, out of the ontological turn, new approaches based on immanent ontologies, more-than-human relations, and speculative practices have been born along with new understandings of everything from time and space to causality, subjectivity, and objectivity, among others (St. Pierre, 2019). That way, according to MacLure (2021), the ontological turn has been instrumental in challenging "the hegemony of language as the dominant mode of research engagement, importing the dynamism of sensation, affect, and the virtual" (p. xii).

A similar concern with foundational matters can easily be discerned in *Meeting the Universe Halfway*. Here, Barad introduce their position in keeping with the themes identified by Zembylas when they ascertain that "Matter and meaning are not separate elements. They are inextricably fused together, and no event, no matter how energetic, can tear them asunder" (Barad, 2007, p. 3). This first sentence of the introduction to Barad's book clearly indicates where Barad intend to go and where they are coming from. Thus, returning to Niels Bohr's theory of quantum mechanics, Barad re-turns Bohr's conclusions based on a radical reinterpretation of his philosophy-physics, and so with this book, Barad usher in a new way of thinking not only about matter and meaning but also about identity, agency, and reality itself.

In keeping with the ideas outlined above, Barad (2007) suggest that agential realism entails an entirely different sense of ontology and epistemology, which calls for a performative understanding of discursive practices. Barad (2007) write

> A *performative* understanding of discursive practices challenges the representationalist belief in the power of words to represent preexisting things. Unlike representationalism, which positions us above or outside the world we allegedly merely reflect on, a performative account insists on understanding

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[7] Despite the fact that Barad use the term "constructivism" to delineate the paradigmatic position referred to here, I have opted for the term "constructionism" here and elsewhere so as not to confuse it with the constructivist theory of learning which I will discuss in Chapter 6.

> thinking, observing, and theorizing as practices of engagement with, and as part of, the world in which we have our being. (p. 133, emphasis in original)

A particularly important point to be stressed here is that in following through on the consequences of their interpretation of the ontological implications following on the basis of quantum mechanical experiments, Barad's agential realism does not merely amount to a viewpoint in support of one side of the discussion between conflicting theories such as the one going on between traditional realism and constructionism. Rather, agential realism cuts across such oppositions, thereby offering up a new and radically different epistemological and ontological framework that does not depend on the same foundational assumptions that have posed subject against object, agency against structure, and idealism against materialism, to mention just a few of the traditional binaries.

To explain the role agential realism plays in my project, I now present a rather dense definition of agential realism in which I employ no less than seven of Barad's philosophical concepts. Thus, using Barad's own terminology, which is replete with numerous neologisms, agential realism may be defined as (1) a posthumanist performative account informed by (2) an ethicoontoepistemological position according to which everything is (3) relationally entangled and comes into existence through a continual emergent process of (4) intra-active becoming in which (5) material-discursive phenomena and apparatuses are produced and produce (6) diffractive patterns of difference that make a difference in and to the world's worlding even while lacking separate ontological being which they only appear to attain due to the way (7) agential cuts are intra-actively enacted by human as well as nonhuman agencies.

While Chapter 5 is dedicated to describing and discussing what I have done to produce the insights presented in this kappa text, I feel it is necessary at this point to forestall the course of events and touch briefly on some methodological issues in order to substantiate my choice to spend the greater part of the present chapter on a rather detailed and lengthy exposition of (how I understand) the seven concepts included in the definition above. The main reason for including the detailed explanations of how the seven agential realist concepts may be understood, what they entail, and how they are connected is that, as they are "employed" here, these concepts might be said to constitute important methodological components in and by themselves. Thus, in addition to its double function as both paradigmatic position and theoretical framework, because of the particular way it figures alongside 'thinking with' in the research question, informing my efforts, agential realism also has an important methodological role to play in this project. Indeed, "thinking with" only makes sense as a methodological grip when followed by something that can be used to think with,

such as a theoretical framework, a paradigmatic position, or some other tactics. That said, 'thinking with agential realism' should not be seen merely as a way of operationalizing the theoretical framework of agential realism, which would have required the seven concepts to have been "translated" into concrete "measurable" constructs. After all, this is what is meant by operationalization which may be characterized as a strategy that allows researchers to identify themes or signs of themes reflecting their research interests in their empirical material and proceed to "measure" the prevalence, function, and significance of these constructs by either quantifying, explaining, or describing them.

Instead, thinking with agential realism should be understood as what Barad (2007), inspired by Haraway, call a diffractive methodology. According to Haraway (1992/2004),

> Diffraction does not produce "the same" displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear. (p. 70)

Thinking with agential realism, in that sense, entails something altogether different compared to more conventional qualitative approaches.

Seven central concepts of agential realism

Before I embark on the promised exposition of each of the seven concepts picked out partly due to their centrality in and for agential realism and in part due to their relevance for my particular project, I reckon that a brief interjection may be called for. Thus, in what follows, I attempt to explain how concepts are understood in agential realism so as to clarify not only how individual concepts themselves but also the particular agential realist understanding of the nature and function of concepts, in general, affect what agential realism makes possible, not least in terms of thinking different thoughts differently, of worlding different worlds differently.

As mentioned, Barad developed agential realism based on their reinterpretation of Bohr's theory of quantum mechanics. Taking issue with Bohr's original interpretation that Barad find does not go far enough, Barad suggest an alternative interpretation that pursues the ontological implications of the experimental evidence to their logical end, thereby allowing the appropriate conclusions warranted by the experimental evidence to be drawn.

Guide for readers

The seven concepts used above to define agential realism are particularly important to my understanding of and thinking with agential realism. I will therefore offer a brief exposition of each of them, thereby preparing the ground for accounting for the implications of thinking with agential realism, that is, for what agential realism makes it possible to think, do, and say/write. However, if you are already familiar with Barad's agential realist position and trust that so am I based on the definition offered above, you are welcome to skip the rest of this section… except perhaps for the part about the material-discursive nature of phenomena and apparatuses in which I add a small original twist to illustrate my understanding of these concepts and its consequences. So, feel free to fast forward to the next section—not that you need my permission to do so anyway!

Before elaborating on each of the seven concepts used to define agential realism, I feel it best to issue a slight warning about what lies in wait for you on the following pages. Since explaining the seven concepts in plain, everyday language proved too great of a challenge considering the limitations of time and space, I have opted for an alternative approach for introducing agential realism as both the paradigmatic position to which I subscribe and the theoretical framework of my project. Thus, to ensure a common understanding of the agential realist terminology that is central to my project, I have employed the specialized lingo of agential realism from the beginning. Furthermore, since the concepts are presented and explained in the order they appear in the definition offered above, some concepts are employed to explain others even before they have been defined and explained. While such an approach may seem counterintuitive at first blush, I nevertheless believe it to be viable if we allow a little flexibility in our understanding of what the act of reading entails and how it might be done. I, therefore, suggest that it may prove beneficial, if not necessary, to temporarily abandon the linear strategy of reading the pages of this text in numerical order. Instead, I encourage you to let intuition and curiosity guide you through the rest of this section as you engage with the selection of concepts I have found most significant for my thinking about PBL with agential realism.

Concept 1: Posthumanist performativity

Barad characterize agential realism as a posthumanist performative account to stress the fact that as a paradigmatic position, agential realism sides with neither traditional realism nor with social constructionism, both of which Barad find steeped in humanist and representationalist ideas. Despite their obvious differences, traditional realism, as well as social constructionism, are based on the idea of there being a relation of correspondence between the world and descriptions of the world, between things and

words. To overcome the problem of correspondence, Barad propose a posthumanist performative alternative which they describe as

> a non-representationalist form of realism that is based on an ontology that does not take for granted the existence of "words" and "things" and an epistemology that does not subscribe to a notion of truth based on their correct correspondence. (Barad, 2007, p. 56)

According to Barad (2007), agential realism "rejects the notion of a correspondence relation between words and things and offers in its stead a causal explanation of how discursive practices are related to material phenomena" (pp. 44). Thus, in agential realism, the focus on correspondence is substituted for a performative approach, that is, in an interest in how practices, doings, and actions come to matter, in other words, how they are enacted. This point about enactment constitutes a central component in Barad's argument for their agential realist position, and I return to it several times in what follows because it serves to support some other crucial claims that matter for how Barad understand agential realism and for what thinking with this position makes possible.

Because agential realism is occupied with developing new ways of understanding not what humans are but what humans may become as part of the material world with which we are all always already profoundly entangled, posthumanist scholars argue that matter matters. Thus,

> Posthumanism does not recognize humans as being exceptional, nor does it see them in their separateness from the rest of beings, but in connection to them. In such an interconnected paradigm, the well-being of humans is as crucial as the one of nonhuman animals, machines, and the environment. (Ferrando, 2016, p. 246)

In other words, material objects, bodies, and the environment, more generally, matter and should not be ignored, disregarded, or excluded from our studies and understanding of what it means to exist not only as humans but also as nonhumans and more-than-humans. This perspective thus disrupts traditional dualist thinking while advocating a non-dualist position in which no hierarchies exist between the material and discursive, nor between the human and nonhuman. Instead, everything is in a continual state of relational becoming and exists on the same plane within what other posthumanist scholars have referred to as a one-world ontology (St. Pierre, 2019).

Concept 2: Ethicoontoepistemology

> A delicate tissue of ethicality runs through the marrow of being. There is no getting away from ethics—mattering is an integral part of the ontology of the world in its dynamic presencing. Not even a moment exists on its own. "This" and "that," "here" and "now," don't preexist what happens but come alive with each meeting. The world and its possibilities for becoming are remade with every moment. (Barad, 2007, p. 396)

It follows from Barad's understanding of matter and meaning, materiality and discourse, as inextricably fused that matters of being and knowing, of ontology and epistemology, cannot be separated. Having thus arrived at the neologism of ontoepistemology, Barad subsequently explain how matters of being and knowing are also profoundly implicated with ethics. Indeed, according to Barad, intra-acting responsibly in and as part of the world in its differential becoming means

> taking account of the entangled phenomena that are intrinsic to the world's vitality and being responsive to the possibilities that might help us flourish. Meeting each moment, being alive to the possibilities of becoming, is an ethical call, an invitation that is written into the very matter of all being and becoming. We need to meet the universe halfway, to take responsibility for the role that we play in the world's differential becoming. (Barad, 2007, p. 396)

To explain her notion of how being and knowing, and thereby ontology and epistemology, are inextricably fused, such that it no longer makes any sense to try to separate them from one another, Barad posit that

> There is an important sense in which practices of knowing cannot fully be claimed as human practices, not simply because we use nonhuman elements in our practices but because knowing is a matter of part of the world making itself intelligible to another part. Practices of knowing and being are not isolable; they are mutually implicated. We don't obtain knowledge by standing outside the world; we know because we are *of* the world. We are part of the world in its differential becoming. (Barad, 2007, p. 185)

The ethical aspect is a crucial part of the concept of ethicoontoepistemology since all action, according to Barad, involves making so-called agential cuts that inevitably lead to the inclusion of some things while excluding others. Therefore, as Barad (2007) say, we are responsible or response-able for the cuts we make, not as a consequence of individual choice but because we are intra-actively entangled with all the human and nonhuman agencies that come into being through the world's

differential becoming. Thus, it follows that the convergence of a posthumanist and post-anthropocentric attitude leads us towards a process ontology in which subjects are understood not as essential entities but as becoming, always in process, while simultaneously embedded and embodied, situated and accountable (Braidotti, 2018a).

As a consequence of these ideas, knowledge-making practices, including research practices, are profoundly affected. Thus, the posthumanist and post-anthropocentric attitude matters greatly for how we do, think, and write about such practices and the world. Indeed,

> A posthumanist ethics treats knowledge-making itself as a matter of ethical concern. It shifts the focus away from the power of researchers over research participants toward the "world-making" powers of practices of inquiry: their ability to constitute (and not simply discover) the very nature of their objects/subjects of study. (Mauthner, 2019, p. 669)

In keeping with Mauthner's contention, recognizing that knowing and being are mutually imbricated, being is knowing and knowing is being means that one has to accept that research is never a neutral endeavor undertaken from a point of nowhere, outside the world. This attitude comes to the fore in how I understand my findings, not as expressions of the truth but as situated knowledges (Haraway, 1988).

Concept 3: Relational entanglement

As we have seen in the two previous subsections, Barad are adamant in their rejection of humanism, anthropocentrism, and representationalism. Instead of propounding purely theoretical reasons for opposing these ideas, Barad's argument against them is not merely theoretical or grounded in personal opinions or political convictions. Rather, their argument is backed by science in the sense that it is based on empirical evidence gleaned from classical as well as new experiments in quantum mechanics. In combination with philosophical deliberations about the ontological implications of the results of those experiments, Barad introduce their book with a remarkable conclusion that epitomizes not only the form and content of the book but also their agential realist position as such. At once disarmingly simple and incomprehensibly complex, the first paragraph of the preface for *Meeting the Universe Halfway* thus reads:

> This book is about entanglements. To be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence. Existence is not an individual affair.

> Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating. (Barad, 2007, p. ix)

As the quote above makes evident, agential realism is based on a relational ontology. That is to say, an ontology in which the primary ontological unit is not separately existing entities. Rather, relations are there before relata. Relations, therefore, are ontologically primary. That is, what appears as separately existing entities only come into existence as a result of their relations, just as they only appear separate due to the agential cuts enacted as such as parts of the world make themselves intelligible to other parts.

Concept 4: Intra-active becoming

The fourth concept I engage with as part of my attempt to elucidate what thinking with agential realism about PBL might entail is intra-active becoming, which is closely related to the previous concept of relational entanglement. While crucially important to Barad's agential realist framework, intra-active becoming, which combines Barad's neologism "intra-action" with "becoming," is probably the most difficult one of the seven concepts to come to grips with, not least because it turns our habitual intuitive understandings of the world and our role in it upside down, or perhaps better: downside up. With regard to the first part of the concept, intra-action, Barad (2007) explain that

> The notion of intra-action (in contrast to the usual "interaction," which presumes the prior existence of independent entities or relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the components of phenomena become determinate and that particular concepts (that is, particular material articulations of the world) become meaningful. (p. 139)

To begin to develop an understanding of what intra-active becoming means, entails, and implies, it might be helpful to start by thinking about how and why this concept differs from the well-known terms interaction and being. While the former, qua the suffix inter, meaning between, refers to action happening between two or more entities which in turn presupposes that these entities preexist the interaction, the latter term, being, hints at a similar ontology that holds that entities exist separately of each other and independently of any relations. In other words, relata which exist as separate entities, preexist relations in such a view. In contrast, agential realism is a relational ontology in which relations are ontologically primary. Thus, entities do not preexist their relations, nor do they exist separately as things or beings. This idea that entities

come into existence through their relations is what the concept of intra-action is meant to signify. Barad (2007) write

> The neologism "intra-action" *signifies the mutual constitution of entangled agencies*. That is, in contrast to the usual "interaction," which assumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action. It is important to note that the "distinct" agencies are only distinct in a relational, not an absolute, sense, that is, *agencies are only distinct in relation to their mutual entanglement; they don't exist as individual elements*. (p. 33, emphasis in original)

It follows in light of a relational ontology such as agential realism, and due to the perpetually shifting relations that entities cannot be said to exist as being-in-the-world as some phenomenologically inclined scholars would have it. Rather, a better way to describe their existence would be to say that they exist as becoming-of-the-world, that is, as part of the world's worlding. Indeed, outside or prior to their enactment through intra-action, discourse as well as matter are indeterminate (Barad, 2007).

Clearly, understanding the world in terms of intra-active becoming is bound to have profound effects on one's thinking about all aspects of existence, including issues related to education and learning, and thus also to PBL, since agential realism undermines the foundational premises on which understandings of these matters have traditionally relied, leaving us with the task of re-turning and rethinking the meaning and value of concepts such as education and learning in light of a relational ontology. In Chapter 6, I provide examples to show how agential realist ideas affect understandings of PBL more specifically.

Concept 5: Material-discursive phenomena and apparatuses

What exists, according to Barad (2007), are phenomena that are "the ontological inseparability of agentially intra-acting components" (p. 33). Thus, phenomena, according to Barad (2007), are

> *differential patterns of mattering* ("diffraction patterns") produced through complex agential intra-actions of multiple material-discursive practices or apparatuses of bodily production, *where apparatuses are not mere observing instruments but boundary-drawing practices—specific material (re)configurings of the world—which come to matter*. These causal intra-actions need not involve humans. Indeed, it is through such practices that the

differential boundaries between humans and nonhumans, culture and nature, science and the social, are constituted. (p. 140, emphasis in original)

In keeping with this idea, and just like everything nonhuman and more-than-human, humans are entangled material-discursive phenomena, so much so that

Human nature is not the oxymoron we imagined it to be. In this new planetary age of the Anthropocene, defined by human-induced climatic, biological, and even geological transformations, we humans are fully in nature. And nature is fully in us. This was, of course, always the case, but it is more conspicuously so now than ever before: people are entangled in co-constitutive relationships with nature and the environment, with other animals and organisms, with medicine and technology, with science and epistemic politics. (Åsberg & Braidotti, 2018, p. 1)

As the photos below testify, my hardcopy of *Meeting the Universe Halfway* is littered with page tabs, post-it notes, underlined and highlighted sentences and paragraphs in green, yellow, pink, orange, and purple, as well as handwritten notes added in the margin. These markings call attention to the passages I find to be most central, or rather, the passages I found to be most central when I read through the book for the first, second, and third time and which guide me to notice certain things while simultaneously leading me to ignore others as I read through the book once again. In that sense, these material clues and traces are, in effect, equivalent to what Barad (2007) calls apparatuses.

Photo 1. Messy meetings with *Meeting the Universe Halfway* and page 135.

Thus, the particular phenomenon of "my" reading as presented here may be said to be produced via agential cuts enacted and left behind by the intra-active becoming of the reading and reader past as these materialize as apparatuses in the shape of specific material configurations that are themselves part of the phenomena of reading and reader present to whose intra-active becoming they contribute and matter all the while the phenomena of reading and reader present materialize as the apparatus enacting

agential cuts in the process of materializing that matter to the materialization of what we might call the reading and reader yet to come. Barad (2007) explain the general dynamics of this iterative process of differential becoming as follows:

> Materiality itself is a factor in materialization. The dynamics of mattering are nonlinear: the specific nature of the material configurations of the apparatuses of bodily production, which are themselves phenomena in the process of materializing, matters to the materialization of the specific phenomena of which they are part, which matters to the ongoing materialization of the world in its intra-active becoming, which makes a difference in subsequent patterns of mattering, and so on; that is, matter is enfolded into itself in its ongoing materialization. The iterative enfolding of specific materializing phenomena into practices of materialization matters to the specifics of the materialization it produces. In short, the iterative enfolding of matter comes to matter. Matter is the sedimenting historiality of practices/agencies *and* an agentive force in the world's differential becoming. (Barad, 2007, p. 180)

In that sense, the reading I present here is not my own! It never has been, and it never will be.

Apparatuses, according to Barad, are thus boundary-making practices. As such, they are critically important for the enactment of the differences that result in

> *the material conditions of possibility and impossibility of mattering;* they enact what matters and what is excluded from mattering. Apparatuses enact agential cuts that produce determinate boundaries and properties of "entities" within phenomena, where "phenomena" are the ontological inseparability of agentially intra-acting components. (Barad, 2007, p. 148, emphasis in original)

According to Mauthner (2016), this insight is bound to have severe consequences for social research methods that need to be "un/re-made" in order to reveal and undo these methods' "humanist representationalist enactments, configurations, and genealogies" (p. 258). To begin a posthumanist performative way of knowing/enacting social research methods, we have to acknowledge that such material-discursive practices are both objects of study and agencies of observation. They are, to use Barad's terminology, both phenomena and apparatuses, although not simultaneously.

Concept 6: Diffractive patterns of difference

Like most of the other concepts selected for explanation in this section, the concept of diffractive patterns of difference also contains two different concepts, namely

diffraction and difference, that it is necessary to understand in order to gain an adequate understanding of Barad's notion of agential realism and its implications.

To deal with the concept of diffraction first, this concept which is commonly employed in physics to describe wave patterns was first appropriated by Donna Haraway in 1992 in an essay called "The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others" in order to explain her notion of what she calls nature's artifactuality. While this notion falls outside the scope of my project (for now), to explain the concept of diffraction, it might be useful to begin by thinking about reflexivity, which is often promoted and held up as a criterion of quality in qualitative research.

Reflexivity. R.e.f.l.e.x.i.v.i.t.y. As soon as that particular combination of those 11 perfectly executed letters in the shape of the black traces that my key punching activity seems to have produced on the background of white, made possible by the technological wonder of my laptop, accosts me, my mind immediately starts to wander. I look up from the keyboard. I turn away as if to escape from this detested word, reflexivity, that seems to have fallen from grace, at least in circles where Barad and Haraway, Braidotti and Bennett have become household names. But it wasn't always like that. Reflexivity, at one point, enjoyed a position as a radical move that required researchers to account for their involvement in the research. Hertz (1997), for example, writes that

> Reflexivity implies a shift in our understanding of data and its collection—something that is accomplished through detachment, internal dialogue, and constant (and intensive) scrutiny of "what I know" and "how I know it." To be reflective is to have an ongoing conversation about experience while simultaneously living in the moment. (pp. vii)

In such an understanding of reflexivity, the purpose of becoming reflective is clearly "to produce less distorted accounts of the social world" (Hertz, 1997, p. viii). In other words, reflexivity is meant to ensure that the representations researchers produce in the shape of texts and other scholarly outputs accurately reflect what is really real. Recognizing that the representations created by researchers are influenced by researchers themselves, including their background, culture, gender, age, experience, attitude, etc., the logic behind the idea of reflexivity seems steeped in either a traditional realist or a traditional constructionist understanding of being and knowing. Indeed, the idea implicit in the call for researchers to become reflective seems to be that if we can only collect and know all or at least most of the parameters involved in the experience that led to a particular description, we will be able to understand how and why this description came to be the way it is. But Barad object. Even though the

latter of the two acknowledges the role of the researcher in the production of knowledge, something which the former conveniently leaves out of its equation and attempts to account for processes of knowledge production, both of these positions, according to Barad, are guilty of holding on to the tripartite division between objects of investigation, the representations used to describe these objects, and the investigator who produces those representations of the objects.

To avoid the pitfalls and perils of reflexivity upholding such notions of knowledge production as those mentioned above, Haraway and Barad with her encourage us to think instead in terms of diffraction, which is "an optical metaphor for the effort to make a difference in the world" (Haraway, 2018, p. 16). And so, following Haraway's lead, Barad explain their notion of diffraction as

> a critical practice for making a difference in the world. It is a commitment to understanding which differences matter, how they matter, and for whom. It is a critical practice of engagement, not a distance-learning practice of reflecting from afar. (Barad, 2007, p. 90)

Summing up Barad's position, Kaiser and Thiele (2014) offer the following condensation:

> With Barad's quantized diffraction, a relational ontology emerges that can no longer be categorically separated from its epistemological processes. Quantized diffraction becomes 'entangled': as both method of engagement and radically immanent world(ing) where relationality/differentiation are primary dynamics of all material-discursive entanglements. Ontology and epistemology become inter-/intra-laced as onto-epistemology. (p. 165)

In that sense, diffraction can be understood as a practice that re-orientates taken-for-granted assumptions, not least the one about agency belonging to humans which can frequently be discerned in the implicit assumptions undergirding traditional qualitative inquiry in which humans and human activities are elevated above all others, leaving the impression that only humans have agency (Lambert, 2021).

Probably the most foundational conceptualization in and of agential realism on which all of the concepts discussed in this chapter rely is Barad's understanding of difference. Importantly, Barad understand difference not as difference from but as difference that makes a difference: "Crucially, diffraction attends to the relational nature of difference; it does not figure difference as either a matter of essence or as inconsequential" (Barad, 2007, p. 71). Thus, according to Barad, difference is not just about distinction and opposition, rather difference is an intrinsic part of the fabric of

reality to the extent that I am tempted to conclude this section by contending that difference and the way in which everything that comes into existence does so via differentiating processes, that is by making a difference, difference is what makes the world go round, so to speak. In other words, from an agential realist perspective, difference is understood as a dynamic and productive force emerging through entanglements. It follows that such an understanding will inevitably challenge dualistic and fixed understandings of reality. Allowing Barad to have the final say on this issue, I end this section with a quote about how agency is imbricated in the world's differential becoming. Barad (2007) write: "Agency is not an attribute but the ongoing reconfigurings of the world . The universe *is* agential intra-activity in its becoming" (p.141, emphasis added).

Concept 7: Agential cuts

Agential cuts, diffraction, and difference are closely connected concepts in Barad's agential realism. They are closely connected to each other as well as to the other five concepts, whose meanings and functions I have already described in this chapter. Agential cuts are instrumental in making material-discursive phenomena of all kinds determinate, that is, of temporarily enacting boundaries so as to make human, nonhuman, and more-than-human phenomena appear separate even though they never are. Barad (2007) write

> It is through specific agential intra-actions that the boundaries and properties of the causally related components of phenomena become ontologically determinate and that particular concepts become meaningful (that is, semantically, agential separability-the determinate). Intra-actions enact *agential separability*—the condition of exteriority-within-phenomena. Separability is not inherent or absolute, but intra-actively enacted relative to a specific phenomenon. (p. 339)

Agential cuts are both ontic and semantic, and without such cuts, the boundaries between the agentially intra-acting agencies within phenomena would remain indeterminate as it is the agential cuts enacted by apparatuses that produce what Barad call resolutions within phenomena to enable the differencing differences to differentiate and to be discerned. In yet another dense paragraph populated with the characteristic agential realist terminology, Barad provide the following description of agential cuts:

> Intra-actions include the larger material arrangement (i.e., set of material practices) that effects an *agential cut* between "subject" and "object" (in contrast to the more familiar Cartesian cut which takes this distinction for

granted). That is, the agential cut enacts a resolution *within* the phenomenon of the inherent ontological (and semantic) indeterminacy. In other words, relata do not preexist relations; rather, relata-within-phenomena emerge through specific intra-actions. Crucially, then, intra-actions enact *agential separability*—the condition of *exteriority-within-phenomena*. (Barad, 2007, pp. 139)

The theoretical is paradigmatic is ethical is methodological is political is performative

Departing from Barad's agential realist position has a number of significant implications for the way research is done and understood. Before pointing out and discussing these implications, allow me to briefly recap what can be distilled based on the introductory remarks and the exposition of the seven central agential realist concepts.

Summing up the most important points of the previous sections, what has become evident is that the basic unit of reality is not separate individual entities because there are no ontologically separate individual entities. Rather, everything that exists is entangled and comes into being as phenomena through intra-active processes of differential becoming. What comes to exist in this way, and that is everything, becomes determinate only through the boundary-producing agential cuts, at once ontic and semantic, enacted by apparatuses differentiating what matters from what does not.

The oddly constructed heading of this section is not only intended to connect the methodological, the theoretical, the ethical, the political, and the performative by placing these terms in proximity. The deeper intention behind connecting these terms in one somewhat maladroit heading is to make explicit my understanding of research as an enactment that makes a difference. This point is supported by Barad (2007), who contend that "method, measurement, description, interpretation, epistemology, and ontology are not separable considerations" (p. 121). It follows from the ethicoontoepistemological position to which I commit that research is never a neutral endeavor. In fact, connecting the methodological and theoretical and the personal and political, the way I have in the heading of this section is meant to signal that no research, no matter its disciplinary origin, purpose, or design, is ever neutral.

Furthermore, research performed in light of an agential realist position does not merely identify problems and injustices. On the contrary, according to agential

realism, research inevitably[8] transforms our social and cultural imaginations and lived realities. As Barad (2007) explain

> The point is not simply to put the observer or knower back in the world (as if the world were a container and we needed merely to acknowledge our situatedness in it) but to understand and take account of the fact that we too are part of the world's differential becoming. And furthermore, the point is not merely that knowledge practices have material consequences but that practices of knowing are specific material engagements that participate in (re)configuring the world. Which practices we enact matter—in both senses of the word. (p. 91)

The implications of thinking with agential realism, as I'm sure many will agree, are grave and many. Not only for research and the methods employed to conduct research but also for our understanding of a host of foundational issues, including our understanding of history, culture, science, subject and object, subjectivity and objectivity, self and other, what it means to be (human), and what responsibilities and challenges we are faced with, to mention but a few. These methodological issues and implications are discussed in more detail in Chapter 5.

Thinking in terms of a relational ethicoontoepistemological understanding such as the one described above is bound to profoundly influence conceptions of the human, humanity, and human experience. But not only that. By implication, everything connected to these issues will also be profoundly affected when understandings of these foundational categories change in light of an agential realist framework. Thus, it follows that concepts such as learning, problem-based and otherwise, teaching, as well as education more generally, inevitably shift and change in radical ways as they are reimagined and reconceptualized according to agential realism, not least because agential realism rejects humanist notions of human exceptionalism and supremacy.

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[8] It is crucial that this proposition is not confounded with a similar-sounding but critically different proposition that might read as follows: On the contrary, agential realist research inevitably transforms our social and cultural imagination and lived realities. The important difference that matters in this regard is the difference between the grammatical subjects of the two sentences. Whereas the subject in the first sentence is constituted by the word "research" on its own, in the second sentence the subject is realized by the noun phrase "agential realist research". Hence, these two propositions are not interchangeable as the first expresses a significantly more radical view of agential realism and its consequences in comparison with the second. I return to discuss the implications of this idea in more detail in Chapter 4.

In conclusion, I believe in agential realism not only because of its ability to explain aspects of reality but because I think it has the potential to create change. In that sense, my reasons for believing in this theory are closely connected with the political reasons for adhering to a posthumanist point of view. Braidotti (2018b) writes that as critical thinkers, we (should?) situate ourselves "in, and as part of, the world, defending an idea of knowledge production as embedded, embodied, affective and relational" (p. xv).

INTRALUDE

Deleuzian distractions: A triptych

Yesterday, I encountered the following advice for writers on a random website: "Find a room with a lock for your writing session. This ensures that there will be no physical distractions, whether it's your dog, your loved one, a mouse, or your cat."

Looking around the room, however, I realized that my study is one big distraction as, in addition to Facebook, Instagram, Messenger, Google, YouTube, blogs, and my phone, it is filled with books, papers, markers, maps, pictures, posters, and photos all the while equipped with two (!) unlocked doors in and out of which Louis (the dog), Røde (the ginger cat), Luffe (the mottled cat) along with Mickey and Minnie (Mouse) whom the cats will generously invite into the house for a last meal as well as Søren (the husband), and Asta (the daughter) sweep, making me feel like I'm trying to write my dissertation in an underground station in London during rush hour. Even the familiar message communicated via the loudspeakers, "Doors closing," seems mirrored in my repeated reminders asking those of my fellow dwellers who have the motor skills to accomplish this feat to "Close the doors, please!"

But even if I had been able to lock those two eternally revolving doors and thereby eliminate at least some of the physical distractions, there are worse distractions that are not nearly so easy to get rid of because they seem to sashay in and out of the perpetually open doors to one's mind and once inside their rather charmless tendency to nonchalantly overstay their welcome quickly comes to the fore. One such dubious acquaintance to whom I have been introduced and who has frequently disturbed me while working on this project is Deleuze!

In reading about agential realism and other posthumanist theories, as well as accounts of how particular aspects and concepts related to particular examples of such theories have been operationalized in empirical studies in applied fields of research such as education, it is impossible not to notice the ubiquitous presence of and frequent references made to one pair of scholars in particular: Deleuze and Guattari. In fact, mentioning Deleuze and Guattari seems to have reached ritual status. Hence, the absence of their names in introductory remarks and indexes in books about

posthumanism seems to attract more attention and stir up more surprise than their presence.

While this kappa is not an ideally suited place to try to comprehensively explain Deleuze's and Deleuze and Guattari's philosophy, which has been described by many a confused and overwhelmed reader as unbelievably pretentious, crazy, or offensively obtuse (Young, 2013), there is no denying that Deleuze's and Deleuze and Guattari's philosophy has inspired many of the scholars who can be categorized as belonging to those schools of thought, such as new materialism and posthumanism, that have followed in the wake of the ontological turn (cf., for example, Alaimo & Hekman, 2008; Bennett, 2010; Bignall & Braidotti, 2019; Dolphijn & van der Tuin, 2012; Murris, 2021; Snaza & Weaver, 2015; Taylor, 2019b; van der Tuin and Blaagaard, 2014). And so I feel it would be strange to allow Deleuze and Guattari to become conspicuous by their absence from this text, even if their influence has only played a minor role for me and my project. I might only have engaged with their writings on a superficial level, but due to how their ideas have been used extensively by others interested in posthumanist and new materialist theories, their influence cannot simply be ignored. Indeed, according to Stark (2017),

> Deleuze is an extremely useful ally for feminists committed to challenging liberal humanism. His work offers a radical alternative to Enlightenment models of thought: he liberates thought from the hierarchies inherent to reason; he critiques the Cartesian devaluing of the body as a passive container for an active mind, arguing instead for the imbrication of mind and body; and he releases thought from the interiority of the subject. (pp. 7)

Inspired by Spinoza, Deleuze and Guattari advocate for what they call a monist or immanent ontology in which no materialities, that is, among others, objects, thoughts, and social formations, should be defined based on fixed attributes, nor should such definitions be issued based on their form, substance, or subjectivities. The only thing that matters, which can be used to define such materialities as those mentioned here, are their capacities to affect and be affected (Fox & Alldred, 2021).

Even though Barad only mention Deleuze fleetingly in *Meeting the Universe Halfway,* they nevertheless share a profound interest in the concept of difference which plays a major part in both their æovres. And not only that. As far as I can tell, they also seem to have quite similar understandings of this concept and its implications. Colebrook (2006) describes Deleuze's interest in difference as his primary interest. Indeed, according to Colebrook, Deleuze considers the concept of difference the most important philosophical concept. She writes:

But the concept of life that Deleuze spends his entire philosophical life creating is the concept of difference: it is possible to intuit life as difference – not life as some thing that then changes and differs, but life as the power to differ. (Colebrook, 2006, p. 1)

As I understand Barad and their agential realist position, they would not be hard-pressed to allow themselves to be persuaded to express their idea of differential becoming in similar terms even if some scholars such as Hein (2016) have argued that Barad's philosophy is fundamentally different because they are based, according to Hein, on different ontological assumptions with Deleuze's immanence-based philosophy focused on difference while Barad's, according to Hein, is a transcendence-based philosophy focused on identity thus rendering the two positions incommensurable.

II

Trained as I am in sports science, I am certainly no philosopher. In fact, I cannot even claim to enjoy the status of student of philosophy, at least not in the normal sense of that word, where you are guided in your efforts to come to an adequate understanding of what is important in this field of study by knowledgeable and sometimes even wise teachers who know when to introduce different texts and topics depending on their students' level of expertise or lack thereof. For me, the reading of philosophy (I hesitate to employ the word 'studying' as this term seems to imply that the process of learning is thought through, systematic, and planned out in advance by someone more knowledgeable than the student herself) involves jumping haphazardly between a motley crew of impenetrable texts, most of which I haven't got the faintest clue how to interpret or place in relation to other obscure texts and ideas.

That this is, in fact, what my use of philosophy amounts to became exceedingly clear to me today when I began my morning session by reading a journal paper by Kathrin Thiele called "Ethos of diffraction: New paradigms for a (post)humanist ethics" (ominous title, yes, I know!), which led me first to a paper by Barad called "Nature's queer performativity" and next on to a book by the author herself in which I was confronted with what occasioned my newfound insight about my stumbling approach to philosophy in the shape of a most offensive and inconvenient equation that Thiele extracted from a book by no other than the infamous mare who seems to haunt my efforts at trying to figure out what philosophy is and is about, namely no other than Gilles Deleuze! In English-speaking contexts, I have often heard his name pronounced: "Deloose," which always immediately inspires me to set up an equation of my own: "[Delu:se] = You lose!" (And by "you," I mean me). It's like someone shouting 'Check Mate' in your face even though you are right in front of them. The

equation set up by Deleuze, by the way, was: "Ontology = Ethics," in case you were wondering.

<div align="right">*III*</div>

I'm reading a book. No surprise in that. It is called *Writing with Deleuze in the Academy: Creating Monsters* (Riddle et al., 2018). I am not well versed in the writings of Deleuze, but I am curious. Not least to see what all the fuzz is about. Everybody seems to be saying something about/with Deleuze these days. On page 33, the author, Eileen Honan, ends with a quote from a blog by Corry Shores, who writes that

> What we note from the machines is how comically unrelated are the conjoined parts. They are more like disjunctions than conjunctions, but they are mechanical, because they affect one another; or we might say the resulting transformations are always implied yet never coherent. What we see is the production of differences on the basis of differences. (Shores, 2010, n.p.)

"Transformations that are always implied yet never coherent?" I wonder what that means. But then again, the difficulty related to coming to grips with a particularly challenging idea or concept is often equivalent to the value of said idea or concept. In other words, the harder something is, the more attractive it seems. But I cannot let go of my insecurities. What if I do not understand?

Deep breath.

Go on.

On to the next page.

See what awaits.

As my eyes wander across the crease between the pages of the book to the top of the next page, I feel quite lost, confused, and bewildered. And then, as if that wasn't enough, on the next page, I encounter something resembling a poem:

> in (an)Other language?
>
> The star(e)y gaze,
>
> the aw(e)kward smiles,
>
> the resolute signing,

the (re)iterating wor(l)ds.

If not, deterritorialising the big country and its languaging?

Silent voices and [vociferous silences.]

Another deep breath.

When will I understand?

I feel my left eye start to twitch.

Why do I subject myself to this kind of pain over and over again?

When will the pain of incomprehension stop?

Sooner or later?

Sooner? Like today? Tomorrow? Next week? Or when I have read a couple of more books?

Or later? Like in several months? Next year? Or when I have finished my Ph.D.? Even the last and least attractive of these options is filled with hope and gumption. It radiates with (naïve) belief in a promising future in which everything will finally become clear. In the back of my mind, however, the thought of an alternative outcome that I cannot seem to suppress lies in wait: What if rather than sooner or later, the answer to my question is NEVER?! What if I never come to grips with these kinds of texts? What will become of me? Will I be able to finish my Ph.D.?

More twitching.

Frustration leads me to flip the book so that its cover faces up. I feel myself looking at the strange pattern on the reddish front page with bold white letters with reproach as if the book, in its physical manifestation, is somehow to be blamed for its content not making any sense to me. Although really annoyed by now, I turn the book back around and run my eyes down the page, looking for the place where I left off. There is that twitch again, and I haven't even begun decoding the text yet!

I force myself to resume reading even though I really don't want to. The next paragraph begins as follows:

"My uncle had moved to the big country when he was young."

What?! What uncle?! By now, I am completely lost. The only thing I recognize that connects this sentence with the poem above is the reference to the big country. But what about the machine and its comically conjoined parts? Where are they? Is this uncle the engineer behind the Goldberg machine referred to by Shores? I read the excerpt from Shores' blog again to ensure I didn't miss some hidden or implicit reference to this mysterious uncle. I can detect no clues. I then read the poem again… twice… but still, the point escapes me. I am just about to settle on the idea that Honan's point must be to try to disrupt what she calls the academicwritingmachine. This is truly an example of the monstrous kind of writing that Honan is advocating, I think to myself. The kind of writing that refuses to submit to the logic of conventional academic writing. I'm not particularly fond of this conclusion, but I take solace in the fact that this style of writing is still rather new to me. I tell myself that it makes me uncomfortable because I am unfamiliar with this kind of extreme writing. I just have to get used to it. That's all.

Twitch.

Twitch.

I don't know if it is the twitching that causes my gaze to start to wander until finally, it stops in the top right-hand corner of the page, where the page number is written in tiny black letters. 165, it says. But wasn't the excerpt from Shores' blog on page 33? Yes, it was! I cannot believe how I could possibly be this stupid. As it turns out, it is, in fact, the very materiality of the book that has been the direct cause of my confusion. Because I have printed the book myself in a format resembling the way a real book would look, page 33 and page 165 are printed on the same piece of paper. I must have lost the pages in the middle on my way from the printer and back to my office, hence the utterly incomprehensible transition from Goldberg machine to uncle, who moved to the big country.

CHAPTER 4

PhEmaterialist excursions

As I have already indicated in the introductory chapter, this project, that is, the studies that have led me to produce the four papers in addition to the present text is situated at the intersection where a diverse group of philosophies, theories, and methodologies meet, overlap, and diffuse while exchanging, mixing, soaking up, and contaminating each other with new ideas. In this chapter, I review a sample of the research literature that has used similar posthumanist and new materialist ideas to those introduced by Barad. I do so in order to situate my project in the field of posthumanist and new materialist research on educational matters. However, as I have already indicated in the introduction, I deliberately do not attempt to provide a comprehensive review of all the published literature that exists using a posthumanist approach to exploring matters related to education. For that, the field is simply too vast, with the number of publications increasing exponentially over the past decade. Thus, instead of trying to produce a comprehensive account in the shape of a detailed map of this field of research, I have opted for a different approach, which involved using Google Scholar to identify publications containing both of the specific terms "PBL" and "agential realism". In the end, the review I present amounts to a carefully curated selection of three papers, two of which are concerned with agential realism and PBL, while the third is about agential realism and learning in general.

Even though my search for publications on PBL and agential realism, alternatively learning and agential realism, did yield a few useful results, I don't intend to use these to characterize the general tendencies in and of the field but rather to explicate how my reading of Barad leads me to conclusions that are quite a bit different from those frequently propounded in empirical research using posthumanist or new materialist ideas as their espoused theoretical framework. In my opinion, the new normal of posthumanist and new materialist empirical research does not go far enough in interpreting and thinking about the consequences of sporting posthumanist perspectives inspired by Barad's ideas. And so, while I recognize the insights produced by phEmaterialist scholars, I wish they would go further in their interpretations of Barad's position. Indeed, in a way similar to how Barad seeks to draw out the ontological implications of Bohr's theory of quantum mechanics, I wish that scholars engaging with Barad's position would also attempt to explore this position's (ethico)onto(epistemological) implications in greater depth before

operationalizing its concepts in ways conducive to the conduction of empirical research.

Posthumanist scholarship on higher education

Much educational research is performed according to a reproducible model in which a method is used to answer a question by going through a series of steps leading from the posing of a research question over a review of the relevant literature, choosing a suitable method, describing the methodology and epistemology of the methods, to analyzing the results provided by the application of the method to the collected data (Cole & Rafe, 2017). In addition, a conceptual framework will sometimes be added to connect the research to the theory. According to Cole and Rafe (2017), this sequence of well-known steps effectively defines what educational research is and can be. However, as one consequence of the ontological turn and how it has affected educational research, the traditional model described by Cole and Rafe (2017) has come under scrutiny and pressure as alternative approaches inspired by posthumanist views have been developed.

In contrast to the traditional approach, a posthumanist approach to educational research is typically interested in and focused on "the agency of things, materialities and spaces, the force these more-than-human agencies have, and the way they act relationally with humans in educational processes" (Taylor, 2017a, p. 419). Thinking about how matter, particularly the things surrounding students in the study environment, comes to matter from a posthumanist perspective directs our attention to how material artifacts can contribute to what is educative about a particular experience, thereby posing a serious challenge to traditional ways of researching educational issues. According to Charteris et al. (2017),

> New materialism recognises the agential nature of matter and questions the anthropocentric narrative that frames the post-enlightenment conception of what it means to be human. The decentering of human subjects through a materialist ontology facilitates a consideration of the power of objects to affect the spatial politics of learning environments. (p. 808)

However, in 2016, when Bozalek and Zembylas edited a special edition about critical posthumanism, new materialisms, and the affective turn for socially just pedagogies in higher education, in comparison with other educational sectors, higher education had received relatively little attention from researchers interested in exploring how the ideas of critical posthumanism, new materialism, and the affective turn might influence pedagogical thinking as well as practice (Bozalek & Zembylas, 2016).

But since 2016, interest in higher education and what can be gleaned about the issues and aspects that characterize higher education, specifically with the help of posthumanist and new materialist theories, has increased dramatically to the extent that accounting for all the published literature in this field would be impossible by now.

PhEmaterialisms: What is it, and what does it do?

According to Taylor (2016), the main problem that haunts all practices in and on education, from curriculum policy and research to actual teaching, is that education is steeped in a particular regime of accountability in which

> desires for a quick and easy relay from theory to practice, and the requirement that 'evidence' – the most valorized form of which often comes in the shape of large-scale randomized controlled trials – ought to inform pedagogic interventions, constitute the dominant ways of thinking and modes of inquiry. (p. 5)

Taylor is not alone in pointing out this problem. Indeed, numerous other scholars have submitted similar complaints, cf., for example, Snaza and Weaver's (2015) frank and polemic attempt at rocking the boat of research on educational matters calling for alternatives to the status quo of educational research:

> We think that educational studies could benefit from more wonder. Indeed, in large part due to the neoliberal takeover of schooling at all levels and its attendant shrinking of "educational research" to mean randomized, large-scale quantitative studies of specific pedagogical and curricular interventions, educational studies have become tedious, instrumental, and boring. (p. 7)

That said, in general, the field of educational research has not been slow to adopt and adapt posthumanist and new materialist theories to its arsenal of different philosophically-informed approaches to the study of educational phenomena, with a great deal of research focusing on different levels of education from the specifics of early childhood education to the particular problems of higher education. One strand of this research field has become known as phEmaterialisms.

As the term phEmaterialisms indicates, scholarship conducted in the spirit of phEmaterialisms is characterized by a distinct theoretical affinity with posthumanist and new materialist ideas. On a website located at http://www.phematerialisms.org, the following explanation of the word phEmaterialisms is made available on the first page that meets the viewer upon entering the cyberspace of the website:

> The P-h refers to Post-Human PHilosophy. "Phem," refers to multiple feminisms; "E" refers to Education in the broadest sense; "Materialism" comes from new materialist thought; The 'ph' is pronounced 'f' so that sound and letter bring posthuman and feminism together in one expression. (*PhEmaterialisms* 2022)

Embracing a variety of different posthumanist and new materialist ideas, and in order to promote the spread of an ethics of response-ability, the declared goal of phEmaterialisms is via a range of arts-based and creative methodologies to disrupt the kind of tedious, instrumental, and boring educational research that rests on randomized, large-scale quantitative studies of specific pedagogical and curricular interventions. Indeed,

> PhEmaterialism is committed to disrupting/troubling the schizoid condition of academic labour and insists that we move beyond the proliferating dynamics of micro-niche publishing (cognitive capitalism) and performative branding and impact machines in higher education/academia. We enact, activate and entangle with real world problems, communities and struggles. (*PhEmaterialisms* 2022)

Just below the explanation quoted here, as a further attempt at clarifying, expanding, and elaborating on what phEmaterialisms are about, the network behind the website, which currently counts 27 researchers, practitioners, educators, artists and activists from around the world, offers the following poem, written by one of the network's founding members, Jayne Osgood:

> **PheelyDoings**
> Enacting politics
> Reimagining possibilities
> Materialising hopes
> Through entangled practices:
>
> Practices that matter.
> More than gathering representations
> Of a world out there
> We resist the God-trick
> Recognise our infected, affected place
> And so, engage in world-making practices:
>
> Practices that make a difference.
> We collage

We felt
We Pheel
We walk
We craft
We PhArt
We doubt
We fear
We trouble
We reclaim
Our practices are with the (k)not yet knowns:

Practices that create more liveable worlds.
We are troublesome creatures
Descendants of witches, still burning bright
Through our doings
Our agitating and activism
Our practices refuse to accept the status quo

Practices that generate, potentiate something more.
It is through practices of
Suturing
Cutting
Becoming
Haunting
Confessing
Crafting
Patchworking and
Activating that the
Mattering of Matter
Is materialised.
The thing-power of stuff
Takes on another life
Generates affective forces
That makes a difference to what we know
How we feel
What do we do with what is provoked, brought to life?

What is our response-ability?
By bringing the out of place
To a place

That matters
Glitter, rulers, play-doh and string
Take our investigations to other
Intensely productive places
That underline what matters. (*PhEmaterialisms* 2022)

The poem makes clear that phEmaterialisms are not merely directed towards producing (more or less) neutral or objective descriptions of education. Rather, phEmaterialist research is geared towards a transformative objective, with its proponents focused intently on how they might create response-able research that can contribute to the bringing about of change that matters, particularly in the direction of social justice, ecological sustainability, and response-able ways of living, when they explicate their message about how "Through our doings//Our agitating and activism//Our practices refuse to accept the status quo" to mention just one example.

PBL and agential realism

According to Hasse (2020), few posthumanist scholars have looked into the implications of their theoretical position for learning theory. To that, I might add that even fewer, if any, have looked into the implications of a posthumanist stance, such as agential realism, on how PBL is theorized, practiced, and researched. Nevertheless, I think it is safe to say that since 2020 when Hasse's book came out, there has been a substantial increase in the number of publications on topics related to education and learning in combination with posthumanist or new materialist perspectives. However, for the most part, explorations of PBL are strangely missing from this relatively new body of research literature. As a case in point, allow me to mention that although my search for relevant scholarly literature dealing with PBL and agential realism on Google Scholar yielded 52 hits primo 2023, very few of the papers and chapters to which the entries referred were actually concerned with how PBL might be understood in light of agential realism. Indeed, most of the identified hits containing both of these terms merely mentioned either PBL or agential realism, and so they were primarily concerned with PBL *or* agential realism but rarely actually with both at the same time[9]. Thus, as mentioned above, reviewing the 52 hits provided by Google

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[9] One can only speculate on the possible reasons behind this conspicuous absence of PBL in the posthumanist and new materialist literature on educational matters. Perhaps, the seeming lack of interest in PBL might stem from the prevalent discourse according to which PBL is an inclusive, student-centered pedagogy which might in turn have led some to assume that PBL is already a more socially just, sustainable, and equitable approach to learning than more conventional pedagogical approaches. There is no way of knowing.

Scholar for research in which agential realism is put to work in relation to PBL, I was able to locate just three texts in which agential realism and PBL are put into actual contact with each other: (1) Chappell et al. (2021), (2) Jørgensen et al. (2012), and (3) Jørgensen and Strand (2014). These texts are not representative of the broader field of research on this topic because there is no broader field of research on the specific topic of PBL and agential realism. In what follows, I only review two of the papers since the second and third papers make similar points regarding PBL and agential realism, and so I have limited my review to a discussion of the paper by Chappell et al. (2021) and the one by Jørgensen et al. (2012).

`Chappell et al. (2021)`

If we take Chappell et al.'s (2021) paper as an indication, the suspicion described above in footnote number 9 would seem to be confirmed by these researchers since they implicitly claim that PBL is, in fact, a more just and sustainable pedagogy in and by itself compared to other approaches to learning and teaching. Thus, at the beginning of their paper, the authors submit that they use PBL as short for posthumanist project-based learning (which is problematic in itself since there is a great deal of research available already in which PBL has another meaning, one that there has been consensus on among researchers for some time) and what their objective is when they write that

> Through the re-design and delivery of a module focused on gender, sexuality and violence in Palestine/Israel, 'posthumanist project-based learning' (PBL) emerges as a method that allows us to bring these elements into conversation, while exploring/experiencing the generative capacity of unease. (Chappell et al., p. 2)

In addition to the statement above, Chappell et al. (2021) describe the purpose of their study as an exploration of "how module re-design and delivery around 'posthumanist project-based learning' (PBL) attends to materiality, embodiment, affect, ethicality, social justice and political transformation" (p. 1). While this purpose may appear to make their study similar to mine at first blush, owing to the fact that our studies seem to have a shared focus on PBL, to be explored from similar theoretical perspectives, and in similar higher education contexts, they are, in fact, vastly different. Indeed, upon closer scrutiny, Chappell et al.'s study cannot be compared to mine for at least five reasons. (1) First, it would seem that what Chappell et al. refer to when they use the abbreviation "PBL" is not problem-based learning. Rather, these authors use PBL to denote "posthumanist project-based learning," which is not equivalent to how I use the same abbreviation in my project. (2) Second, their purpose differs from mine. (3) Third, the approach used by Chappell et al., although informed by a theoretical

position similar to mine, also differs from mine. (4) Fourth, their foundational assumptions differ from mine. (5) Finally, fifth, their findings differ significantly from mine since they focus almost exclusively on what PBL does well when it works, while my focus is rather on how PBL sometimes goes awry, how it sometimes leads to detrimental effects and results in both social and academic conflicts among students or between students and supervisors.

Jørgensen et al. (2012)

In their chapter from 2012 in the *Handbook of College and University Teaching: A Global Perspective,* Jørgensen et al. discuss the concept of intra-active pedagogy, which builds upon PBL by organizing teaching and learning around real-world problems. Intra-active pedagogy emphasizes multimodal approaches that go beyond traditional spoken or written language and includes the voices of animals, nature, artifacts, and bodies in the learning process. According to Jørgensen et al., memory in intra-active pedagogy is not limited to linguistic expressions but encompasses the entire learning context, including books, teachers' and learners' knowledge, values, material artifacts, technologies, spaces, bodies, and historical traditions. The chapter further highlights that pedagogical instruments and tools, as well as teachers' perspectives on student learning, play a significant role in pedagogies. Furthermore, teachers and their competencies and experiences are understood as integral parts of the pedagogical apparatus. According to this chapter, there can be no privileged or best way of doing PBL. They emphasize that learning takes place in the midst of pedagogical practices, and the focus should be on embracing the potentials and possibilities that emerge in the present moment, rather than adhering to fixed narratives or predetermined methods. Teachers are encouraged to work with students' potential for learning in each situation, fostering an open attitude towards alternative understandings and interpretations. Learners are seen as entangled becomings shaped by material-discursive practices, and their learning process occurs through the dynamic relationship between the teaching apparatus and whar Jørgensen et al. call a storytelling apparatus. Ultimately, while the focus of PBL should be on learner engagement and their active involvement in shaping their learning experiences the goal of intra-active pedagogy is to engage, activate, and involve learners, making their stories the central objective of the learning process.

Plauborg (2018)

Keeping in mind the ideas presented in Chapter 3 about the foundational assumptions that inform agential realism as well as the ideas about learning imbued in traditional theories of learning (please see Chapter 6 for elaboration), it is not hard to see that accepting an agential realist position as a point of departure is bound to profoundly

influence the understanding of everything imaginable including ideas and theories about learning. And so by "everything imaginable," I literally mean everything human, nonhuman, and more-than-human that exists, including matter, language, meaning, discourse, concepts, and theories. For this reason, it is hardly surprising that thinking with agential realism should involve a re-thinking of both the concept of learning itself as well as the supporting notions and metaphors that undergird this concept.

It follows that (re)-thinking PBL with agential realism requires us to think about and perhaps re-think our understanding of learning more broadly. The task of re-thinking learning, in turn, demands that we re-think and re-imagine the central metaphors on which many conceptualizations of learning rely. These metaphors include learning as acquisition, learning as participation, learning as creation, and learning as transfer, to mention just a few (Qvortrup & Wiberg, 2013; Qvortrup et al., 2016; Sfard, 1998) of the ones often employed in conceptualizations of learning.

While the two papers reviewed in the previous section were both, in different ways, concerned with PBL and agential realism, in this section, I zoom out to focus on the broader issue of learning and agential realism. Thus, in this section, I discuss a paper in which the author tries to develop an agential realist concept of learning in order to locate yet another source of inspiration for what thinking about PBL with agential realism might entail and produce. More specifically, in this section, I discuss a paper from 2018 by Danish educational scholar Helle Plauborg who attempts to develop an agential realist concept of learning based on an empirical example describing a particular educational situation involving a group of Danish students and their English teacher.

Plauborg begins her paper by identifying what she considers the most central supporting metaphors for the concept of learning. According to Plauborg (2018), these metaphors are the acquisition metaphor of learning and the participation metaphor of learning. Both of them are frequently employed in traditional theories of learning to explain what learning is. Next, Plauborg introduces the idea of developing an agential realist concept of learning, contending that

> The perspective that agential realism brings to learning is, by contrast, a basic performative perspective, in which the subject and the world are constantly in a dynamic state of becoming where there is no a priori separation between the world and us. In agential realist thinking, learning is an emergent and open phenomenon without a beginning or end. (Plauborg, 2018, pp. 324)

Importantly, and perhaps rather surprisingly considering the passage quoted above, Plauborg argues in favor of retaining the acquisition metaphor of learning in an agential realist concept of learning, but before presenting that argument, she highlights Barad's concept of intra-action as a crucial component for developing an agential realist concept of learning. Hence, to get started, Plauborg sums up Barad's concept of intra-action as follows:

> According to Barad, the concept of interaction presupposes that entities are to be found in individualised and separate forms prior to a given interaction, while the concept of intra-action is based on entities not existing prior to but coming into being as a result of intra-action. As such, it is also implied that intra-actions have effects: something comes into being and something is changed vis-á-vis intraaction (Juelskjær and Plauborg 2013) and the intra-activity is always ongoing. (Plauborg, 2018, p. 325)

According to Plauborg (2018), if we accept Barad's idea about the intra-active nature of the world's differential becoming, developing an agential realist concept of learning requires central metaphors used to describe what learning is, such as the acquisition metaphor of learning as well as the participation metaphor of learning and transfer, commonly used in traditional conceptualizations of learning, to be rethought. Importantly, my objective in this project differs from Plauborg's as I am not out to develop an agential realist concept of learning in general nor of PBL more specifically.

In my opinion, while the first part of this statement correctly reflects Barad's idea about intra-action, the latter part is somewhat more problematic for me to accept. Thus, I agree with Plauborg's contention about intra-actions having effects and that something comes into being as a result of intra-actions, but when this idea is then followed by "and something is changed," I no longer concur. Indeed, to my mind, the phrase "and something is changed" seems to indicate that something can exist in two different forms: one prior to changing and another after changing. As far as I can see, accepting such a view of intra-action undermines Barad's position and the very point of introducing the concept of intra-action in the first place. While this may seem like a rather petty and cantankerous counterargument in response to Plauborg's understanding of what the concept of intra-action entails and what its implications are for understandings of learning, I make it, nonetheless, because I believe it to be justified and significant.

Because I don't agree with Plauborg's understanding and her way of describing what learning in light of agential realism might entail, it is also impossible for me to accept the idea that we ought to retain the well-known metaphor of acquisition in such a new agential realist conceptualization of learning even though it has been used by many a

learning theory to explain how learning happens. In fact, the very fact that *most* learning theories have invoked the acquisition metaphor of learning should not be seen as a reason to retain this concept. Rather, its frequent use in conventional theories of learning should be cause for alarm when one's mission is to develop a new concept of learning based on radically different foundational assumptions about being, knowing, and ethics compared to those informing existing theories of learning such as behaviorism and constructivism.

Reading Barad differently

I interpret the agential realist notion of intra-action in a different sense than Plauborg. Since relations are ontologically primary, and everything exists "in" a continuous process of differential becoming, thinking of learning in terms of such concepts as acquisition, in my opinion, is not viable. Taking Barad's understanding of existence seriously entails an understanding of humans not as bounded and autonomous individuals with agentic capacities to effect change and make the world intelligible by way of their cognitive functions. On the contrary, according to Barad (2007), humans

> exist only as a result of, and as part of, the world's ongoing intra-activity, its dynamic and contingent differentiation into specific relationalities. "We humans" don't make it so, not by dint of our own will, and not on our own. But through our advances, we participate in bringing forth the world in its specificity, including ourselves. We have to meet the universe halfway, to move toward what may come to be in ways that are accountable for our part in the world's differential becoming. All real living is meeting. And each meeting matters. (p. 354)

In that sense, while addressing the problems inherent in humanism and anthropocentrism, a posthumanist performative perspective radically reconfigures what being human means due to its denunciation of the subject as unified and bounded. According to Barad (2007), humans, including but not limited to

> human bodies, like all other bodies, are not entities with inherent boundaries and properties but phenomena that acquire specific boundaries and properties through the open-ended dynamics of intra-activity. Humans are part of the world-body space in its dynamic structuration. (Barad, 2007, p. 172)

Thus, in agential realism, which is just such a posthumanist performative perspective informed by a relational ethicoontoepistemological stance, humans are not understood as separately existing, autonomous subjects because there *are* no separately existing, autonomous subjects, according to this view. In contrast, while recognizing that we

exist as both embodied and embedded within biological as well as technological worlds, posthumanist theory is undergirded by a relational ethicoontoepistemology that entails that humans, as well as nonhumans and more-than-humans, are intra-actively entangled to the extent that they only seemingly come to exist as separate entities when things, in the shape of subjects and objects, are temporarily fixed as such as parts of the world make themselves intelligible to and thereby response-able for one another.

At this point, I want to point out what I see as a misunderstanding in how many have employed posthumanist ideas as if they were methods in the traditional sense of that word. Indeed, I agree with Murris' (2022) claim that "Sense-making, theorising, imagining, knowing, reading, writing, remembering, walking, critiquing, dressing, exercising, lesson planning, learning, mothering, and birthing—they are all *intra-active material-discursive practices* with/in the world" (p. 27, emphasis in original). In fact, to stress the fact that agential realism is not merely a random theoretical framework or methodology that one can choose to employ at whim and will whenever such a position seems beneficial to one's purposes, I'm tempted to add "always already" to Murris' statement.

Thus, because I understand agential realism as an attempt to describe how the world/reality, that is, knowing in being, functions and always has functioned, I believe that Barad's ideas are not about what might happen if we decide to apply them to the study of this or that particular aspect of the world, rather, Barad's ideas tell us about the foundational conditions that constitute and produce the world and reality now and always. That said, it matters whether we recognize the ethicoontoepistemological idea of agential realism or not. It matters for what we see and how we understand the world in all its complexity, including our own roles. However, as I see it, it doesn't change the fact that whether we recognize it or not, we are always involved in intraactive processes of differential becoming through the entangled relationalities that are the primary ontological units of reality. At the same time, difference constitutes the dynamic force of everything, including time, space, and matter.

It's (not) (all) about the methods... or is it?

About halfway through graduate school, I attended a Ph.D. course given by two very well-renowned professors. At one point during the weeklong course, one of the very well-renowned professors told us (a crowd of approximately 30 adoring graduate students) that all examples of sound empirical research of the qualitative kind share one distinguishing feature. According to this very well-renowned professor, all examples of sound empirical research of the qualitative kind are concerned with conveying what is interesting, significant, or in some other way important about the actual empirical discoveries made by the researcher in the course of her research project. If only the findings in and by themselves prove substantial enough, it will not be necessary for the researcher to dilute her descriptions and subsequent analyses by digressing at any great length about matters related to the philosophical premises of issues of a more theoretical or methodological kind. In other words, the very well-renowned professor seemed to advocate that it's (not) (all) about the methods. Now, I probably would not have given this idea another thought had it not been because I am extremely preoccupied with just such matters and have been for a while.

As I embark on the journey of what I hope will eventually allow me to produce, if not groundbreaking, then at least a somewhat interesting ethnography about a particular case of PBL in higher education, I am well aware that the odds are stacked against me. Not only am I hopelessly inexperienced, but I have also received no formal training in the art of fieldwork, and, as if that was not enough, obstacles also seem to lurk wherever I turn. In a desperate attempt to compensate for my shortcomings, I have turned to reading. But to what avail? These days, most books are brutally honest about the challenges posed by fieldwork: "It is usually inconvenient, to say the least, sometimes physically uncomfortable, frequently embarrassing, and, to a degree, always tense" (Shaffir & Stebbins, 1991, p. 1). "Wonderful!" I think to myself as I turn the page only to be confronted with yet another dejecting promise: "For most researchers the day-to-day demands of fieldwork are fraught regularly with feelings of uncertainty and anxiety" (Shaffir & Stebbins, 1991, p. 2). On top of that, apparently, the characteristics of my personality render me utterly unsuited for the whole enterprise: "Many social scientists are unsuited temperamentally for the stressful activity of such an undertaking [fieldwork] because they are rather asocial, reclusive, and sometimes even abrasive" (Shaffir & Stebbins, 1991, p. 4). But what can possibly be done about it, that is, about the fact that research is hard, messy, and complicated?

According to Law (2004), because reality itself is messy, the methods we use to study it must accommodate this messiness. Therefore, conventional methods that eliminate this mess, replacing it with orderly taxonomies, will not do. Indeed, "the task is to imagine methods when they no longer seek the definite, the repeatable, the more or less stable" (p. 6). Instead of methods, we need method assemblages because we need something that can describe and retain the complexity of the realities we live in. Inspired by Deleuze, Law understands method assemblage in opposition to traditional methods as "a tentative and hesitant unfolding, that is at most only very partially under any form of deliberate control" (Law, 2004, pp. 41).

The problems described above by Shaffir and Stebbins naturally add layers of complexity to ideas about how research may be conducted and the kinds of issues that influence it. Moreover, following Law's contention about the messiness of reality and the need to construct methods suitable to handle such messiness render research processes and methodological questions quite a bit more complex than traditional approaches would have us believe. With the introduction of agential realism, the trouble is further exacerbated. Thus, if we subscribe to agential realism, no matter how asocial and abrasive the researcher might be, she is not the only nor perhaps even the most central component in the apparatus because

> Apparatuses are not assemblages of humans and nonhumans; they are open-ended practices involving specific intra-actions of humans and nonhumans, where the differential constitutions of human and nonhuman designate particular phenomena that are themselves implicated in the dynamics of intra-activity, including their enfolding and reconstitution in the reconfiguring of apparatuses. (Barad, 2007, pp. 171)

So… methods matter, in other words… and they are certainly not innocent or neutral. Thus, we must think long and hard about our chosen methods and how we employ them. But we already knew that I guess, and besides,

> If we affirm that we are fully in Latourian and Harawayian naturecultures and naturecultures are fully in us, and if we can no longer assume the epistemological viewpoint of 'Universal Man', we need to re-think everything, even thinking itself as embedded, embodied and even (in a more object-oriented way) as the 'stuff of the world'. Thinking together, things and/or (non)humans, demands a diverse form of scholarly accountability. And speculation, in turn, becomes a very material process, a performative process of the world, a form of worlding itself. (Åsberg et al., 2015, p. 152)

CHAPTER 5

High on heuristics

Even though the chapter title above does its best to keep from revealing that this chapter is actually about methods and methodology, that is, nevertheless, the case. That said, calling it a methods section or chapter would betray its purpose, contents, and form while eschewing from view what it is meant to do. Thus, while the present chapter is about methods and methodology, it is decidedly not geared at describing what I have done in conventional methods terms. Quite the opposite, in fact! Hence, there are two reasons why I have opted for employing an unconventional approach to discussing matters related to methods and methodology. First, since I have already described how I have produced the insights of the four papers *in* the four papers, there is no need to repeat those descriptions here. In fact, due to the somewhat conventional way in which I described them there, I'd rather not. Second, because I have described my methods in the papers in a way steeped in conventional methods jargon, I have found it necessary to upset the impression those papers might have left. In that sense, this chapter constitutes an attempt at producing a performative account of the approach(es) I have employed to bring about the insights of my project. This chapter, then, is specifically dedicated to two tasks: (1) The tricky task of describing the methodological consequences of thinking with agential realism and (2) the equally tricky task of describing what I have done to produce the insights about PBL presented in the four papers as well as in this kappa.

While proceduralism (Springgay & Truman, 2018), methodocentrism (Snaza & Weaver, 2015), and methodological hegemony (Law, 2004) seem to cling to qualitative research conducted in the traditional vein, not least because researchers' choice of methods, the way they employ and describe them, as well as the quality criteria for judging the appropriateness and goodness of the methods and the way they have been employed all seem to depend on whether researchers are willing to accept and capable of following a predetermined procedure. Indeed, as a consequence of the restraints stemming from proceduralism, methodocentrism, and methodological hegemony, Law (2004) submits that

> we are being placed, however rebelliously, in a set of constraining normative blinkers. We are being told how we must see and what we must do when we investigate. And the rules imposed on us carry, we need to note, a set of

contingent and historically specific Euro-American assumptions. (Law, 2004, pp. 4)

The problem described above, however, is just one in a nexus of troublesome issues that haunt traditional qualitative methods of inquiry and pose serious challenges to social scientific endeavors, including educational research. Thus, another problem of the traditional qualitative methods of inquiry is that they are not particularly adept at capturing impalpable, vague, diffuse, ephemeral, and transient phenomena such as "pains and pleasures, hopes and horrors, intuitions and apprehensions, losses and redemptions, mundanities and visions, angels and demons, things that slip and slide, or appear and disappear, change shape or don't have much form at all, unpredictabilities" (Law, 2004, p. 2). I believe that learning, problem-based or otherwise, teaching, pedagogy, and education more broadly are good candidates that qualify for being included in Law's list of phenomena that are not easily described through the use of traditional social science methods.

In keeping with the understanding of methods and methodology advocated in this section, this chapter attempts to illustrate how I have operationalized the theoretical concepts of agential realism to answer my research questions. Of course, when articulated in this way, the process of operationalizing theoretical concepts sounds linear and straightforward. However, the truth of this matter is much more complicated than the first sentence of this paragraph seems to indicate.

To further underscore my position and justify my thinking on matters related to methods and methodologies, I begin to proceed to quote from a book written by Karin Murris in order to stress the entangled nature of research which cannot, nor should it, be understood as a secluded and separately existing in some kind of parallel universe where its elevated exclusivity spares it from the influence of everyday trivialities, as if research were somehow profoundly different from everything else that we do, outside the realm of other spheres of life. In reality, research can only be separated and isolated from everything else for analytical purposes, a point supported by Murris (2022) when she submits that

> Agential realism is not just a philosophy. Not that philosophies are only about ideas. But like other new materialist and posthumanist orientations, agential realism explicitly theorises the significance of materiality in social and cultural practices. And not just at a theoretical level. It involves a profoundly different doing of research, and reading and writing texts through the provocative use of grammar. But not just academic texts. This book engages the reader with the radical implications for education when embracing agential realism personally as well as professionally. It is impossible to separate teaching from

research, the personal from the professional, the domestic from the public, or the political from the academic. (Murris, 2022, p. 8)

Murris, I trust, would agree with Law (2004) on issues related to methodology and methods as their positions appear quite compatible, especially with regard to the point about methods producing realities which in turn leads to the conclusion that choosing and using particular methods are deeply ethical matters, not least since methods are not innocent, technical procedures, nor are they merely a set of neutral procedures allowing researchers to report on an already given reality entangled as they are with the personal, public, and political aspects of the world's differential becoming. Rather, as Law (2004) explains, method is performative. Thus, method

> helps to produce realities. It does not do so freely and at whim. There is a hinterland of realities, of manifest absences and Othernesses, resonances and patterns of one kind or another, already being enacted, and it cannot ignore these. At the same time, however, it is also creative. It re-works and re-bundles these and as it does so re-crafts realities and creates new versions of the world. It makes new signals and new resonances, new manifestations and new concealments, and it does so continuously. (Law, 2004, p. 143)

Accepting Law's contention about method shifts the view of method. So much so that one might easily indulge a notion of standardized methods and their use as a disavowal of thinking—an excuse for not thinking, as a matter of fact. The thoughtless deployment of standardized methods is problematic, not least because "methodologies necessarily bring with them select assumptions about knowing and being—perspectives on the world that are heavy with political weight" (Kuntz, 2015, p. 13). Methodologies are never merely neutral tools that can be innocently employed to pursue particular research agendas across different contexts. Rather, the methodological is political because a researcher's methodological stance and the ontological and epistemological assumptions that inform it will influence what it is possible to think, say, and do. In other words, different methodological choices will not only produce different effects in terms of the scientific results. Rather,

> historicizing our methodological approaches goes a long way toward reconnecting them to particular material political contexts; it refuses any assertions of select methodologies existing across time and space. Beyond critical moves to historicize methods—showing their necessary entanglement in sociopolitical contexts—such a sense of responsibility also entails an articulated vision for alternative spaces of possibility, places where we might act and be as other than we currently are. (Kuntz, 2015, p. 14)

Keeping the points outlined above in mind, the latter part of the present chapter may also be read as a critical or sarcastic comment even on the use and reliance on standardized research methods that produce results whose validity is believed to depend wholly on the extent to which the researcher has succeeded in repeating the steps specified by other researchers as the best or even correct way of collecting and analyzing data while also dictating normative standards for how findings should be written up and presented if the work is to have any chance of being accepted into the community of practice of research.

The methods or activities, if you will, that I list on the final pages of this chapter are thus not described in the way methods are usually described, nor do I employ the standardized terms usually deployed for such purposes. Indeed, because I do not believe others will be able to reproduce my findings anyway, cf. the Intraruption preceding the present chapter in which I describe Barad's contention about the specificity with which the open-ended practices of apparatuses need to be designed to fit the purpose, context, and the specific entanglements which are co-constituted along with them as they come into being as part of the world's dynamic intra-active differential becoming.

To stay true to the posthumanist and performative idea, the words used to describe the activities on the list are at once more precise than the conventionalized language of method and, at the same time, deliberately imprecise. This move constitutes a rethinking of our common ideas about good quality, rigor, and clarity in qualitative research. Law implicitly supports such a view of how to write about methods when he submits that we need to rethink ideas about clarity and rigor via "techniques of deliberate imprecision" (Law, 2004, p. 3). And so that is what I strive for in listing those 224 activities that I engaged in as part of my research, at once professional, personal, domestic, public, political, academic, and much more.

(Alternative) facts of fieldwork

Describing the methods I employ(ed) to produce the findings in the four papers using the conventional lingo of qualitative inquiry customarily used to describe and justify the methods used would be a gross simplification. In fact, to be perfectly honest, I am frankly convinced that it is always the case that such terms serve to cover up the complexity of something so complex that any attempt at describing it in all its intricacy is destined to fail. Thus, I did not merely observe, not least because, as Barad (2007) puts it, "we are not outside observers of the world. Neither are we simply located at particular places in the world; rather, we are part of the world in its ongoing intra-activity" (p. 184). Nor did I merely interview the students who agreed to

participate in my study as if they were nothing more than providers of information to me, informants, as it were.

To address the issues raised by the research questions about how thinking with agential realism affects theories, practices, and research on PBL, I conducted three rounds of fieldwork with three groups of undergraduate students[10] from three different study programs at Aalborg University[11], all of them were required to complete a project guided by the principles of the Aalborg PBL Model, sometimes participating as participant researcher, sometimes as researcher participant[12]. At least that was how I thought of my role at the beginning of the fieldwork. Later on, I became keenly aware that no matter how I choose to describe my role, whether as participant researcher or researcher participant, I was and am always already intra-actively involved in the constitution of the phenomenon being studied.

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[10] I have decided that there is no reason to describe the groups in further detail since information about their study programs and what semester they were on, is not relevant to the findings I present here. Leaving out this information further decreases the risk of compromising the anonymity of the students and supervisors who participated. Finally, due to the non/representationalist form I aspire to observe, specifying details about each of the groups and their members would not add any additional value nor would it increase the quality of the study or the trustworthiness of my conclusions, not least because the criteria of trustworthiness doesn't make sense in such a perspective.

[11] Or at least that is one way of describing how the research process played out and led to the insights presented in this kappa and in the four papers even though, as I have already revealed in the introduction, describing the research process as if it were planned out in advance and proceeded through a linear process of predictable steps in a particular predetermined order, would almost amount to alternative facts.

[12] Calling the methods I employ participant observation may lead some readers to get the wrong impression of what I have actually done, how I understand what I have done, and its relation to the agential realist framework outlined in Chapter 3. Thus, I find it necessary to distance myself and my understanding of this practice from the way it has traditionally been understood, as exemplified in the writings of Malinowski (1922/2014). According to Malinowski, after only a short time in the field, he considered himself capable of understanding the world more or less, as did the native inhabitants of Omarkana he was studying. What is more, he also imagined himself to blend in to the extent that the participants

> ceased to be interested or alarmed, or made self-conscious by my presence, and I ceased to be a disturbing element in the tribal life which I was to study, altering it by my very approach, as always happens with a new-comer to every savage community. (Malinowski, 1922/2014, p. 7)

The first round of fieldwork was conducted during a spring semester and involved a group of six students, while the second round was conducted during the spring semester of the following year and involved a group of seven students. The year after that, the third and final round of fieldwork involved a group of five students. The three rounds of fieldwork, along with a transformational experience of supervising a graduate student's project, resulted in four research papers, each of which yielded different insights about the theory, practice, and research on PBL.

The fieldwork involved more than 150 hours of in-person observation in addition to several other activities, among them interviews, focus groups, reading students' written work as it was produced, written correspondence, LEGO serious play, playing foosball, test and talk, informal conversation, sketching, writing as a method of inquiry, fiction writing, impressionist tales, document analysis, plugging in, critical deconstruction, thinking, thinking with, speculation, extended metaphors, and artwork. Naturally, these activities yielded a substantial amount of written material. One-third of this material consists of three notebooks filled with handwritten notes and sketches, while the remaining notes were typed directly into dated documents using Microsoft Word.

Importantly, I include all of these activities here even though, under other circumstances, some might have preferred to distinguish between methods used for collection of data, methods used for analyzing and interpreting the data, and methods used for representing the results produced by the former. However, according to Barad's agential realist position, it is impossible to distinguish sharply between such phases or activities from one another because they are all part of the apparatuses "used" to "explore" the phenomenon of PBL. Importantly, however,

> Apparatuses are not assemblages of humans and nonhumans; they are open-ended practices involving specific intra-actions of humans and nonhumans, where the differential constitutions of human and nonhuman designate particular phenomena that are themselves implicated in the dynamics of intra-activity, including their enfolding and reconstitution in the reconfiguring of apparatuses. (Barad, 2007, pp. 171)

Because the activities involved in conducting the kinds of studies that make up this and similar projects overlap and intersect, leak, and bleed into one another in complex patterns of intra-acting relations, it is impossible to separate the activities from one another, not least since most, if not all of them, were engaged in simultaneously and/or iteratively. For this reason, I have deliberately refrained from any and all attempts aimed at ordering the activities chronologically in ways akin to those typically employed in more traditionally informed qualitative inquiries in which standardized and oft-repeated methods are used and described in accordance with the commonly accepted step-by-step procedures promoted in popular textbooks.

With that, I also turn away from descriptions of how research may be conducted in terms similar to those employed by Camiré (2023), who divides the research process into three (or four) different phases, for example, when he offers five guidelines for conducting what he calls intravention inquiries. He writes,

> Specifically, the five guidelines can help intravention inquirers situate the focus of inquiry (i.e., phenomena), the position from which the inquiring should take place (i.e., entanglement), what can be recorded (i.e., artefacts), how the recordings should be scrutinised (i.e., diffractive tracing), and finally how intravention inquiries should be reported (i.e., agential realist accounts). (p. 4)

Thinking with theory

Research is frequently a narrative endeavor and always creative as it contributes to the generative embodiment of becoming. Research may thus be understood not as "a method of explication/representation, but a space to embrace ambiguity, precarity, mystery, vulnerability, humility, and stumble in disorientation" (Hendry et al., 2018, p. vii). By the same token, it would not make sense to try to write up a traditional methods section employing the conventional descriptive terms as if they were neutral, uncontroversial entities that researchers can use as they see fit. Indeed, according to Mauthner (2016), social research methods need to be "un/re-made" in order to reveal and undo these methods' "humanist representationalist enactments, configurations, and genealogies" (p. 258). Such an un/re-making of research methods has severe consequences for how we go about doing research. Indeed, Mauthner (2016) adds

> A posthumanist performative (re)making of methods entails ontologically reconstituting them so that they are no longer enacted as readymade techniques for discovering preexisting realities but as ethical, response-able and accountable metaphysical practices that help constitute particular worlds in non-arbitrary ways. (Mauthner, 2016, p. 270)

Thinking with may be described as a kind of plugging in. Plugging in, according to Jackson and Mazzei (2023), is

> a production of the new: *the assemblage in formation*. This is a dramatic, profound shift from social science knowledge with its hierarchical, empirical demands for recognizable representation to an ontology in which experimentation is privileged. *Thinking with theory,* then, emerges as assemblage, attaching itself to philosophy rather than the dogmatic image of thought in conventional qualitative research. (p. 2, emphasis in original)

Thus, in thinking with theory, different texts are plugged into one another (Jackson & Mazzei, 2012; 2013; 2023). Plugging in, in turn, may be understood as a process of making and unmaking where new insights are produced; that is, as an alternative method of analysis. For example, Kuby et al. (2016) write that in thinking with theory, "theory drives the methods and shapes how data and transcripts are produced, how one intra-acts with data, and how one writes-up research" (p. 142). What is emerging today, in the wake of the ontological turn, Weaver and Snaza (2017) argue, is

> a science of embeddedness, of risky attunement to the more-than-human world, where research cannot rely on prefabricated methods to guarantee its validity but must, instead, wrestle with how to best *listen*[13] *to the world* in ways that enable the participants only poorly thought of as 'objects' (or 'data') to actively participate in the construction of knowledge and the political debates concomitant with it. (p. 1056, emphasis in original)

One immediate outcome of such a refusal of the conventional ways of doing research is, according to Lather and St. Pierre (2013), that we can no longer think, let alone use, many of the concepts with which we used to judge the quality of research such as systematicity, audit trails, the clarity of language, value-free knowledge, triangulation, coding, research questions, methodology, participants, researcher, and data itself (Bridges-Rhoads, 2015).

Thinking with agential realism

To begin a posthumanist performative way of knowing/enacting social research methods in keeping with the agential realist position described in Chapter 3, we must acknowledge that such material-discursive practices are both objects of study and agencies of observation. They are, to use Barad's terminology, both phenomena and apparatuses, although not simultaneously. In that way, Barad's work

> articulates a new kind of empiricism for the social sciences which involves (a) reclaiming the creative and speculative force of experimentation, as a way of reconfiguring our concept–matter mixture, (b) recentering the philosophical problem as a source of inquiry, and (c) mapping a more-than-human quantum relationality. (De Freitas, 2017, p. 741)

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[13] It is funny that Weaver and Snaza should emphasize the importance of listening to the world in this regard since really listening to the world was what led me to many of the insights about the significance and agency of the nonhuman and more–than–human.

Messy list of many more methods

In this section, I have assembled a list of activities, and while far from comprehensive, I believe this list of activities that I engaged in at different points in time while studying for my Ph.D. is a far better way of describing my research process in a way that does not ignore or gloss over the fact that research is a much more complex, messy, and diffuse business (Law, 2004) than a traditional methods sections would seem to imply.

I have listed them alphabetically to not betray the messiness of the research process. Hence, I have compiled a list of 224 activities that I conducted… no, wait… that I enacted… no, wait… through which the apparatuses, including the researcher, and the phenomena came into being by way of agential cuts used to temporarily freeze certain features in order to render visible and meaningful particular aspects of the world in its differential becoming as some things are made to matter while others are simultaneously excluded from mattering. I could easily have produced a much longer list of activities or a second list of another 224 or 2240 activities that also contributed to the research. As such, many activities have been left out, not because they did not matter, but because it quickly becomes apparent that such a list is potentially endless. The point I am trying to bring to the fore with this list of activities is that while the activities on the list may not seem of the utmost importance with regards to the description of what I have actually done to eventually arrive at the conclusions presented in the four papers and this kappa, they are nonetheless no less significant than others. As such, "What is produced as knowing in the diffractive analysis is thus a material-discursive reality where that which has been considered passive and minor is now seen as active and forceful in its intra-activities" (Lenz Taguchi, 2012, p. 278).

Upon being confronted with the list below, you may wonder why I have chosen to narrate the story that makes up this chapter using the first person pronoun, I, when I have just spent several pages in Chapter 3 trying to convince you that no such entity can be said to exist, and indeed, when Barad emphasize that

> It would be incorrect to assume that there is an "I" that decides on choosing where to make a cut. This is a humanist flattening out of what I am trying to articulate. In intra-acting there is no distance between the "I" and "the world." There is no "I" that acts from the outside; rather, it is intra-actively constituted through practices of sense-making. (Barad & Gandorfer, 2021, p. 30)

To explain this seemingly inconsistent use of language, I quote from the first page of Deleuze and Guattari (2013), where they touch upon this issue:

> To render imperceptible, not ourselves, but what makes us act, feel, and think. Also because it's nice to talk like everybody else, to say the sun rises, when everybody knows it's only a manner of speaking. To reach, not the point where one no longer says I, but the point where it is no longer of any importance whether one says I. We are no longer ourselves. (pp. 1)

Thus, since I subscribe to Barad's agential realist idea about our entangled nature or, as they also put it, about our "being-of-the-world" instead of "being-in-the-world" (Barad, 2007), when I refer to an "I" here and elsewhere throughout this text and in general for that matter, I am not referring to myself (notice how this word might also be written my-self to highlight its focus on individuality) in the sense we have grown accustomed to thinking about ourselves as separate individual entities with specific identities. Instead, we need to recognize that embodiment is co-constituted relationally through boundary-making practices of cutting together apart and that the belief that bodies and thereby subjects and selves end at the skin is mistaken. *Prima facie,* it may seem like a rather obvious and banal fact that one of the methodological implications of starting from an agential realist position is that researchers have to think as part of their efforts to conduct research. Braidotti (2019b) writes, "Thinking is the conceptual counterpart of the ability to enter modes of relation, to affect and be affected" (p. 124). Thinking in Braidotti's Deleuze-inspired understanding thus involves and sustains

> qualitative shifts and creative tensions. Escaping the gravitational pull of dominant systems of thought, critical neo-materialist thought pursues the actualization of transversal relations. Posthuman thought is inhabited by a vitalist and materialist multi-directional affectivity that works in terms of transpositions, that is to say generative cross-pollination and hybrid interconnections. (Braidotti, 2019b, p. 124)

The list

I affected and was affected[14], I analyzed[15], answered[16],

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[14] I affected and was affected. Agency entails the ability to affect and be affected. In keeping with Barad's agential realist understanding, humans are not alone in having agency. On the contrary, animals, plants, and artifacts also exhibit the ability to affect and be affected, as do immaterial things such as discourses, narratives, ideas, data, and concepts, and so

> We are obliged to acknowledge that data have their ways of making themselves intelligible to us. This can be seen, or rather felt, on occasions when one becomes especially 'interested' in a piece of data—such as a sarcastic comment in an interview, or a perplexing incident, or an observed event that makes you feel kind of peculiar. Or some point in the pedestrian process of 'writing up' a piece of research where something not-yet-articulated seems to take off and take over, effecting a kind of quantum leap that moves the writing/writer somewhere unpredictable. (MacLure, 2013, pp. 660)

[15] I analyzed. Like Masny (2014), I hope my approach, uncomfortable and unconventional as it might be, will yield a new way of thinking about problem-based project work and ethnography in education. The approach, known as rhizoanalysis, is meant to rupture ethnography and create room for maneuver such that newness might emerge. According to Masny (2014), rhizoanalysis disrupts "representation, interpretation and subjectivity" (p. 346). In that sense, rhizoanalysis "proposes to abandon the given and invent different ways of thinking about and doing research and what might happen when reading data differently, intensively and immanently ..." (p. 346). Elsewhere Masny explains rhizoanalysis as follows:

> Through rhizoanalysis, representation and interpretation deterritorialize and reterritorialize as antirepresentation and antiinterpretation. There is no direct experience of data. In other words, the research assemblage is not limited to what a researcher generates by way of interpretation based on the data before her/him. Immanence and difference extend experience of rhizoanalysis beyond what is to what might be. (Masny, 2017, p. 2048)

[16] I answered. Undertaking a study of this kind is, of course, about answering the main research question. But more than that, I think the role of asking new kinds of questions is actually equally important since questions open up while answers have a tendency to close down. That said, a study of this kind involves giving many answers if only of the tentative kind.

asked[17], assumed[18], became[19], blogged, breathed, cared, cried, critiqued, cut[20], dared, defeated, deflated, deleted,

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[17] I asked questions and tried to answer some too. Especially for help and feedback. In that sense, the word "asking" is able to capture in one word several different activities that the word "interviewing" would not have been capable of. But a great deal of the effort that goes into producing a study of the present kind is collaborative and many more questions are asked of supervisors and colleagues, friends and family compared with the formal preconceived questions that the researcher uses to investigate what participants think, say, and do, what they think they say and do, and what they say they think and do. In addition, there is the research question that guides and informs the overall direction of the study. Thus, asking is a much more prevalent activity in research than traditional descriptions of interview protocols are able to reveal.

[18] I assumed. As everyone always does, I assumed many things both before, during, and after I conducted this study. I assumed things about what I would do, how it would make sense to do it, and why. While these assumptions appear innocent enough at first blush, upon further inspection they turn out to be closely related to a great deal of problematic and significantly more profound issues. For example, assuming that I would be able to conduct a classic ethnographic study of how and what students learn when doing problem-based project work by observing and interviewing them is vested in the representationalist idea that everything, including humans, exists as separate individual entities with inherent attributes, anterior to their representation (Barad, 2007).

[19] I became. I became fascinated, I became affected, I became other than I was.

[20] I cut. But what that means in light of an agential realist position is not that I, the individual KLT, did/caused/effected that cutting. Rather, the fact that I cut should simultaneously be seen to mean that I was cut together-apart as I became and became affected as part of the world's differential becoming. Murris (2022) explains,

> The cutting up is an agential cut that does not separate and cut into two parts like a Cartesian cut does. Instead, it furthers the already existing relationalities: a 'cutting together-apart' in one move (Barad, 2014). As an agential cut, Barad's philosophy reworks who "I" am and who Barad is. Their scholarship works in unexpected affective ways through questions that cascade infinitely. Being affected is more than emotion or feelings; it is a mutual performativity that troubles cognition/emotion, nature/culture, and inner/outer binaries (Barad, 2007). (p. 22)

described[21], diffracted[22], dreamed,

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[21] I described. Because the descriptions provided by ethnographers are supposedly based on their first-hand experience of a particular event or setting, readers are expected to accept these descriptions as truthful renderings reflecting reality as such (Schneider, 2002). Thus, in the particular genre known as realist ethnography, "what gives the ethnographer authority and the text a pervasive sense of concrete reality is the writer's claim to represent a world as only one who has known it first-hand can" (Marcus & Cushman, 1982, p. 29). These descriptions, then, are thought of as objective accounts because their claim to truth is based on the assumption that there can be correspondence between what really happened and the ethnographer's textual representation thereof. In this sense, ethnographic realism

> constructs scientific authority and objectivity by means of the narrative fiction of the ethnographer who enters the field and becomes submerged in what is other, foreign, or mysterious, then struggles to free himself in order to finally return from the field with the scientific facts about nature or reality. (Clough, 2000, p. 160)

As time has passed, the somewhat unreflective belief in the ethnographer's ability to provide objective, value-free descriptions of reality that seems to implicitly accompany the realist notion of ethnography has come under increasing pressure. As skepticism towards this idea has gained ground among a growing number of ethnographers, more and more ethnographers now seem to agree with Weber's (1949) contention that there can be no such thing as a presuppositionless interpretation of cultural phenomena: "We cannot discover, however, what is meaningful to us by means of a "presuppositionless" investigation of empirical data. Rather perception of its meaningfulness to us is the presupposition of its becoming an object of investigation" (p. 76).

[22] I diffracted. Taking the following statement from Barad into consideration, it is clear that the simple phrase used to introduce this note about diffraction can be ascribed a number of different meanings. Barad (2014), writes that "Diffraction is not a set pattern, but rather an iterative (re)configuring of patterns of differentiating-entangling" (p. 168).

drew[23], embedded, embodied,

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[23] I drew. As part of the field notes I wrote on those occasions on which I sat in on students while they were working on their projects in their groups, I drew quite a few sketches that I imagined would help my memory once I had to reread and rewrite the field notes to transform them into more or less coherent narratives for others to read. Drawing, I found, can sometimes have a similar effect to that of writing as a method of inquiry as described by Richardson and St. Pierre (2018) when they posit that

> No textual staging is ever innocent (including this one). Styles of writing are neither fixed nor neutral but rather reflect the historically shifting domination of particular schools or paradigms. Social scientific writing, like all other forms of writing, is a sociohistorical construction and, therefore, is mutable. (p. 1412)

Sometimes, as with writing, my drawings were not intelligible, mainly because I am not very good at drawing and would frequently mess up the perspective when I tried to add some depth to my motifs. Legs, for example, would generally be either missing altogether or end up looking very long and flat and out of place when they were supposed to look like they were resting comfortably on a chair. While I did not see any unicorns or dragons while sitting in on group meetings, the fact that I drew these creatures testifies to the salience of a particular aspect of doing fieldwork that I had not anticipated: Boredom. Of course, no matter what activity you engage in, once you decide to do it for prolonged periods of time, a certain measure of boredom is to be expected. Anything that feels new and exciting at first will eventually inevitably turn trivial and boring after a while of doing it over and over again, and it goes without saying that even if the activities listed here seem like a varied and balanced diet for an inexperienced ethnographer, the dishes served up by fieldwork quickly seemed to become uninteresting with each day looking very much and more and more like the one before.

But aside from drawing a few less than mediocre sketches, I also drew conclusions, just as I tried to draw out the implications of pursuing a posthumanist perspective for the way we think and do problem-based project work. Drew in, drew out, drew up, drew attention to, drew on, drew from

emerged[24], enacted[25], encountered, engaged, entangled[26], examined, experienced, experimented, explored, evaluated, felt, feared, fixed, flowed, folded, followed[27], forgot, formed, found, fumbled, glossed over, goggled, googled, graded, guessed, held my tongue, hoped, hopped, imagined, implied, indulged, insinuated, intercepted, interjected, interpreted, interrupted, intervened, intra-acted, intra-viewed, invented, irritated, iterated, joked, judged, jumbled, jumped through hoops, juxtaposed, knew[28], knotted, laughed, learned, listened, lost, made, managed, mapped, messed up, met, misinterpreted, misread, missed, misunderstood, mixed, moved, narrated, objected, obsessed, obtruded, offended, offset, opened, operated, opposed, ordered, organized, overcomplicated, overestimated, overthought, passed, pasted, paused, performed, philosophized, planned, played, played roles, plotted, plugged in, praised, presented, pretended, problematized, processed, produced, promised, put on masks, questioned,

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[24] I emerged. In the process of conducting the studies to which this text relates, not only did I emerge as novice researcher, with my emergence as researcher, the research phenomenon also emerged as such.

[25] I enacted "intra-actions enact agential cuts, which do not produce absolute separations, but rather cut together-apart (one move)" (Barad, 2014, p. 168).

[26] I entangled. In keeping with Barad's (2007) notion of entanglement that entails, among other things, that knowing and being are mutually implicated as I have already explained in Chapter 3, it should be clear why the concept of entanglement is highly relevant to a discussion of methods in a study of PBL and problem-based project work in higher education.

[27] I followed. I did not restrict myself to follow human students and supervisors. Rather, I also followed nonhuman agencies such as tables. In addition, I followed ideas described by Deleuze and Guattari (2013) as lines of flight. In fact, Deleuze and Guattari use the word "following" as a metaphor to describe an alternative model of representation. They posit that while a river flow may be observed from a fixed point on the bank, one might also opt to follow the flow of the river by taking to a boat and becoming part of the flow (Deleuze & Guattari, 2013).

[28] I knew. This idea was particularly salient in the first phases of the project when I thought I knew what I was doing and what I would be doing, how it was to be done, and why. That I knew that turned out to be a mistake, however. Thus, in the clear light of hindsight, I knew significantly less than I imagined when I started out, and five years later this situation seems to persist, only now I know that what I thought I knew turned out to be wrong, and therefore what I know now is that, ironically, all claims about what I think I know should be taken with a grain of salt, and that goes for this very claim as well, of course, cf. Chapter 3. Thus, stating as part of my attempt to describe what I have done, my methods if you prefer, that I knew, has wide-ranging implications since knowing is closely related to the process of becoming.

quoted, read, received, rejoiced, remembered, removed, reread, rescued, resisted, rested, restricted, reterritorialized, returned, revealed, revised, rewrote, risked, rubbed words up against each other, said, sang, sat, scrolled, searched, sensed, settled, shared, shopped, slept, socialized, speculated, spoke, stared blankly into the air, stated, stood, stumbled, supervised, stifled, strained, stressed, stretched, structured, struggled, stuttered, subdued, suppressed, surveyed, talked, taught, territorialized, theorized, thought[29], threaded, tied knots, took chances, traced, trained, transformed, transgressed, tried, troubled, turned, typed, uncovered, uncrossed, underappreciated, undercut, underestimated, understood, underwhelmed, undulated, unfolded, unhinged, united, unmade, unmasked, unloaded, unlocked, unsettled, unstabilized, untwined, uplifted, upset, urged, used, utilized, uttered, ventured, verified, vibrated, visualized, voiced, waited, warned, was bored, was moved, watched, won, worked, worried, wrote, wrote as a method of inquiry, yawned, zoomed, zoomed in, zoomed out.

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[29] I thought. It may seem like an odd thing to emphasize in a methods section, but I think it makes good sense to stress the importance of thinking in this section because methods sections are often utterly devoid of thinking in the sense that researchers will sometimes attribute the scientific value and quality to the methods used. If only one follows the prescribed directions for the preapproved methods, one is certain to get reliable results. At least that seems to be the idea promoted by traditional texts on the matter. But if you think about it, thinking and thinking hard about one's choice of methods or approaches is really the best guarantee for producing reliable... whatever that means... interesting and useful results... "Thinking happens "behind your back" and you are impelled and constrained by it" (Badiou, 2000, p. 14).

> But how strange, on entering the park, the silence; the mist; the hum; the slow-swimming happy ducks; the pouched birds waddling…

> —Virginia Woolf, *Mrs. Dalloway*

According to Saville-Troike (1985), "silence may be used to question, promise, deny, warn, threaten, insult, request, or command" (p. 6), while Poland and Pederson (1998) posit that silence is commonly understood as the opposite of speech. The opposite of *speech*! Notably not of sound or noise but of speech.

Until now, studies about silence in educational contexts have typically focused on silence as being either positive or negative. For example, Jin (2014) has argued that silence may be understood as a positive and constructive phenomenon that signals participation and contributes to collaborative knowledge construction. On the other hand, Jaworski and Sachdev (2012) have shown that students' silence is typically negatively valued by teachers who evaluate students who speak more, faster, and longer more favorably compared with students who speak less, slowly, and for shorter periods of time. In this intravention, I argue for a completely different take on silence.

Thus, based on how particular observations of silence and no silence encountered in a PBL setting played out and led me to new insights not only about silence and PBL but also about research and research methods, I argue that the fact that moments when no one speaks are labeled 'silent' is the result of a problematic anthropocentric understanding of what is relevant to processes of learning and the study thereof.

To be a good methodologist, the ethnographer has to organize what she has "seen, heard, and read" (Glesne, 1999, p. 130). Indeed, according to Mazzei (2007),

> Good methodologists are taught to focus on and analyze what participants talk about, what they tell us, what they describe, what they recount. Good methodologists are carefully, carefully taught to be attentive to their field notes

and transcription data, and if nothing is said, to turn their attention to another day, another conversation, another participant (p. xi).

The insights presented here have certainly *not* been produced in accordance with the guidelines for what constitutes a good methodological approach, as described by Glesne (1999) and Mazzei (2007), for example. Instead, they have been produced by comparing two sets of field notes using a so-called abductive approach. Unlike deduction and induction, research that is based on abduction does not begin with either theory or data. On the contrary, it may be described as an approach that "occurs in situations of breakdown, surprise, bewilderment, or wonder" (Brinkmann, 2014, p. 722). Thus, my argument is not the result of following a preconceived plan involving specific, well-defined methods for data collection and analysis. In fact, the idea for this study came about through sheer serendipity when a comparison of two sets of field notes led me to stumble (Tanggaard & Brinkmann, 2017, p. 88) on to what seemed to me a rather odd difference in the prevalence of the word "silence".

Going through my field notes, I discovered a curious feature. Thus, in all of the field note material from the first round of observations, the word "silence" is never mentioned in the 189 pages of handwritten notes. At first blush, this may seem like an insignificant detail that does not merit much attention. When compared with the frequency with which that same word appears in the second set of fieldnotes, however, the absence of this word in the first set of fieldnotes becomes highly conspicuous. Thus, in the second set of field notes, the word "silence" appears no less than 89 times in 94 pages of double-spaced typed notes. While I hadn't noticed this difference during my time in the field, once I had seen it, I could not forget about it. Why, I wondered, did this difference arise? Thinking about this issue, it wasn't long before I realized that when the fieldworker uses the word "silence" to describe the (non)-action happening, this is only one part of the story, and a very anthropocentric part at that since what this word seems to convey is that no one speaks, but that does not mean that there is silence. Not at all. In fact, there is, of course, no such thing as silence in the absolute sense. That no one speaks, however, does not mean that there is no sound, cf., for example, the following fieldnote entry:

> Silence. A bus passes by outside. The seagulls let out startled screams of surprise as if objecting to being interrupted in whatever they were doing. Since I don't know anything about the ways of seagulls, I am unable to say what they might have been doing. Another bus passes by. Again, the seagulls scream as if they are once again surprised by the intrusion of the bus on what they apparently consider their territory (Excerpt from fieldnotes, March 25, 2019).

The fact that moments when no one speaks are described as silences when they are not silent at all reveals a narrow focus of the researcher on human agents alone while everything else is forgotten or intentionally ignored as if it was not there and devoid of the power to affect and be affected. In other words, the agency of the numerous non-human agents involved in this entangled web of relations is simply erased. Accepting the argument made here about the need to dismantle and disrupt the anthropocentric assumption about the importance and superiority of spoken words entails that there is also a need to dethrone the conventional view of spoken language as particularly important for researchers' possibilities for uncovering what is really said by analyzing what is said in face-to-face encounters. As St. Pierre (2014) reminds us,

> There is no primary empirical depth we must defer to in post analyses as there is in the ontology and empiricism of conventional humanist qualitative methodology. That is, in post ontologies it makes no sense to privilege language spoken and heard "face-to-face" as if it has some primary empirical purity or value, as if it's the origin of science. (p. 12)

While the observation about the different frequencies with which the word "silence" appears in two different sets of fieldnotes was brought about by a chance encounter with what seemed at first to constitute nothing more than an insignificant detail, it was noticing and then thinking about the difference in the prevalence of silent moments that resulted in the prolonged sense of wonder that eventually led me to a conclusion similar to that of Snaza and Weaver (2015) who advocate a posthumanist perspective when positing that "whenever research is conducted in schools there is much more going on than interaction between a teacher and students or teachers and teachers or students and students" (p. 9).

In keeping with this line of thinking, I suggest that we develop a new and different understanding of learning inspired by an agential realist perspective in which learning, including PBL, is seen as an assemblage with its own affect economy that includes a variety of different things such as classes, schedules, classrooms, tables, chairs, hardware, software, theories, philosophies, concepts, literature, didactics, pedagogy, knowledge, and of course, teachers, students, as well as innumerable others. Following Barad (2007),

> Matter's dynamism is generative not merely in the sense of bringing new things into the world but in the sense of bringing forth new worlds, of engaging in an ongoing reconfiguring of the world. Bodies do not simply take their place in the world. They are not simply situated in, or located in particular

> environments. Rather "environments" and "bodies" are intra-actively co-constituted. (p. 170)

Such a relational way of thinking about bodies and environments, in turn, would allow us to think of PBL as a territorialization that functions to produce students, teachers, and other actors relationally according to the particular flows of affect produced in their intra-actions. By opening ourselves to the influence exerted by non-human actors, we gain a new perspective from which to understand processes of learning, and we come to realize that an anthropocentric focus will not allow us to develop an adequate understanding of the complex processes that go on within PBL.

CHAPTER 6

Different cuts cut differently

> If someone tells you what a story is about, they are probably right. If they tell you that that is all the story is about, they are very definitely wrong.
>
> —Neil Gaiman, *The View from the Cheap Seats*

Having now described the overall purpose and research questions that guide my project in the introduction, situated my argument in relation to the state of higher education in the 21st century in Chapter 1 and in the field of research on PBL in Chapter 2, discussed the foundational assumptions and rationale of agential realism in Chapter 3, situated my argument in relation to phEmaterialist scholarship in Chapter 4, and discussed the methodological consequences of an agential realist position in Chapter 5, I am ready to present my closing arguments in the shape of a discussion of the implications of thinking about PBL with agential realism.

While the main purpose of this chapter is to make it possible to arrive at answers to the research questions about how thinking about PBL with agential realism might affect practices, theories, and research on PBL, there can be no *final and conclusive* answers to these questions. In keeping with this point, I feel it is necessary to offer a brief disclaimer to ensure that you, the reader, don't get your hopes up too high from the get-go, expecting this chapter to provide the kind of closing satisfaction that trivial works of fiction are typically skilled at serving up on their final pages. If that is the kind of happy ending you were expecting, I'm sorry to inform you that you will likely be both disappointed, dissatisfied, and perhaps even a little disgusted by what follows. Thus, this chapter merely offers some tentative answers to the research questions while adding some new perspectives on PBL, learning, and (higher) education more generally in light of agential realism.

The reasons why we have to settle for tentative answers follow directly from the agential realist position with which I think. Indeed, in keeping with agential realist ideas, no text—not this kappa nor the narrative accounts presented in the four papers, nor those trivial works of fiction mentioned above nor any other kind of text—can be

understood as a transmission or representation of "real words or "brute data" that accurately correspond to inherent, individual aspects of "true" life" (Jackson & Mazzei, 2023, p. 3). On the contrary, texts, like everything else, according to the nonrepresentationalist view advocated by agential realism, are performative in the sense that they "bring forth the very life which they speak" (Jackson & Mazzei, 2023, p. 2). In other words, to paraphrase Jackson and Mazzei (2023) once again, texts *are* not things; rather, texts *do* things. What is more, because of the profoundly agentic and leaky nature of texts and their ability to affect and effect circumstances to what seems "far removed in space and time," the story of this project doesn't end with your turning of the last page. Rather, every new reading will add another diffractive layer adding new perspectives depending on the specific features of the apparatus used to make part of the world intelligible. The last word on the last page, in other words, is not really the last word at all. Finally, since indeterminacy reigns supreme, not least because, in the words of Barad (2014), every moment is "a diffracted condensation, a threading through of an infinity of moments-places-matterings, a superposition/entanglement, never closed, never finished" (p. 169), closure is by definition impossible. For these reasons, I readily concur with Rosiek and Adkins-Cartee (2023), who contend that an agential realist position leaves us

> facing choices with indeterminate consequences. It delivers us into a mode of being that lacks epistemic shelter, a condition of possibility in which you, the reader, are now entangled. Inquiry does not just provide definitive guidance for actions to come, but our actions also give meaning to past inquiry. Social inquiry is temporally co-constituting. Herein lies great hope and vertiginous responsibility. (p. 11)

And with that, dear reader, I welcome you to the enactment of the final chapter of this text, which is not final and in which you are already deeply entangled.

Doing my best to stay true to the understanding of texts as performative, I use the space provided by this chapter to diffractively re-call and re-member, re-mind and re-turn (to) the findings and arguments of the four papers and the preceding chapters while drawing out what I see as the most significant implications of thinking with agential realism about PBL. The first part of the section that follows this one, then, is dedicated to re-calling and re-membering the points made in the four papers, followed by a section dedicated to re-minding and re-turning the insights presented there. Thus, the first thing you will meet after this section is four brief subsections dedicated to repeating the abstracts included in the papers. These abstracts are repeated verbatim before their points are re-minded and re-turned in the latter part of that same section. Next, I discuss the implications of what I have found and argued for notions of learning and theories of learning, and then for pedagogy and education before turning

to PBL in the latter part of that section, where I address the three research questions. Finally, I end the chapter not with an unambiguous final statement, nor with a set of concrete recommendations, but rather with a section dedicated to thinking differently about PBL and imagining new possibilities via speculative questions intended as contemplative prompts to provoke new thoughts about PBL—to tickle, in other words, thinking about PBL out of its dogmatic complacency while opening possibilities for newness to emerge.

In the end, I hope to show how my arguments can be understood as indicators of where to go next with research on PBL as well as PBL practice by explaining how an agential realist perspective may help us get started in the direction towards developing a and different kind of research and enacting a different kind of higher education practice in the shape of a socially just problem-based pedagogy.

Re-calling and re-membering, re-turning and re-minding

At this point, I might have opted for repeating the findings in a summary but otherwise similar form to the way they are presented in the four papers that comprise the main part of my project, and having endured the experiments of Chapter 5, I'm sure some readers are longing for something somewhat more familiar, conventional even. Truth be told, four brief summaries were also what I had in mind right up until the point when I began ingesting and digesting Barad's paper from 2014, in which they describe their diffractive approach as one of *re-turning*. They write,

> I want to begin by re-turning – not by returning as in reflecting on or going back to a past that was, but re-turning as in turning it over and over again – iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimemattterings), new diffraction patterns. (Barad, 2014, p. 168)

Reading Barad's paper prompted me to consider the radical implications of thinking with agential realism in more comprehensive terms and led me to the realization that writing up and summarizing the findings of my research in a traditional manner would betray and contradict the very idea for which I advocate. Indeed, as I have already mentioned in the introduction and Chapter 3, thinking with agential realism should be understood as what Barad (2007), inspired by Haraway, calls a diffractive methodology. According to Haraway (1992/2004),

> Diffraction does not produce "the same" displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or

reproduction. A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear. (p. 300)

Elaborating on Haraway's explanation of what diffraction as a methodological device might entail, Barad (2007) submit that

> a diffractive methodology is a *critical practice for making a difference in the world*. It is a commitment to understanding which differences matter, how they matter, and for whom. It is a *critical practice of engagement*, not a distance-learning practice of reflecting from afar. (p. 90, emphasis added)

Thus, my choice to re-call and re-member the four papers by repeating their abstracts verbatim in what follows is inspired by Barad's (2014) point about there being no possibilities for moving beyond and thus no way of leaving the old behind. Barad (2014) write,

> As such, there is no moving beyond, no leaving the 'old' behind. There is no absolute boundary between here-now and there-then. There is nothing that is new; there is nothing that is not new. Matter itself is diffracted, dispersed, threaded through with materializing and sedimented effects of iterative reconfigurings of spacetimemattering, traces of what might yet (have) happen(ed). Matter is a sedimented intra-acting, an open field. Sedimenting does not entail closure. (p. 168)

As I see it, this choice then underscores the performative ambition of my project while simultaneously highlighting the fact that reading is not merely an act of decoding and uncovering some already determined message or meaning but rather an act of creative collaboration in which multiple strands of knowing and being entangle to produce differences that come to matter. To repeat: Sedimenting does not entail closure!

Re-calling and re-membering: Playful encounters with problematic paradoxes in problem-based project work: An impressionist expeculation in three parts

> Different universities employ different pedagogies. One pedagogy that is quickly becoming popular, spreading rapidly to universities worldwide, not least because it promises to develop critical thinking, collaboration, and self-direction in students, is problem-based learning (PBL). Although directions for how to implement and organize PBL abound, in practice, things sometimes go awry. The purpose of this chapter is, first, to contribute to a more nuanced understanding of PBL and, second, to illustrate how such an understanding

may be brought about by employing an alternative strategy of creative meaning-making inspired by posthumanist thinking. Thus, we use an abductive bricolage methodology that entails combining participation, conversation, and observation with experimentation and speculation to produce three impressionist tales based on the first author's experiences in a particular PBL context. We direct attention to problematic paradoxes, things that are not supposed to happen in PBL, to try to rescue PBL from dogmatic thinking. (Thorndahl et al., 2023)

Re-calling and re-membering: You have no right to remain silent: An agential realist take on silence in problem-based project work

Silent students are often construed as passive and, therefore, problematic in and for problem-based project work in which active participation in the shape of verbal communication is a highly valued, critical component. In this paper, however, we problematize the prevalent understanding of silence and aim to show the diversity and complexity of the phenomenon of silence in the context of problem-based education. Inspired by Barad's agential realism, we argue that the material-discursive entanglements intra-acting to make up problem-based project work with its human, nonhuman, and more-than-human agencies are co-constitutive of the phenomenon of silence, while silence, in turn, reconfigures the material-discursive entanglements enacted by students and supervisors, pens and paper, birds and busses, etc. Three examples based on observations of three groups of undergraduate students are read with agential realism to investigate enactments of silence and illustrate how silence as a relational phenomenon manifests and functions in problem-based project work. (Thorndahl et al., submitted)

Re-calling and re-membering: Tell-tale tables and other telling matter(s) for how matter comes to matter in and for PBL and problem-based project work

This paper aims to restore some of the wonder we are missing out on when we take matter for granted, putting it to use in familiar, habitual ways. To that end, the significance of the material circumstances of and for a particular higher education context is explored, and their influence on pedagogical matters is made explicit. Taking our point of departure in Barad's agential realism, we argue that the entangled nature and iterative enactments of the matter and material conditions that constitute the institutional places, spaces, and matter(s) that make up the material culture of the university, are neither inert, neutral,

nor aligned with the expressed image of the institution. Among other things, the findings reveal that mundane things contribute to reinforcing an unequal, gendered hierarchy that keeps men in a hegemonic position even though they only make up a minority of the population in the institutional context discussed here. (Thorndahl & Telléus, submitted)

Re-calling and re-membering: Supervision beyond borders: Perspectives on a mutual process of becoming in higher education

In the context of problem-based higher education, students are typically supervised by a person referred to as either a teacher, a tutor, or a supervisor. The supervisor's job is to facilitate students' learning—most prominently by asking questions and encouraging students to reflect and become active participants in the construction of knowledge. But supervision can take many different forms. The purpose of this paper is not to provide readers with a set of strict guidelines for how to supervise students in the context of problem-based higher education. Rather, we merely strive to show that even within the confines of the neoliberal university, there is room for maneuver to resist the status quo of commoditization and to carry out oppositional practices that may ultimately result in transformational learning. To accomplish this goal, we have employed a postqualitative perspective allowing us to think supervision differently and describe ways in which the relation between supervisors and students may also be performed differently. We argue that while it is necessary to let go of the rigid thinking and professional expectations about what proper supervision is that confine supervision to a limited and limiting space, such oppositional practices can challenge hegemonic discourses and contest the legitimacy of the structures governing higher education today. More specifically, we draw on a patchwork of collaborative narratives written before, during, and after the fall semester of 2018 to describe a particular process of supervision that significantly affected the both of us, that is, the student as well as the supervisor. (Thorndahl & Frandsen, 2022)

Re-turning and re-minding

The overall purpose of the re-turning and re-minding performed in this section is to direct attention and promote a heightened awareness of what might be described as the indistinct problems of PBL that often remain hidden from view. This re-turning and re-minding constitute an attempt to try to rescue PBL from the kind of calcified thinking that seems prevalent in the literature in which many of these problems frequently experienced when involved in the actual practice of PBL are not described

at all, and so although directions for implementing and organizing PBL abound, more often than not, these recipes leave a lot to be desired.

As the re-calling and re-membering of the four abstracts make evident, gender, silence, matter, personality, time, the supervisor's attitude, and beliefs matter greatly in the actual practice of PBL. The full-length versions of the papers further emphasize the significance of social status and hierarchies, academic capital, socioeconomic background, and culture. Nevertheless, these things are only very rarely mentioned in introductory texts about PBL used to prepare students for entering into the collaborative communities of practice of problem-based project work, nor are they typically mentioned in study plans, curricula, and policy documents describing how PBL ought to be organized and how students ought to be supervised.

What is more, the fact that the questions of equality and equity are typically not explicitly addressed in introductory texts on PBL seems to neglect the fact that social status, academic, social, and cultural capital, as well as socioeconomic background, do not just amount to personal attributes or challenges to be handled by individuals but are rather results of unequal structural conditions putting some students at an advantage in higher education while hampering others. This idea also resonates with the contention that supervisors and teachers are not the only ones in need of more and better education on PBL. Students must also gain a deeper and more nuanced understanding of the dynamics and mechanisms that play a role when involved in PBL in groups.

The papers further confirm that what we usually believe and say about PBL, or at least much of what we believe and say, cannot be verified when actual practice is studied. This is because many things that have never been described or considered in the research literature happen in practice. More generally, practice differs greatly from how it is imagined and described in the literature. This matters for research because we might not be asking the right questions in our interviews and surveys when basing them on what we *think we know* about PBL and problem-based project work and what we *imagine* things to be like in practice. The complexity of education in general and the particular issues at play in PBL render them particularly hard to access and describe for researchers equipped with traditional methods, such as questionnaires and standardized tests typically used to quantify the effects of different kinds of interventions. Hence, to those who have experienced the challenging aspects of PBL, the advice and tools offered by books and scientific papers on how to supervise students doing PBL sometimes seem too rudimentary because they fail to take into account the full range of complex aspects and nuances that characterize the dynamics at play in educational situations.

What is more, the common guidelines informing educational policies and interventions with a view to optimizing the effect of pedagogical efforts on various parameters influencing students' learning are frequently based on a simple input/output logic. Learning in such a perspective is understood as a linear process of causality that can be described, predicted, measured, and controlled (Biesta, 2015a). According to Biesta (2015a), such an understanding is problematic because there is no linear relationship of causality between input and output when it comes to learning, whether problem-based or otherwise.

Finally, even though the insights presented as part of the fourth paper demonstrate that there seems to be room for maneuver within the neoliberal academy to resist the status quo and to expose the indistinct problems that often remain out of sight, it is not enough nor is it responsible to leave it to individual supervisors to do what they see fit in this regard. Thus, in the case of Lasse and Kathrine's collaborative efforts, for example, the outcome may have been positive as it resulted in positive changes and relationships, but this case need not be typical of what can be expected. Moreover, since we were not fully aware of what we were doing and what the consequences would be, not least since our efforts were not based on conscious and rational decisions, and since they were certainly not supported by the system, had they not produced the desired results, the individual supervisor would likely be blamed for their failure to exercise due diligence.

Implications

On the desk in my study, a tall stack of books towers next to my laptop. These are some of the books I have consulted most frequently during the writing of this kappa, and so it is only natural that the titles sported on their spines should be telling signs of what my project is about, or at least, what I believe my project to be about.

Photo 2. Books on my desk.

Based on the titles photographed here, it seems evident that although I have repeatedly said that my project aims to explore how thinking with agential realism affects the

theory, practice, and research on PBL, this combination of interests implies an additional focus on issues related to learning, teaching, pedagogy, and education more generally. That this should be the case is hardly surprising since PBL is short for problem-based *learning,* which is often categorized as a *pedagogical* approach employed in *educational* settings to *teach* students the knowledge, skills, and competencies they need to fare well in the complex globalized labor market of the present. But more than that, the stack also reveals that there is, or at least that I believe there to be, a connection between (the concepts of) learning, teaching, pedagogy, and education. After all, I wouldn't have stacked those exact books with those exact titles on the desk in my study right there next to my laptop if I didn't believe that the topics with which they are concerned were somehow all relevant to the questions that guide my exploration of what thinking about PBL with agential realism does to PBL theory, practice, and research, would I?

Conventional ideas of learning

Learning is often understood and described as "an enduring change in behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience" (Schunk, 2014, p. 3). Although not presented as a definition per se, Schunk's book, *Learning Theories: An Educational Perspective,* begins with the following semi-definitional statement about the nature of learning: "Learning involves acquiring and modifying knowledge, skills, strategies, beliefs, attitudes, and behaviors. People learn cognitive, linguistic, motor, and social skills, and these can take many forms" (Schunk, 2014, p. 2). While far from novel, this view of learning is neither neutral nor objective, even if it does represent a common-sensical position that is bound to align neatly with many people's intuitive understanding of what is entailed by the concept of learning. That said, understandings of learning vary greatly.

However, despite their differences, different theories of learning, such as behaviorism, constructivism, and social learning, are all based on the assumption that the world consists of separate entities, some of which constitute living subjects capable of acquiring knowledge about non-living objects and other subjects through processes of learning. Beyond that, different theories have different understandings of what learning is and how it happens. For example, behaviorists typically favor a view of learning in which stimulus and response are understood as central elements in and for learning. Thus, according to a behaviorist understanding, learning has occurred when a changed pattern of behavior can be discerned in an individual as a result of a given stimulus (Beck et al., 2014). On the other hand, proponents of a constructivist notion of learning see learning as a process in which individuals use prior experiences to construct individual learning by reconfiguring the mental schemas in their minds to incorporate new experiences by assimilating the new or by accommodating the old

(Beck et al., 2014). Finally, in social theories of learning, the most transformative kind of learning is believed to take place within so-called communities of practice in which individuals learn by participating as central or peripheral members depending on their status and competencies vis-a-vis the particular practice that is valued within a particular community of practice. In this understanding, learning is seen as a situated activity (Lave & Wenger, 1991; Wenger, 1998).

Another noteworthy delimitation that these different theories of learning seem to have in common is described by Schunk (2014) when he adds that,

> Animal learning is de-emphasized, which is not to downgrade its importance because we have gained much knowledge about learning from animal research. But human learning is fundamentally different from animal learning because human learning is more complex, elaborate, rapid, and typically involves language. (p. 2)

The anthropocentric attitude is hard to miss, not just because of the explicit focus on human learning and its unique and superior status in comparison with animal learning but also because of what is emphasized about animal learning which is valued not for its intriguing nature in and by itself but rather for what it has been able to teach us about human learning. Human learning, in turn, is elevated as the most sophisticated kind of learning there is, which seems rather arrogant considering how little we actually know about learning, human as well as that of the other species with whom we share the planet. In that sense, traditional theories of learning can be said to contribute to the production and reinforcing of a binary understanding in which nature and culture are juxtaposed as opposing spheres in a hierarchical structure in which humans and culture are valued over everything nonhuman and nature. The consequences of such an anthropocentric and humanist view are grave, especially for those considered other. According to Hayles (1999),

> When the self is envisioned as grounded in presence, identified with originary guarantees and teleological trajectories, associated with solid foundations and logical coherence, the posthuman is likely to be seen as antihuman because it envisions the conscious mind as a small subsystem running its program of self-construction and self-assurance while remaining ignorant of the actual dynamics of complex systems. But the posthuman does not really mean the end of humanity. It signals instead the end of a certain conception of the human, a conception that may have applied, at best, to the fraction of humanity who had the wealth, power, and leisure to conceptualize themselves as autonomous beings exercising their will through individual agency and choice. (p. 2)

At the same time, separating culture and nature into separate spheres serves to reproduce what Haraway has called "the God trick" (Haraway, 1988), in which humans imagine themselves capable of adopting a view from nowhere as if somehow existing outside of nature, thereby turning nature into an object that can be exploited for human purposes. It is not hard to see that Schunk's statements rest on a number of assumptions about the kind of world we live in as well as human nature. In the next section, I argue that what Schunk calls capacities to behave in a given fashion depend on the context as much as it does on the assumed subject whose capacity to behave is said to have changed through learning. This argument, in turn, opens the door to possibilities for reconfiguring the understanding of learning in light of Barad's agential realist position.

These ideas about learning and educational practice, in turn, result in an understanding of the relationship between human and nonhuman agents informed by humanist ideas, according to which everything nonhuman remains inert, lying passively in wait to be used by competent humans. Describing educational practices in accordance with a humanist model further involves seeing those competent humans in a particular way. Indeed, problem-based or otherwise, mainstream thinking and research about educational matters typically entertain a particular idealized notion of the student as an average abstract notion without markers of identity existing in a neutral social setting. However, adopting such a perspective of higher education and the students subject to its consequences can be dangerous. Indeed, it may cause teachers, policy-makers, researchers, and various other stakeholders to lose sight of how actual students, embodied and embedded (Braidotti, 2019a), become in relation to the specific didactics and policies, material circumstances and methods of inquiry put in place to teach, assess, manage, and study educational practices.

Implications for ideas about learning

Since an authoritative source like *The SAGE Handbook of Learning* features separate chapters dedicated to explaining posthumanist, actor-network, and complexity theories on learning, one might expect the task of explaining how learning is understood in light of an agential realist position to be quite simple. Unfortunately, upon further inquiry, this seems not to be the case. Indeed, the understandings of posthumanist, actor-network, and complexity theories of learning presented in *The SAGE Handbook of Learning* differ quite a bit from how I interpret the matter with regards to agential realism, and so it takes a little more work before we can arrive at a tentative understanding of what an agential realist theory of learning would involve qua the understanding of learning that an agential realist position entails. In the next section, I proceed to discuss how others have described PBL in light of agential realism. Because I find the descriptions and explanations provided by the authors of

the two papers discussed to be lacking, I return to the matter of how learning might be understood in light of agential realism and what an agential realist theory of learning might look like in the section after that.

Grounded as they are in the humanist tradition, current framings of problem-based approaches to learning in higher education and their theoretical underpinnings typically rely heavily on constructivist theories of learning, pedagogy, and education more broadly, which typically results in a narrow focus on and interest in what humans say, think, and do. Thus, humanist and constructivist thinking does not and cannot take the broader material context of learning, pedagogy, and education into account when trying to explain how different pedagogies, educational policies, and forms of organization influence students' learning and agentic becoming. Conventional approaches to studying the complex phenomenon of learning, therefore, often fail to consider the implications of the entanglement of everything and -one involved in the process of learning. However, since the spaces, places, and environments in which teaching takes place and in which learning as a consequence is expected to happen come into being as entangled, intra-acting human, nonhuman, and more-than-human agencies, all of which matter due to their possibilities to affect and be affected, it is essential to consider how spaces, places, and environments, as well as the human, nonhuman, and more-than-human agencies, come into being intra-actively in attempts to describe processes of learning.

Attempting to think about learning with agential realism gives rise to a series of questions, including but not limited to: How can we understand the phenomenon and conceptualization of learning in light of the agential realist position? Can it even be said to exist at all? And if we decide in favor of retaining the word, how can we describe and talk about learning as a phenomenon? How can we describe and talk about learning as a concept? Does the concept of learning make sense in light of the agential realist position? Indeed, according to Westman and Bergmark (2019),

> Once we recognize that the material is immanent to the discursive, while the discursive is simultaneously immanent to the material (Lenz Taguchi, 2010), there can be no more thinking of discourses as separate from "the agency of other materials, artefacts and phenomena that intra-act and are part of the rhizomes of learning" (p. 796).

But there is more! As I have already argued at some length in Chapter 4, thinking with an agential realist position entails a radically different understanding of the concept and phenomenon of learning. Indeed, according to Plauborg (2018),

> The perspective that agential realism brings to learning is, by contrast, a basic performative perspective, in which the subject and the world are constantly in a dynamic state of becoming and where there is no a priori separation between the world and us. In agential realist thinking, learning is an emergent and open phenomenon without a beginning or end. (pp. 324)

Although Barad do not explicitly deal with learning, their agential realist position implicitly paints a picture of the phenomenon of learning or at least of how we might understand the concept of learning. To be able to discern the contours of the motif of that painting, however, requires the viewer to rid themselves of old habits of seeing and ingrown ways of interpreting. But following Barad's ideas without compromise and trepidation is not easy, primarily because the consequences of doing so, that is, of seeing this position through to the end, may not produce the results we initially expected, rendering acceptance difficult if not downright impossible. In other words, accepting the consequences of Barad's position when it comes to learning may be too bitter a pill for some to swallow, especially if they have spent years and years thinking about learning from a more traditional point of view. That said, I think it would constitute no less than an offense to the agential realist position developed by Barad were we not to make an honest attempt at distilling its consequences for understandings, theories, and concepts of learning.

An inconvenient reading

You don't need many excerpts from Barad's texts to realize that their agential realist ethicoontoepistemology if taken seriously, is bound to pose a significant challenge to conventional understandings of learning. For example, in *Meeting the Universe Halfway,* the following excerpt serves to drive home the point about the severe consequences of adhering to this position when it comes to understanding the concept and phenomenon of learning. The trouble begins right away from the very first sentence of the preface in which Barad describe the theme of their book:

> This book is about entanglements. To be entangled is not simply to be intertwined with another, as in the joining of separate entities, but to lack an independent, self-contained existence. Existence is not an individual affair. Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating. Which is not to say that emergence happens once and for all, as an event or as a process that takes place according to some external measure of space and of time, but rather that time and space, like matter and meaning, come into existence, are iteratively reconfigured through each intra-action, thereby making it impossible to differentiate in any absolute sense between creation and renewal, beginning

and returning, continuity and discontinuity, here and there, past and future. (Barad, 2007, p. ix)

What, if anything, does this mean for rethinking the concept of learning in light of an agential realist position? First, entanglement is to lack an independent, self-contained existence. If we are entangled, as Barad argue we are, then we do not exist as separate entities, and neither do the objects we are used to handling in our everyday lives. Thus, the idea of enduring change, as well as the metaphor of acquisition, are rendered non-sensical since there is no one to acquire the knowledge, skills, and competencies that are often posited as the outcome of learning processes, nor is there anyone to show signs of enduring change.

Second, the idea that emergence does not happen once and for all but rather as a process in which "time and space, like matter and meaning, come into existence, are iteratively reconfigured through each intra-action" dismantles any fantasies we might have of understanding learning as a linear process that progresses in time through a series of progressive stages from one of less capacity to one of more capacity.

In light of the ideas presented in the excerpt above, the foundational assumptions undergirding such ideas as change and acquisition as well as transfer are undermined, all because they presuppose the existence of separate individual entities. Hence, it follows that if we can no longer presuppose the existence of separate entities, the traditional understanding of learning is, in effect, rendered nonsensical. Indeed, if existence as such can be described in terms of differential becoming, and if there are no individual beings that are able to undergo change, then it follows that there can be no such thing as learning, not in the traditional sense of that word anyway. If, at every moment, everything is intraactively becoming, the possibilities opened up as a consequence of the continual enactment of the world qua its differential becoming, depend on the entirety of everything else coming into existence in the resulting situation, and this becoming of a particular situation and the actions it makes possible and impossible depend in turn on everything that has already happened in every preceding situation… sort of. In Barad's words

> The spacetime manifold does not sit still while bodies are made and remade. The relationship between space, time, and matter is much more intimate. Spacetime itself is iteratively reconfigured through the ongoing intra-activity of the world. The world is an ongoing intra-active engagement, and bodies are among the differential performances of the world's dynamic intra-activity, in an endless reconfiguring of boundaries and properties, including those of spacetime. (Barad, 2007, p. 376)

I realize that the particular way of understanding Barad's position in relation to the concept and phenomenon of learning I have advocated above differs from how agential realism is most often interpreted in the field of education, especially with regard to the consequences that thinking with agential realism has for educational matters such as learning, teaching, and pedagogy. As a consequence of this difference, the implications I draw for understandings of learning and theories of learning may appear strange and radical.

Alternative readings

In addition to the radical understanding of agential realism and its consequences for what it is possible to think, say, and do with regard to the concept and phenomenon of learning that I have advocated above, two other possibilities for thinking of learning with agential realism might be said to exist.

According to the first of the alternative readings, learning does indeed exist. In fact, it is all-pervasive because learning can be said to *be* the adaptive differentiations that make existence possible. Thus, because existence is relational and in a constant process of becoming with/of the world, existence is learning, and learning is existence. Some might object that this contention cannot be correct since we can decide to learn certain things while neglecting or refusing to learn others. However, from an agential realist perspective, there is no "we" to begin with. There are only relations and continual becoming, always already attuned to the world's demands, and thus ensues that process of becoming, which we call learning. Therefore, claiming that learning is a noticeable change of the self, caused by external stimulation of the individual while motivated from the inside, is not viable in an agential realist perspective because learning, according to proponents of this position, is pervasive. We need to learn to live since living is becoming, and becoming is learning.

Learning, in this sense, if this term must be retained, which I'm far from certain that it should, is the inevitable side-effect of intra-active becoming as embodied and embedded being- or becoming-of-the-world. The world, in turn, should be understood as an emergent process of events and assemblages rather than a static structure consisting of stable and fixed systems that determine what it is possible to think, say, and do. Furthermore, since there is no outside or inside because there is no independent entity in the shape of a concrete individual, there can be no talk of neither stimulation or motivation. Neither is needed for learning to take place. On the contrary, we learn what we need to in every moment of existence in which we become intra-actively in relations, and so to exist is to learn.

Second, and in a less radical vein, if one instead insists on retaining the concept of learning, it will at the very least have to be rethought in light of the fact that there are no independently existing entities as everything becomes in relations due to the way in which the world's worlding happens intraactively. As seen in Chapter 4, such an understanding is prevalent among phEmaterialist scholars who argue that learning is "not simply an individual cognitive process set in motion from within each individual child" (Lenz Taguchi, 2010, p. 90). Rather, "the force of learning does not separate thinking and bodily doings from objects, matters, time, spaces and places" (Lenz Taguchi, 2010, p. 90). Instead,

> learning is a collaborative process of meaning-making taking place between human subjects, their bodies and things, in specific places and spaces around questions and problems arising in the moment or event of investigation, constituting important turning-points in the event. (Lenz Taguchi, 2010, p. 90)

Once we realize that all bodies, human, nonhuman, and more-than-human alike, as well as spaces, matter(s), and discourses exist as entangled webs of intra-acting relations, we have to accept that learning and education, including PBL, must be reimagined along with the way we think about and do research on these matters so as to take the relational nature of the world's differential becoming and everything that emerges via agential cuts into account.

Implications for ideas about pedagogy and education

What has become evident by now, I hope, is that learning from an agential realist perspective is understood in a way different from how it is conceived in cognitivist approaches to learning, such as constructivism, for example. As a result of this different notion of what learning is and how it happens, the idea and purpose of pedagogy as the intentional educational processes aimed at enhancing learning also change. Thus, from a posthumanist perspective, pedagogy "entails the expansion and intensification of the assemblages within which the student is being connected" (Postma, 2016, p. 319) in such a way that the mode of becoming is enhanced. This means that, in addition to being embodied and embedded (Braidotti, 2013), learning is simultaneously

> a creative and aesthetic practice that is generative of new thought through relational processes that entangle recognition and response to expected and/or unexpected material phenomena, which cannot exclude more-than-human others such as plants, insects, and animals. (Rotas, 2016, p. 180)

The point about learning happening everywhere all the time should not be used to argue that we don't need education! However, as Bodén reminds us, in light of posthumanist thinking,

> education is portrayed as practices which are entangled, relational, and messy; practices which emerge from the relationality of myriad agents–both human as well as nonhuman. This highlights a shift in which agency is no longer considered an attribute of teaching or learning subjects, but instead considered as an emergent force, connected to and emanating within particular practices. (Bodén et al., 2021, p. 3)

Education, while it cannot provide guarantees, is meant to teach/highlight specific things for very specific purposes and reasons. The problem is that policymakers and politicians typically assume that there exists a linear, causal relationship between input and output in educational contexts so that it is possible, based on the result of a standardized test, to say something meaningful about a student's learning, just as they seem to assume that there is a similar simple relationship between teaching and learning. If only this misconception could be exorcised, we might begin to see more clearly that there is a need to focus more intently on discussions about the purpose of education. Indeed, how we think about the purpose of education, that is, what we want/wish/imagine/intend our educational efforts to produce and why matters greatly. Once this has been established, we can begin to think about questions related to *how,* while always mindful of the fact that there can never be a linear causal relation between what the teacher teaches/intends the students to learn and what the students take away/learn. Indeed, even if the teacher's intentions and methods of teaching could be perfectly aligned to ensure the most optimal and effective learning process, there are so many factors involved in every specific teaching and learning situation that they can never be fully controlled. The student might become distracted for some reason, the teacher might be unable to teach in a way that the student understands, and so history, culture, materiality, etc., all play a significant role in their entangled relations and will always affect what results from the teacher's efforts to teach something.

While the notion of change is fundamental to understandings of education—in particular in and to traditional conceptions of education that rely heavily on the idea that the primary purpose of education is to instantiate *cognitive* change in the *individual* student, cf., for example, Schunk (2014) as quoted above—such change need not be the primary purpose of education. According to Biesta (2015b), because "purpose is constitutive of education" (p. 77), education cannot but raise questions about its own purpose. However, if this is how education is understood, and if learning is the goal of education, then, due to the inevitable teleological character of education

(Biesta, 2015b), education may be understood as a causal process of upward enhancement (Bodén et al., 2021).

Implications for theories, practice, and research on PBL

It is evident from the terms typically employed to describe problem-based approaches to learning that they are also grounded in a particular conception of the human—one in which human beings are recognized as conscious, rational, and separately existing individual subjects. Because the understanding of humans implied in problem-based pedagogies' goals of promoting the development of critically thinking, collaborating, and self-directed individuals are closely tied to ideas about individual subjectivity, consciousness, rationality, and autonomy, it follows that problem-based approaches to learning are steeped in the general anthropocentric, humanist ideas about what it means to be human. In such a humanist understanding of the relationship between the human and nonhuman, everything nonhuman remains inert, lying passively in wait to be used by more or less competent humans. Indeed, problem-based or otherwise mainstream thinking and research about educational matters typically entertain a particular idealized notion of the student as an average abstract notion without markers of identity existing in a neutral social setting. Indeed, it may cause teachers, policymakers, researchers, and various other stakeholders to lose sight of how actual students, embodied and embedded[30] (Braidotti, 2019a), become in relation to the specific didactics and policies, material circumstances and methods of inquiry put in place to teach, assess, manage, and study educational practices. On the other hand, developing an agential realist or otherwise posthumanist notion of higher education might allow us to become better attuned to

> the unheeded effects of the knowledge-political entanglements that shape and inform educational practice, and they might enable us to better understand how extendings, or similar empirically situated unheeded effects, simultaneously highlight and occlude, applaud and criticise, recognise and ignore aspects of the practices of our objects of knowledge. (Sauzet, 2021, p. 95)

Problem-based learning is a distributed process. This means, for one, that learning cannot be regarded as a purely cognitive activity. Instead, what is experienced as

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[30] Understanding students as embodied and embedded is inspired by the posthumanist idea introduced by Braidotti to describe the conceptual foundation of what she calls the critical posthumanities. According to Braidotti (2019a), the critical posthumanities, which are based on a monistic ontology, "implies that the posthuman knowing subject has to be understood as a relational embodied and embedded, affective and accountable entity and not only as a transcendental consciousness" (p. 31).

learning does not depend on an individual's cognitive capacity, first of all, because there can be no such thing as isolated cognition. We are *of* the world, as Barad puts it. As such, we are intra-actively entangled with the environment and all the human, nonhuman, and more-than-human agencies that populate it to the extent that we become only as a consequence of the relations that exist prior to the coming into being of any subject or object. Barad (2007) writes,

> It is important to note that the "distinct" agencies are only distinct in a relational, not an absolute, sense, that is agencies are only distinct in relation to their mutual entanglement; they don't exist as individual elements. (p. 33)

Such a relational way of thinking about bodies and environments, in turn, would allow us to think of PBL and problem-based project work as territorializations that function to produce students, teachers, and other actors relationally according to the particular flows of affect that are produced in their intra-actions. By opening ourselves to the influence exerted by nonhuman agencies, we gain a new perspective from which to understand processes of learning, and we come to realize that an anthropocentric focus will not allow us to develop an adequate understanding of the complex processes that go on within PBL.

The result of shifting one's perspective in the way suggested in this project is the emergence of a new understanding of how to develop and train teachers' competencies and teaching skills; for professional development, that is:

> In adopting a rhizomatic perspective we have to accept that there is no linear developmental 'track' for colleagues to follow with arbitrary end-points for 'assessment', or professional standards to which they should align – in the sense typically understood as 'curriculum'. (Kinchin et al., 2021, p. 95)

Another issue related to thinking about PBL practice with agential realism has to do with the implicit

In PBL, members of the same group of students receive not only the same amount and level of support; they actually receive the exact same support. Supervisors usually only meet with the group as a whole, and while some supervisors probably make deliberate efforts to check if all members of the groups they are supervising are up to par and have an adequate understanding of the problem they are working on, others assume that if one student in a group seems to have a good grasp of the theories, methodologies, and background relevant to the problem the group is working on, this level of understanding is shared by the other students as well. Nevertheless, students do not always perform equally well on exams which tells us that this assumption is

wrong. Still, many supervisors seem in practice to supervise groups as if all of the group's members are on the same level as those students who speak the most. We do this even though most of us will readily admit that we know that one student's level and knowledge cannot be taken as representative of all group members' level of knowledge and depth of understanding. Knowing this, we may defend our (negligent) practice of supervision with reference to the popular PBL dictum stating that students are responsible for their own learning. In other words, we hide behind the assumption that students are grown-ups, autonomous, self-directed, and rational enough to ask if there are things they do not understand, knowing very well that this is not what the average student tends to do. Besides, the notion of students as autonomous, self-directed, and rational individuals is based on the liberal idea of equality in which equal opportunities are thought to produce fair chances for all involved.

Such ideas, however, amount to little more than an abstract fantasy. Furthermore, most supervisors are keenly aware that the hierarchy that inevitably exists between students and themselves will prevent many, if not most, students from voicing their concerns about a lack of understanding. Thus, the framework for learning put in place by our institutions of higher education and their policies and established habits of pedagogical practice, which were supposed to promote learning, openness, equality, equity, autonomy, motivation, etc., actually often ends up hampering these things instead.

As shown in Chapter 4, few studies have combined the topics of agential realism and PBL. Future research would do well to consider how it might be possible to engage more deeply with the nitty-gritty of PBL by studying how micro-moments come to matter using alternative methods to generate the kind of knowledge that can inspire teachers and researchers to think about and re-think their own practices and interactions with students and everything else that influences PBL.

> One central consequence of an onto-epistemological perspective is that there can be no non-contextualised and universal 'best ways of learning' when applied to education. What we are engaged in, in pedagogical practices, can simply be understood as constituting habits – habits of teaching and learning that are tied to material-discursive conditions of things and matter, as well as ideas and notions of learning. (Lenz Taguchi, 2010, p. 49)

Thus, we need to pay attention to a great many more human, nonhuman, and more-than-human factors that influence the learning process. And! If we really intend to take the consequence of agential realist ideas about learning, teaching, education, and subjectivity, we must radically change our practices, including those of research.

As pointed out in Chapter 1, it is not uncommon for educational scholars to lament the current state of higher education and complain that universities increasingly suffer under the pressure exerted by the marketized neoliberal system. This pressure entails that most universities today are governed according to a corporate logic characterized by a firm focus on competition, consumerism, and commodification. Implementing initiatives based on neoliberal ideas has resulted in a hollowing out of the mission of higher education in general while promoting impoverished and instrumental notions of teaching and learning (Kinchin et al., 2021).

To a great extent, the neoliberal logic has also come to characterize, if not control, research efforts directed as they often are toward efficiency, accountability, and evidence-based, quantifiable results. On the other hand, deep critical efforts informed by theory seem to have become marginalized despite (or perhaps because of?) their potential to expose the politics undergirding the neoliberal shifts and their effects in and on higher education. The problems described here are no doubt serious. However, the reason why they are serious is not just that instrumental notions about teaching and learning prevail. Instead, the problem identified here is of major concern both for and because of the times in which we live and the grave challenges that face us at this critical point in time.

> There is no longer a public sphere. There is no longer a private sphere. There is only and everywhere a neoliberal sphere. Neoliberalism is not only the dominant model of economic and political relations across social institutions and practices, it is the ubiquitous modus operandus of the Anthropocene in which postsecondary education finds, constitutes, and embattles itself today. (Gildersleeve, 2017, p. 286)

One could say the same thing about PBL, as a matter of fact. Indeed, to be able to confront the challenges we face at this time, not only must PBL itself be reimagined so that thinking about PBL comes to involve the development of new ways of thinking about learning, pedagogy, and education as well as new understandings of students, teachers, and curriculum that reflect the complexity of the educational task facing us at this time, it must also contribute to the promotion of new ways of thinking for students. Thus, to remain relevant, rather than focusing exclusively on employability, PBL needs to teach students new ways of thinking, new concepts, and new social imaginaries to enable the pursuit of more socially just and ecologically sustainable ways of living.

At this point, I think it is clear to most that we cannot continue to do what we have done for the past 200 years, nor can we continue to think the way we have thought about humans' role and place in the world for the past 200 years since the

anthropocentric ideas and the neoliberal practices these actions and thoughts have produced are undeniably the main reasons for the unsustainable situation of planetary distress in which we now find ourselves. It follows that as educators, we can no longer participate in the promotion of the prevalent western ontology in which the world is seen as a resource for humans to master and exploit for whatever purposes they see fit. That said, and keeping in mind the point about the othering of what is considered excluded, it is important to remember that

> A pedagogy for social justice does not focus on empathy, compassion, charity, care or equality where the other is treated as deficient in some way. These pedagogies may too easily lapse into the certainty of the knowledge of who the other is and what they need. The emphasis should rather be on the creation of the conditions which could enhance the ability of everyone to produce their own desires, to make their own connections and to become different. (Postma, 2016, p. 325)

Rereading the quotes I presented in Chapter 2 about how PBL may contribute to producing critical change agents who will be willing and able to create real change in the direction of a more socially and ecologically sustainable and just future reminds me of a statement made by Daniel Herwitz in his recent book about the political power of visual art. Discussing the works of Banksy, the (in)famous English street-based artist, Herwitz (2021) writes,

> As examples of the hegemonic nature of art markets, we may turn to the way those artists, known for their edginess and assault on capital forces, become assimilated by the very thing they criticize, their criticisms turning into the latest market brand, there to titillate the 1 percent that is buying. (p. 152)

In much the same way as Banksy, who set out to disrupt and contest the art world and who was out to make an oppositional political move like the ones described by Chambers (1991), ends up as an object of desire for/in this art world, PBL was also meant to be a disruptive force in the educational world. Hence, problem-based learning was meant to disturb habitual thinking and education to bring about change. However, like Banksy, PBL becomes an object of desire, a tool to reproduce the status quo of a neoliberal education market. Herwitz (2021) writes,

> I want to say his [Banksy's] work now lives a double life—as a political attack on the artworld and as the latest brand item, fetish, desirable quantity for those it attacks. … This is artworld politics. The way genuine attacks on the system become incorporated into it and desired by it. Edginess has market value in the right circumstances. (p. 154)

In keeping with what I've argued above about the implications of thinking with agential realism for ideas about learning, teaching, pedagogy, and education writ large, answering the question about what thinking about PBL with agential realism does is actually quite simple at this point. Hence, the answer is simply that it, thinking about PBL with agential realism that it opens Pandora's box to a myriad of questions that shake and perhaps undermine the unstable foundational assumptions of learning, teaching, education, and pedagogy that inform PBL. Such questions may serve to They are, in effect, similar to the discovery of platypuses that frustrated and upset the understandings of species up until that point. Such discoveries and the new ideas they foster remind (and warn?) us that

> The guarantee that our hypotheses are "right" (or at least acceptable as such until proved otherwise) will no longer be sought for in the a priori of the pure intellect (even though the intellect's most abstract logical forms will be saved) but in the historic, progressive, and temporal consensus of the Community. Faced with the risk of fallibilism, the transcendental is also historicized; it becomes an accumulation of interpretations that are accepted, and accepted after a process of discussion, selection, and repudiation. This foundation is unstable, based on the pseudo-transcendental of the Community (an optative idea rather than a sociological category); and yet it is the consensus of the Community that today makes us favor Kepler's abduction rather than Tycho Brahe's. Naturally the Community has supplied what are called proofs, but it is not the authoritativeness of the proof in itself that convinces us or prevents us from falsifying it; it is, rather, the difficulty of calling a proof into question without upsetting the entire system, the paradigm that supports it. (Eco, 2000, p. 98)

While Eco is no doubt right about the fact that the thought of having to rethink the entire system of what we believe renders us rather reluctant to efforts and other events calling us to disrupt our foundational assumptions about the world, it is nonetheless also the case that sometimes "the world kicks back," as Barad (1998) would have it. That is, although we know because we are of the world, sometimes our theories and foundational assumptions have to be reconfigured because those theories and assumptions, which are cuts that temporarily separate, are confronted with aspects of the world, like the discovery of platypuses, for example, that force us to change our mind and beliefs about the world.

The unexpected ways in which PBL sometimes goes awry that I have described in the four papers constitute just such incidents of the world kicking back and may be characterized as *glitching* phenomena in and of PBL when glitching is understood in the sense suggested by Linghede (2018), who explains that glitching may be seen as

"a messy phenomenon that breaks, crashes and confuses the conventions" (p. 570). Thus, in the case of the unanticipated mishaps observed during problem-based project work, the unforeseen incidents constitute just such glitches as they serve to question and problematize our habitual ways of thinking about PBL, how it unfolds, and what it produces. But there are more glitches to be found in the work done to produce the insights of this project. Hence, the realization that the anthropocentrism of conventional fieldwork in which humans and what they/we do, think, and say are primary points of concern excludes everything nonhuman and more-than-human from mattering in and to the research endeavor may also be understood as a glitch. We might think of this particular glitch as a kind of methodological or epistemic glitch, breaking, crashing, and confusing the methodological and epistemic conventions of ethnographic fieldwork.

Judging by the widely held beliefs among scholars and educators about what PBL can produce, as well as both the research findings and the way researchers conduct studies into issues related to PBL, one might easily be led to believe that employing problem-based approaches to learning guarantees the development and improvement of students' abilities for critical thinking, collaboration, and self-directed learning, cf., for example, Kumar and Refaei (2017), Cockrell et al. (2000), and Antepohl and Herzig (1999). Furthermore, as mentioned in Chapter 2, PBL is often promoted as a way of preparing employable and agile workers for entering into the workforce of the ever-changing globalized market, cf., for example, Servant-Miklos and Noordegraaf-Eelens (2019) and Suarta et al. (2017). While the descriptions of the unexpected events presented in the four papers that serve as my project's point of departure cannot be used to disprove the popular claims about PBL and its positive effects on critical thinking, collaboration, self-directed learning, and employability, the descriptions of the unexpected events cannot but plant a seed of doubt about the extent to which PBL, as it is organized and practiced in the context of higher education today, promotes the promised skills and competencies while also contributing to students' acquisition of relevant knowledge.

Investigating PBL by thinking about it with agential realism produced the descriptions of the unexpected events presented in the four papers, which in turn led to the insight that PBL needs to be reimagined/reconstructed/reconfigured because these events demonstrate that the foundational assumptions on which PBL rests are not as robust as they may seem at first blush. Staying with the trouble outlined in the preceding paragraph about the challenges of PBL that remain to be addressed leads us when all of the arguments I have presented in this kappa are taken into consideration, to the realization that neither pedagogy, didactics, nor any particular form of organization alone, will do the trick, so to speak. Indeed, sometimes it may look like a pedagogy, didactics, or form of organization such as PBL works as intended. At other times, it

may look as though it doesn't. The crux of the matter is that a given pedagogy, didactics or form of organization will only work (if such an expression is even sensible) when combined with a host of other and deeply entangled things that we can neither know nor control simultaneously. In fact, in keeping with agential realist ideas, such things and the way they affect and are affected may even be indeterminate! If we accept this conclusion, then the present project has done nothing to contribute to developing more effective methods for conducting PBL, just as the conclusion that sometimes it works and sometimes it doesn't is hardly helpful for someone looking for concrete solutions or interventions for improving practices in order to optimize students' learning. This dispiriting conclusion notwithstanding, my project is neither useless nor has the time and effort invested in doing it been in vain.

PBL re-imagined

Several years ago, Heidegger identified the dangers of relying on traditions when he claimed that

> When tradition thus becomes master, it does so in such a way that what it transmits is made so inaccessible, proximally and for the most part, that it rather becomes concealed. Tradition takes what has come down to us and delivers it over to self-evidence; it blocks our access to those primordial "sources" from which the categories and concepts handed down to us have been in part quite genuinely drawn. Indeed it makes us forget that they have had such an origin, and makes us suppose that the necessity of going back to these sources is something which we need not even understand. (Heidegger, 1962, p. 43)

At this point in time, that is, in times of what Braidotti (2022) calls "the posthuman convergence," Heidegger's point seems more highly topical than ever, not least because by now, it has become exceedingly clear that we cannot continue living the way that caused the predicament in which we now find ourselves in the first place. Indeed, according to Braidotti (2019b), we now live under the influence of what she calls the posthuman predicament, which has emerged as a consequence of three events: (1) the sixth extinction, (2) the fourth industrial revolution, and (3) advanced capitalism whose combined effects characterize the Anthropocene. The term "posthuman predicament," as Braidotti employs it, is thus used to designate the present historical condition of the Anthropocene, which is characterized by interrelated changes to the social, environmental, and technological aspects of life. The challenges of the posthuman predicament, among them the ongoing transformations of the human, Braidotti submits, calls for the kind of critical

interventions that posthuman feminism and posthumanist thinking are well-positioned to deliver. Braidotti writes,

> The feminist agenda of the posthuman convergence is the analysis of the intersection of powerful structural socio-economic forces, led by technological development, in combination with equally powerful environmental challenges, centred on the climate crisis. These multiple factors join forces in dislocating the centrality of humans and require new definitions and practices of what being human may mean. (Braidotti, 2022, p. 5)

The term "posthuman convergence," as Braidotti employs it, describes the convergence of post-anthropocentrism and posthumanism as a critical response to the posthuman predicament in which we presently find ourselves that combines the ideas of posthumanism with those of post-anthropocentrism in order to think differently about what being human might mean when the confining shackles of anthropocentrism and Humanism are broken. Effectively addressing the challenges of the posthuman predicament, however, requires

> the creation of new ways of thinking, new concepts and social imaginaries that reflect the complexity of the times and the pursuit of affirmative ethics, as well as criticism. This requires an affirmative, not a defensive or nostalgic approach. (Braidotti, 2019b, pp. 91)

If higher education, including problem-based higher education, is to contribute to interventions, innovations, as well as new concepts and social imaginaries the way Braidotti suggests, a drastic reconfiguring of higher education in general and PBL, in particular, seems to be required since in their current form it seems clear that they contribute more to reproducing neoliberal agendas than to creating possibilities for disrupting and resisting the values and ideologies of advanced capitalism that result in a self-perpetuating cycle of increased consumerism, competition, commodification, and corporatization. To disrupt this mechanism via educational initiatives, however, requires new ways of thinking and doing higher education and PBL, and that demand, in turn, requires us to fundamentally recalibrate ideas about the purpose and function of higher education. Certainly, relying on tradition and dogmatic notions about higher education, PBL, learning, teaching, and pedagogy—doing what we have always done—is not an option if we wish to create opportunities for bringing about positive change in the direction of increased sustainability and social justice.

Thinking something different differently, the way I have attempted in this project might inspire practitioners and researchers to adopt new ways of approaching and understanding the objects and objectives of their research. This, in turn, might be seen

as a concrete example of next practice within research on PBL in the sense that it might inspire changes in both the theoretical and methodological frameworks needed to develop new PBL models and practices.

PBL, that is, theory, practice and research, has to be (or become?) malleable enough to accommodate new and emergent situations and conditions—those brought about by major global events as well as those necessitated by local policy changes. Indeed, speaking with Deleuze and Guattari (2013), we might say that if we understand subjects as nomadic, then pedagogies dealing with such subjects must themselves become nomadic, that is, in flux, evolving, becoming to remain relevant.

Importantly, if problem-based pedagogies are to evolve and retain their relevance, especially if that relevance is connected to an objective of contributing to the education and formation of critical change agents and increased conscientization, as some proponents have claimed to be its goal, then a critical discussion about both the how and why of problem-based pedagogies needs to be sustained. While this point may seem counterintuitive at first blush, critique is nowhere near as dangerous as its absence which is bound to entail calcification and dogmatic thinking that is likely to produce a dominant discourse foreclosing possibilities for thinking and doing something different differently.

The recognition brought about by thinking with agential realism that humans, nature, and materialities are not separate but emerge in and through entangled relations allows new perspectives on educational matters to emerge. Indeed, thinking with agential realism shows us that and how we need to rethink our pedagogical approaches, among them PBL, so that we can begin to develop more nuanced, ethical, and embodied pedagogical practices that align with posthumanist understandings of learning and teaching, pedagogy and education as well as of what it means to be human.

Hopefully, in this way, this project will be able to go beyond promises about what transformations *may* result in the future if only we start thinking differently. Thus, my ambition has been to produce insights about PBL in higher education that are different from the ones commonly accepted and to do so differently in order to open up new possibilities for human and nonhuman agencies to become in sustainable and affirmative ways, thereby bringing about more ethical and just realities.

Imagine! It's easy if you care to try

Imagine what would happen if we stopped grading students. Imagine what would happen if there were no limits on the amount of higher education a person could enroll in. Imagine what would happen if (higher) education everywhere was free. Imagine

what would happen if students were free to combine courses to reflect their true interests. Imagine what would happen if no jobs were paid more than others. Imagine what would happen if all positions and functions were considered equally valuable. Imagine what would happen if competition was replaced with collaboration and community. Imagine what would happen if we stopped measuring the value of education in economic terms. Imagine what would happen if the majority of students could be convinced to appreciate complexity in and by itself. Imagine what would happen if most people realized and acknowledged the fact that existence is an entangled affair and lived accordingly.

CODA

Speaking truth to (em)power

> Feminists, post-colonial scholars and queer theorists who have developed and adopted new materialist perspectives on social and political engagements find in them a framework that is materially embedded and embodied (Braidotti, 2011, p. 128) and can be used both to research the social world and to seek to change it for the better. (Fox & Alldred, 2021, p. 3)

In recognition of Fox and Alldred's point about the transformative potential inherent in posthumanist and new materialist perspectives, in this final part of this kappa, I offer a brief recap of the purpose, point, and problems of my project, along with five short sections on the projects contributions, the privilege of philosophy, books and hooks, hopes, and limitations.

Recap

Inspired by Barad's agential realist position, in this project, I have tried to open up new possibilities for engaging with PBL and problem-based project work and the implications of thinking about such pedagogical approaches with agential realism. Thinking with agential realism about PBL has inspired me to investigate how various relationally entangled human, nonhuman, and more-than-human agencies that come into existence as students and teachers, materials, and discourses due to the agential cuts enacted through intra-active relationalities. Such an approach, in turn, may render us more attentive to the nuanced, ethical, embedded and embodied ways humans, nature, and materialities emerge in and through mutually sustaining, co-constitutive relationalities. As such, thinking with agential realism provides a powerful approach and point of departure for questioning and contesting the conventional understanding of PBL and problem-based project work in higher education.

Contributions

This project's contribution has been twofold in the sense that it has brought about an empirical as well as a theoretical point with consequences for how we might think about PBL on the one hand and agential realism on the other. Thus, first, what I have presented in this kappa, based on an affirmative critique of the conventional understandings of PBL, is intended, via a cartographic approach informed by agential realism, to contribute to producing possibilities for reimagining PBL so that it may be

thought otherwise and done differently in the future. More specifically, the insights presented about the consequences of thinking about PBL with agential realism for theory, practice, and research on PBL can be used to re-read, re-think, re-route, re-turn, and re-imagine PBL and hence disturb and challenge educators' and researchers' assumptions about what is or what could be important in and for problem-based higher education. If successful, such an affirmative critique might contribute to cultivating a heightened critical awareness of the need to (continue to) question and contest the status quo of PBL to keep it from sedimenting and turning dogmatic.

Second, this kappa has also been devised to try to challenge how agential realism has come to be understood and not least employed in educational research. In particular, I have argued that the consequences of thinking about educational or any other matters with agential realism are far more radical than many educational researchers seem (willing) to acknowledge. Certainly, the implications of such a radical reading of Barad's position are neither pleasant, convenient, nor practical. Quite the opposite, in fact! Offering such a re-reading is bound to stir up controversy and be both unpleasant, inconvenient, and highly impractical. These obstacles notwithstanding, researchers must engage with the implications of subscribing to the concepts of the agential realist position, and not just with some of them but rather with all of them in the greatest possible depth. If we expect research performed in this vein to be taken seriously and wish for it to make a difference in the world, we must accept that we are not at liberty to pick and choose between its conceptualizations and their consequences. Rather, we must engage with all of them, think about them, and find ways to put them to use in response-able ways. Anything else would be ethically untenable. As Barad (2007) reminds us,

> Intra-actions are agentive, and changes in the apparatuses of bodily production matter for ontological as well as epistemological and ethical reasons: different material-discursive practices produce different material configurings of the world, different difference/diffraction patterns; they do not merely produce different descriptions. Objectivity and agency are bound up with issues of responsibility and accountability. Accountability must be thought of in terms of what matters and what is excluded from mattering. (p. 184)

In the end, reconceptualizing PBL in this way, that is, in terms of a relational understanding of learning, pedagogy, and education, may produce novel insights for a number of the most crucial aspects of problem-based education, including, but not limited to, curriculum, institutional policies, teaching, learning, and assessment.

On the privilege of philosophy

If we accept Barad's claim as I think we should about how knowing and being cannot be separated, along with Braidotti's contention that we are all in this together, but we are not one and the same because our becoming is embodied and embedded, then we also have to acknowledge that ideas will be easier to swallow under some conditions as opposed to others. Thus, in contexts deeply affected by the consequences of social and ecological injustice where people struggle to survive, it may prove beyond difficult to convince people of posthumanist ideas for greater sustainability since their living conditions do not provide the necessary room and sense of stability for such ideas to come to fruition. Indeed, if you were fighting for survival, if you were starving, or otherwise deprived of possibilities for satisfying your basic needs, do you think you would have the time and energy needed to engage with abstract philosophical ideas such as those put forth by Barad? Philosophy when thought of in those terms is a luxury that is not widely available to everybody in equal measure. It follows that social justice is desparately needed. However, to be able to bring about more socially just conditions, it would seem we need to dismantle neoliberalism and dispense with capitalism! And since time is of the essence, we need to do so quickly. Now is not the time for laziness on the part of academics. And so, we urgently need everybody to become vigilant activists and not the slow kind, even if that idea seems a befitting and sympathetic possibility of retaliation against a neoliberalist system on speed. The question that remains to be answered in light of the points made about higher education in Chapter 1 is whether higher education will contribute to or rather hamper such efforts.

Books and hooks

The idea conveyed above about philosophy as a luxury that is only available to the privileged few, typically white men in university positions in the global north seems to resonate with hooks' point about the function of theory both inside and outside the academy when she submits that

> It is evident that one of the many uses of theory in academic locations is in the production of an intellectual class hierarchy where the only work deemed truly theoretical is work that is highly abstract, jargonistic, difficult to read, and containing obscure references. … It is especially ironic when this is the case with feminist theory. And, it is easy to imagine different locations, spaces outside academic exchange, where such theory would not only be seen as useless, but as politically nonprogressive, a kind of narcissistic, self-indulgent practice that most seeks to create a gap between theory and practice so as to perpetuate class elitism. (hooks, 1994, p. 64)

In the fall of 2019, I enjoyed a four-month stay abroad in the U.S. at the University of Missouri in Columbia, MO. During this time at Mizzou, I was fortunate to be enrolled in a course on narrative inquiry taught by Professor Candace Kuby. There were twelve students in the class, which met for three hours every Monday. A couple of months into the semester, we engaged in a lively discussion about access, that is, about the importance of research being made accessible to a wider audience outside the confines of academia. The question that concerned us most regarding this issue seemed to be what it would actually take for research to become accessible to more people so that they might benefit and learn from the research produced by academics inside the thick walls of universities. Why, we wondered, are most people not only oblivious but also indifferent to those texts that we find so important, texts with the transformative potential to change the world if only enough people would read them? "But books are readily available and accessible in many public places," one student objected and added: "And not just in libraries. In coffee shops and restaurants too… and barbershops, for example!" There was a brief intermezzo of silence before another student responded. "Books like this?" she asked rhetorically, picking up a copy of bell hook's celebrated work, *Teaching to Transgress,* from the heap of books assembled in a messy pile in the middle of the huge oval table at which we were seated. The subtle downplayed delivery of the deceptively innocent-sounding question notwithstanding, the question combined with the expressive yet casual gesture with which she put the book with its screaming bright yellow cover on display seemed to drive home the point of her counter so effectively that it left her disarmed opponent with no other option than unconditional surrender. We all knew that the answer to her question was no, not books like that.

Hopes

My hope is that the insights I have presented based on the probing of the cracks of PBL in its present form will be able to function as a map to inspire and guide new thoughts about PBL and problem-based project work so as to open up horizons for problem-based pedagogies-to-come. The ideas and thoughts presented here are thus both critical responses to the present state of PBL and problem-based project work as I see them, as well as dreams for a different future. Thus, the ideas presented as part of my project implicitly reflect what I imagine a different, more just, and sustainable future might look like and how we might contribute to efforts to begin, however modestly, bringing about the necessary changes for the imagined vision to transform into tangible reality.

While painfully aware that such attempts are likely to fail thanks to the nature of language as well as the insurmountable challenges posed by the structural hierarchies imposed by the micropolitics of expertise and unequal institutional relations of power,

this kappa nevertheless constitutes an attempt to think differently about PBL in higher education. Thus, my ambition has been to uncover something different about PBL in higher education and do so differently in order to open up new possibilities for human, nonhuman, and more-than-human agencies to become in sustainable and affirmative ways, thereby bringing about more ethical and just realities.

Limitations

While I might have spent several volumes on describing and discussing the many limitations that impede both the posthumanist ideas for which I have advocated as well as the particular ways in which I have approached the questions that I promised to address as part of my project, at this point, I limit myself to discussing just one. Indeed, since I have already hinted at and touched upon many of the other limitations that might be used to critique the arguments I have made and the conclusions I have drawn at various points throughout this kappa and the four papers, I restrict my final discussion to addressing one additional limitation that I feel it is crucial to engage with if there is to be any hope of inspiring socially just transformations and widespread change. At the very least, I believe that entertaining this idea by re-visiting and re-turning it is well worth the effort needed to do so.

Maybe, just maybe, the root of the problems we are faced with during this time, is not so much a lack of knowledge per se but rather the fact that the right kind of knowledge, that is, the kind of knowledge that would be able to seriously impact, that is, to create radical change on a massive scale in and to the world of which we are part, is never made available to the vast majority of people outside the ivory towers of academia. Thus, the most important issue we face as academics today might involve getting involved in sharing and disseminating knowledge. As Barad remind us

> Particular possibilities for (intra-)acting exist at every moment, and these changing possibilities entail an ethical obligation to intra-act responsibly in the world's becoming, to contest and rework what matters and what is excluded from mattering. (Barad, 2007, p. 178)

Seizing such possibilities for intra-acting responsibly in the world's becoming, however, also involves speaking truth to power, and speaking truth to power in turn also requires one to speak truth to the kind of power vested in posthumanist theory and research. Indeed, refraining from taking up this responsibility would be irresponsible. In other words, if academics do nothing to transgress the borders of academia, staying close to likeminded members of the exclusive academic club of the privileged few, the ideas fostered and cultivated within those exclusive circles are unlikely to effect any serious change in the grand scheme of things. In light of the

gloomy prospects for the future we can already discern on the horizon as they are rapidly approaching, academics can no longer afford for their noble untainted ideas to seep slowly into the minds of policymakers outside the universities. Rather, finding ways of impacting things outside academia, seems more urgent than ever. Indeed, it seems obvious that the knowledge produced by academics must be disseminated more broadly, more effectively, faster and sooner to produce the kinds of changes that we need… that we need to survive! Taking action on this issue, I believe, is what real response-ability looks like for scholars deserving the title of posthumanist. In that sense, academics must become the killjoys of the world. Not just in the way advocated by Ahmed but also as witnessed in the rage of Thunberg.

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No More Neat Fugues

cutting paper cut
cutting together apart
go on, cut it out

return, turn, re-turn

let the folding folds unfold

mattering matters