

## Article

# The Beautiful Risk of Collaborative and Interdisciplinary Research. A Challenging Collaborative and Critical Approach toward Sustainable Learning Processes in Academic Profession

Jonas Christensen <sup>1,\*</sup>, Nils Ekelund <sup>2</sup>, Margareta Melin <sup>3</sup> and Pär Widén <sup>4</sup><sup>1</sup> Department of Social Work, Faculty of Health and Society, Malmö University, 205 06 Malmö, Sweden<sup>2</sup> Natural Science, Mathematics and Society, Faculty of Education and Society, Malmö University, 205 06 Malmö, Sweden; nils.ekelund@mau.se<sup>3</sup> Faculty of Culture and Society, School of Arts and Communication, Malmö University, 205 06 Malmö, Sweden; margareta.melin@mau.se<sup>4</sup> Culture, Languages and Media, Faculty of Education and Society, Malmö University, 205 06 Malmö, Sweden; par.widen@mau.se

\* Correspondence: jonas.christensen@mau.se

**Abstract:** In this article, we aim to identify and explore possibilities and challenges of academic interdisciplinary capacities and ethos. The objective is that this knowledge could be used both in future interdisciplinary research projects and in educational settings. We achieve this through self-reflective learning processes among a group of interdisciplinary scholars from four distinctly different subjects. The method used is an autoethnographic and empirical self-reflective approach to data collection, analysis and deconstruction of professional learning processes. This also serves to establish research methodological trustworthiness and authenticity. The results show that interdisciplinarity is undervalued by grant-giving institutions and the academic system, in general. It also entails time-consuming and risky research practices. However, interdisciplinary and collaborative research creates a more innovative and stimulating learning environment and enforces new ways of thinking and doing, in ascertaining each individual's knowledge and competences. We argue that a long-term interdisciplinary and collaborative research process could enhance and raise a critical thinking and creative consciousness among scholars, contributing to a more holistic, sustainable and socially robust learning in research and higher education. Finally, we conclude that this academic interdisciplinary capacity and ethos could be framed and enhanced by the notion of Challenge-Based Learning.

**Keywords:** interdisciplinarity; collaboration; sustainability; autoethnography; self-reflective; critical thinking; critical doing; interdisciplinary ethos; learning capacity; Challenge-Based Learning



**Citation:** Christensen, J.; Ekelund, N.; Melin, M.; Widén, P. The Beautiful Risk of Collaborative and Interdisciplinary Research. A Challenging Collaborative and Critical Approach toward Sustainable Learning Processes in Academic Profession. *Sustainability* **2021**, *13*, 4723. <https://doi.org/10.3390/su13094723>

Academic Editors: Maria Amélia Martins-Loução and Adriana Del Borghi

Received: 11 March 2021

Accepted: 20 April 2021

Published: 23 April 2021

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

Higher education and research on all levels and on a global scale are challenged by the notion of Education for all (UN Sustainable Development Goal (SDG) 4) [1]. Therefore, it is critical to design learning for future sustainable academic professions and create robust structures to enable every individual's motivation and driving force to learn. Facing these issues is not a simple matter to research and higher education, in what Biesta [2] defines as a beautiful risk of education—a statement qualifying as also valid for research. This poses new and intriguing questions that demand answers, concepts and practices that go beyond scientific disciplinary knowledge borders [3–11].

In order to address such complex academic issues, we have attempted to do collaborative and interdisciplinary research from the perspective of what is called Challenge-Based Learning (CBL). We argue that scholars need self-awareness to develop a critical understanding ability to identify both the limits and possibilities of interdisciplinary knowledge. We furthermore argue for and aim to contribute to making interdisciplinary research in order to sustain lifelong learning.

### 1.1. Background to Interdisciplinary Learning Ethos

In 2008, the multinational technology company Apple presented a paper where it called for a new approach to teaching and learning for a new digital generation and used the concept of CBL [12]. This has latterly been appropriated by higher education institutions, and within that framework, CBL could be seen as a cultural transformation involving both research and education, staff and students. CBL could be seen as a holistic and transferable learning model and a knowledge-creation perspective, in which learning should be motivated by curiosity, creativity and critical thinking and doing, in order to meet (sometimes risky) authentic, real-life challenges [13].

To meet the contemporary and future societal challenges of sustainability of higher education and research and to research the possibilities and challenges of CBL, our university made a call for further research. At the start, there were 80 people involved. The initial outcome was a series of research seminars, workshops and projects focusing on CBL that resulted in a university-wide larger CBL network of researchers interrelated by workshops, seminars, several articles [13,14], grant applications and a course in CBL for university lecturers. We were asked to form smaller interdisciplinary research groups of four to six researchers, with the purpose of writing grant applications. We formed our own project group, having informally met up in research seminars and finding that we had a lot in common, despite our different subject and research backgrounds. From the start, we were six researchers, but due to prior engagements, two members left.

Against this backdrop, we, a group of researchers from three different university faculties and four distinctly different subjects (history of education, education, biology and Media and Communication Studies (MCS) and journalism), constituted an interdisciplinary research constellation (Table 1) as part of this larger CBL network. We aimed at working through collaborative and participatory research, integrating theory and praxis, and interdisciplinary methods geared toward a deeper understanding of interdisciplinarity [5,8,15,16]. While working on research applications on pedagogical development, cross-border learning and cross-faculty course development in close collaboration with third-party stakeholders, we realized that our own research practices and processes emerged as an interesting self-reflective research subject. Early on we did, however, find that there was very little previous research on collaborative interdisciplinary research [7,8,10,15].

**Table 1.** Background of the four researchers/authors in the project.

Researcher	Christensen	Ekelund	Melin	Widén
Gender/age	Male/58	Male/64	Female/57	Male/51
Position	Senior Lecturer/Associate Professor	Professor	Senior Lecturer/Associate Professor	Senior Lecturer/Associate Professor
Subject for PhD	Education, 2010 (Lund Uni, Sweden)	Plant Physiology, 1988 (Lund Uni, Sweden)	Media and Culture Studies, 1996, (Queen Margaret University, Scotland) Journalism, 2008 (Gothenburg Uni, Sweden)	Educational History, 2010 (Linköping Uni, Sweden)
Subject of employment	Social Work, especially organization	Biology	Media and Communication Studies	Pedagogic Practices
Department	Dept of Social Work	Dept of Natural Sciences, Mathematics, Society	School of Arts and Communication	Dept of Culture, Languages, Media

Table 1. Cont.

Researcher	Christensen	Ekelund	Melin	Widén
Teaching experiences	Social policy Social innovation Welfare studies Educational Sciences Research methods and theory Supervision at BA and MA level	Biology courses Scientific methods Educational Sciences Supervision at BA, MA and PhD level	Cultural industry & journalism Media History Visual culture Communication Research methods and theory Supervision at BA, MA and PhD level	Educational Sciences Research methods and theory Supervision at BA and MA level
Common experiences	Teaching teachers-in-training at the Faculty of Education and Society Coordinating, teaching and supervising on internship courses Teaching at different faculty courses Teaching at graduate, postgraduate and PhD levels Researching Teaching and Learning in Higher Education			

## 1.2. Theoretical Approaches and Current State of the Research Field

### 1.2.1. Research Approach: Risk and Holistic Pluralism

Today's society emphasizes a stronger, more secure, predictable, audited and risk-free research and educational system that premieres transparent, measurable learning outcomes and global standardized testing [17–21]. Biesta, in *The Beautiful Risk of Education* [2], on the contrary, argues for what he defines as “a weak education” and qualities of education. Biesta claims that the stronger and more structured education becomes, the more we lose sight of education as a social practice that is often slow, complex, unpredictable and full of risks and uncertainties. Weakness, in this sense, is “the very condition that makes education possible” [2]. A grand example of classical critical thinking of our time defines education and learning as “a process that is not only radically open and underdetermined but also generative and creative” [2]. Bornemark [19] further makes use of the notions of intellectus and ratio as two different logics of knowledge and learning in order to explain and balance human cognitive and intellectual practice. This ratio highlights already fixed, distinct and precise facts and knowledge as established truth, whereas intellectus is related to open, unfinished and undetermined knowledge practices. Bornemark hereby argues for a necessity of being open to new riskful knowledge, exploring the unknown or the not yet known. This study draws on Bornemark's notions of intellectus and ratio as parallel or as synonym concepts of critical thinking and creative doing. The critical thinking and action ratio is, therefore, built upon and directed toward something already existing, such as our educational traditions, subject disciplines and disciplinary knowledge. Creative thinking and action, on the other hand, centers on intellectus, creating something new and not yet existing out of disciplinary knowledge boundaries, such as the education and research of tomorrow [11,22]. Put in other words, academic work such as that of Biesta's [2] and Bornemark's [19] are also related to identifying and developing research capacities of inquiring and communicating research-based truths within subject disciplines. However, research is not first and foremost about knowledge, knowing truths and communicating the correct answers, but, rather, it also requires us to make use of intellectus, to creatively think, formulate and address new situations with profound and new questions that engage the research community, students and overall society. In turn, we need to look to inquire into robust, creative answers and adequate concepts and practices to new questions of education and research of the unknown tomorrow [10,11,22–24]. In order to meet the education and research of tomorrow, academia (in a broad sense) needs to look ahead and think widely, with new concepts, perhaps think in more interdisciplinary terms to balance between ratio and intellectus for a more sustainable research practice aligned with Biesta's notion of a “beautiful risk of education”. In that sense, the article, therefore, argues for a holistic pluralism in our approach to both learning and performing research. This

embrace both risk-taking and border-cross meetings. We view university lecturers as in an action-oriented professional discipline, and both action and change are essential elements of its identity.

Bronfenbrenner's Development Ecology [25,26] could give a theoretical frame in understanding the individual's drive (e.g., for change processes) and relational ability to influence a specific professional environment in which the individual acts. Bronfenbrenner developed the model of developmental ecology, originally consisting of four environmental systems: micro-, meso-, exo- and macrosystems. This ecological theory of development has proven beneficial in providing insights into the factors that play a role in the growth and development of individuals, including resilience capacity to act and adapt in the face of adversity or constraint, as a result of a complex interplay of risk and protective factors [27]. Resilience capacity in collaboration is necessary to interdisciplinary research as studies emphasize the importance of having multidisciplinary teams in which ecological and social scientists work together to improve conservation of ecosystems and the protection of the societies dependent upon them. The notion of resilience helps us better understand an individual's capacity in collaboration [28]. Viewing an individual as a part of an ecology system enables a holistic knowledge of understanding related to the so-called six Cs: communication, collaboration, character, critical thinking, creativity and citizenship [11,22,29]. Adding resilience capacity as a way to develop the six Cs of education and Bronfenbrenner's model gives us a broader understanding of how people act and develop knowledge within, and beyond, their professions, in certain ways.

### 1.2.2. Toward Interdisciplinary Research Practices

Our starting point was interdisciplinary research, i.e., research done by researchers stemming from different disciplines but working together. When professionals meet in a cross-border collaboration, different kinds of knowledge exchanges take place, with social, academic and cultural dimensions. Interdisciplinary collaboration provides opportunities to establish deeper professional relationships and networks. Aboelela et al. [30] provide an exhaustive definition in a systematic literature review and interviews with interdisciplinary researchers:

Interdisciplinary research is any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process [30].

Löwgren and Reimer [15], an interaction designer and a media and communication scholar, have worked together researching media and design labs. They prefer the term transdisciplinary research rather than the term interdisciplinary, which is to them less flexible, as they "find the connotations of transcending existing disciplinary approaches to be appealing" [15]. To them, collaborative and participatory research should integrate praxis and theory through transdisciplinary research methods, as well as a practice-based interventionist approach, preferably in collaboration with other actors. In addition, Max-Neef [31] prefers the term transdisciplinarity, as it entails collaboration in and between academic disciplines, as well as between those and societal actors. Although we agree that the process of transcending is interesting, particularly for education, we do, however, argue that we, as a research group, have not aimed at this disciplinary transition nor a transition between ourselves and societal stakeholders. Instead, we are firm in our disciplinary affiliation but aim at collaborating our multiple disciplines through a series of cross-border meeting points.

The theory of Community of Practices (CoP) suggests that learning in groups is a key to professional development [10,32–35], providing possible new insights from colleagues and allowing for the development of common definitions for further scientific collaboration partners who are equally responsible and involved. It also allows for inspiration and new

network constellations, as well as developing professional understanding by exchanging view; e.g., learning through the stimulation of being in a new community of reflection and learning practice (and culture) may create a new framework for innovative learning through collaboration, not the least of which achieved in the process of sharing one's unique personal experiences, professional knowledge and frames of references [35]. Working in a CoP builds a collective knowledge base in each member, which has the potential to improve the individual contribution. By creating an interdisciplinary learning environment, it can bridge, connect and make meaning [35].

Interdisciplinary research comes with difficulties and costs, as differing expectations and disciplinary norms within a research team are exposed [36]. Interdisciplinary meetings can lead to conflicts about ontologies and methodologies, while the transdisciplinary approach, in itself, can be problematic, in terms of producing legitimate results that are acknowledged as reliable and valid [37,38]. Both inter- and transdisciplinary collaboration in research is essentially time-consuming and critical [39]. It takes time to clarify problem definitions, integrating assumed performances and norms, in terms of how research questions are being formulated; considering disciplinary power relations and dealing with unfamiliar literature, as well as to develop friendship and collegiality. Moreover, Löwgren and Reimer [15] argue that the cost of inter- and transdisciplinary work is high, particularly as coproduction with societal stakeholders. Grant-holders, for example, seem to prefer silo-like grants awarded to distinct disciplines. The gains and needs of interdisciplinary research are, however, less researched.

Academic institutions are facing interesting times, accommodating challenges of 21st century society, both from local and global perspectives. There is a need for diverse perspectives and experiences, as well as collaboration across society in research and education. Collaboration is an important factor to tackle complex future educational challenges to build socially robust and transferable knowledge to both scientific and societal practices [40]. In order to embrace the possibilities and minimize the costs, Lang et al. [37] argue that this new type of research collaboration that transcends disciplinary approaches requires the following: first, research on complex sustainability problems requires the constructive input from various communities of knowledge to ensure that the essential knowledge from all relevant disciplines and actor groups related to the problem are involved. Second, research on solution options requires knowledge production beyond problem analysis, as goals, norms and visions need to provide guidance for transition and intervention strategies. Third, collaborative efforts between researchers and nonacademic stakeholders promise to increase legitimacy, ownership and accountability for the problem, as well as for the solution options. This is, however, risky business. Thus, risk and resilience are needed as theoretical analytical tools when exploring interdisciplinary research.

### *1.3. The Purpose of the Study*

Given the complexity, diversity and challenges related to achieving collaboration in reaching a common understanding/perspective on lifelong and sustainable academic professional development, we aim to identify and explore possibilities and challenges of academic interdisciplinary capacities and ethos. The objective is that this knowledge could be used both in future interdisciplinary research projects and in educational settings. We achieve this through self-reflective learning processes among a group of interdisciplinary scholars from four distinctly different subjects. The research questions that we have attempted to answer in our study and thus in writing this article are:

- What does interdisciplinary knowledge creation entail in our research context?
- How could possibilities and challenges of interdisciplinary research be approached based on our research process?
- Why is this important?

## 2. Materials and Methods

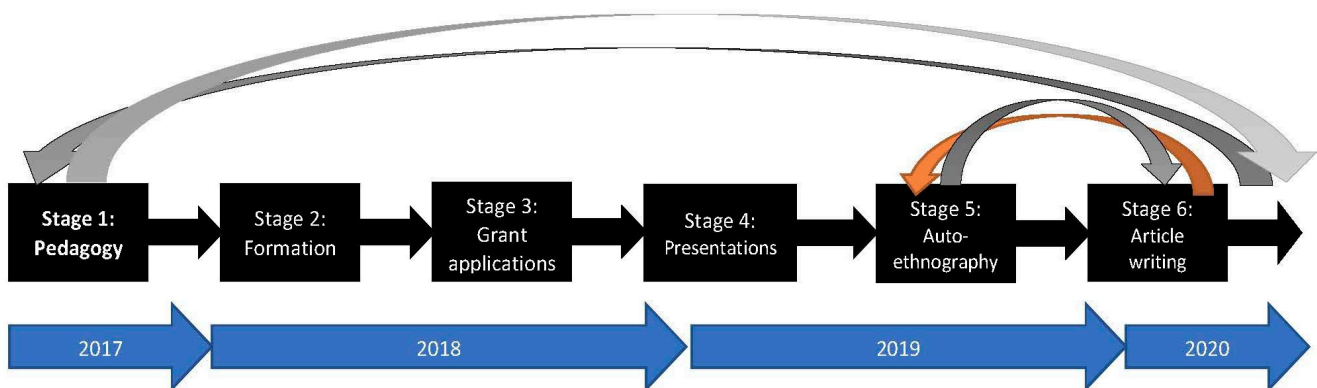
### 2.1. Methodology: Our Methodological Standpoints Autoethnography and Mixed Methods

We need to give a background to the formation of our research group, as we and our experiences are the autoethnographic research material of this study:

To me, our project-group is a research finding in itself (Melin, MCS and Journalism).

As can be seen in Table 1, our backgrounds are varied, but at the same time, we have a common ground to stand on.

Having worked together for four years, with research that aimed at challenging pedagogic practices, we realized that our own ways of conducting research reflected our research objective (Figure 1). Interdisciplinarity challenged our fundamental ways of thinking and doing cf. [7,10]. Thus, we turned to both familiar and novel methods to study our process, i.e., we decided to use so-called mixed methods consisting of autoethnography and statistics.



**Figure 1.** Flow-chart of the collaborative research process starting in 2017.

Autoethnography could be seen as an empirical self-reflective approach for data collection, analysis and deconstruction of professional learning processes, which, according to McIlveen [41], serves to establish research methodological trustworthiness and authenticity. This implies that, out of a self-reflective approach, the authors have conducted a retro-perspective analysis and deconstruction of their own learning activities, processes and results. One could say that autoethnography is not only a way to study the world but to *be in* the world. Ellis [42] argues that autoethnography is about observing how we think and feel and act and rethink our observations over and over again. This is, thus, not simply writing a diary but a way to challenge rethinking and reviewing. This does not mean that we *only* turn inward. That could result in what Bourdieu [43] terms diary diarrhea, i.e., when the researcher does not have the ability to look beyond his/her own experiences without making them universally valid. In order to avoid this, we have, as Adams, Jones and Ellis [44] suggest, discussed our own self reflections within the research group and, thus, found intersections between self, group and society, as well the personal and political. We have, thus, attempted a collective autoethnography aimed at collective meaning-making [45]. This process is also an inductive research process, meaning that, while observing and researching, we analyze and formulate our theory.

We gave each other the task of writing what could be described as field notes in a traditional ethnographic or anthropological sense [41,42,44], which meant that we all wrote extensive reflections (about 10 pages) on what we experienced during our group research process. To balance the inward looking, we have attempted to use mixed methods, as Blake, Sterling and Goodson [46] suggest when studying the complexity of learning for a sustainable future. The analysis of statistical data consisted of a grounded theory process of initial coding, focused coding, and thematic coding to identify past developments, barriers, and drivers for working between multiple disciplines [47,48]. The statistics consisted of our self-reflexive texts being coded sentence by sentence, searching for recurring words,

which was followed up with focused coding to form clusters and categories. Comparisons between self-reflexive texts, codes, clusters and categories allowed for integration of the material and concepts into themes. We also made three word cloud clusters of the words used in two grant applications for CBL project funding and in our self-reflective texts in order to visualize similarities and differences in the texts and over time.

## 2.2. Research Design and Methods

We have identified six different but interconnected stages in our learning process (Figure 1). In the first stage, we worked in different faculties within and outside of the university on developing critical and creative thinking and on pedagogy, including collegial collaboration and developing a curriculum for an interdisciplinary course.

The second stage was and is about formation, i.e., forming and norming [49] our present research group through a number of activities (Table 2). One important aspect of our learning process in this stage was the sometimes conflictual meetings, where we tried to understand each other's scientific jargon, subject discipline discourses and approaches, e.g., the understandings of hypothesis, scientific method, valid knowledge, social challenges and relevance. This has been a fundamental driving force for the group and for the research and learning outcome. During the third stage, the group wrote four research applications and received reviews of the same and received funding for one. The writing process meant deepening understanding of our interdisciplinary processes, not the least of which through the choices and usage of words and the fact that all texts were written collegially, circulating the actual writing practice between us on each occasion. This meant that we always sat together in a physical location with a big screen projecting the text on the wall, where our text was built word by word, sentence by sentence, *together*. This togetherness in the writing process built a collegial structure in our research group. It is interdisciplinary research in practice. The reviews gave us invaluable outside views, new insights and understanding of our research subjects and the difficulties of working among multiple disciplines and with applied science. In the fourth stage, we presented our work at a number of workshops at the university (Table 2). This helped us argue for, concretize and visualize our interdisciplinary acquired knowledge. The fifth stage consisted of interweaved and interconnected autoethnographic reflections, physical and digital meetings, writings, statistics, analysis and yet more reflections and collective writings.

**Table 2.** Interdisciplinarity activities during the research process during all 6 stages (see Figure 1).

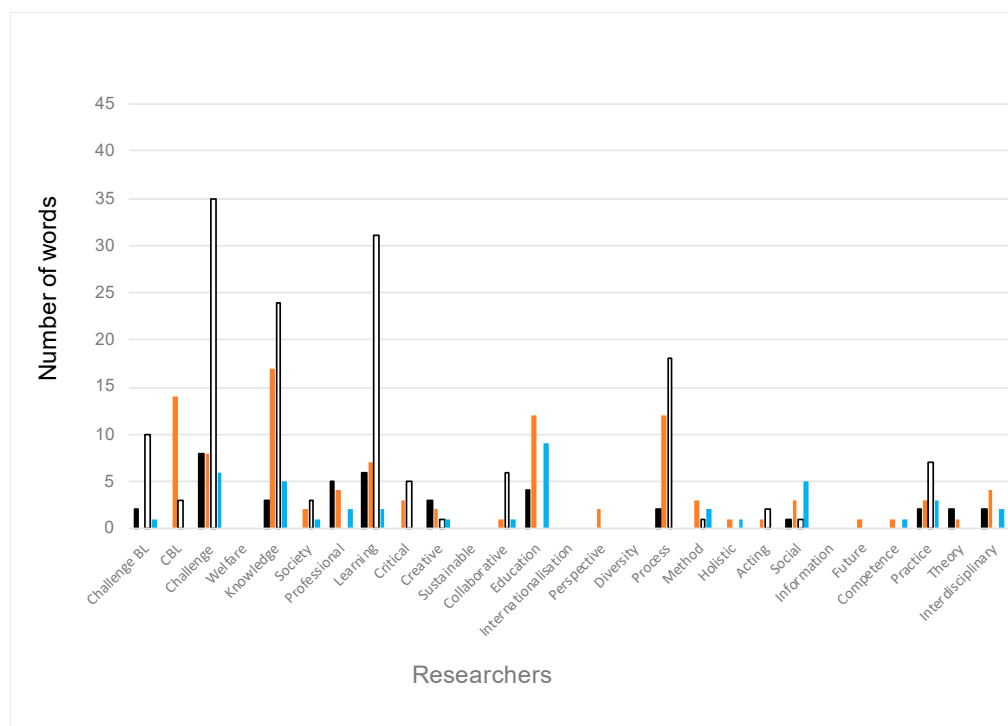
Activities 2017–2020	Year
Start-up Workshop (80 researchers, 5 faculties)	2017
A series of workshops around Societal Challenges and Learning—group allocations (50 researchers, 5 faculties)	2017
Research group (6 members, 3 faculties) writing grant applications/Funding (2 grant applications submitted)	2017–2018
Workshops on writing grant applications (24 researchers, 5 faculties)	2018
Research group (5 members, 3 faculties) writing on grant applications (2 grant applications submitted)	2018
Regular work meetings (research group finalized, 4 researchers, 3 faculties)	2018
Research group (4 members, 3 faculties) starting up autoethnographic work and article writing in progress	2019
Dr. Erin Cory reads and reviews our autoethnographic texts	2019
Workshop around Knowledge for Change (14 members, 3 faculties)	2019
Workshop around Position paper writing (10 researchers, 5 faculties)	2019
Position paper in progress (8 researchers, 5 faculties)	2019
Workshop around Position paper writing (7 researchers, 4 faculties)	2020

The sixth stage is the one we are involved in through the writing of this article. However, that does not mean linear writing, but a revisiting of all the previous stages in a summarizing analysis of our results. As Figure 1 shows, our research process is not linear, but through retro-reflections, as well as various hindrances, it is more of a loop or feed-forward spiral movement.

### 2.3. Empirical Research Materials

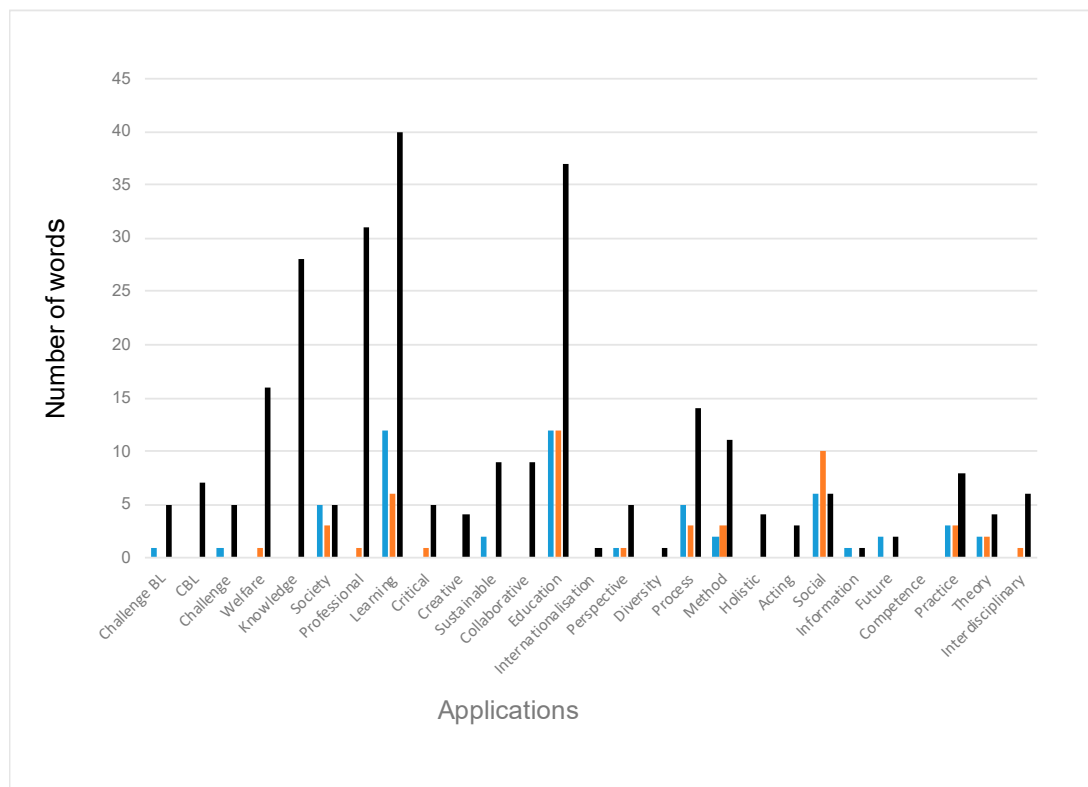
As a result of our research process (Figure 1), we collected a substantial amount of material, which constitutes the empirical basis for this article:

- Our *embodied academic background and pedagogic experiences*, which we brought with us into stages one and two of our research process.
- Four *research grant applications* and, in addition, each application received reviews from external grant fund referees. This was collected during stage three of our research process (Figure 1).
- *Autoethnographic reflections* about our experiences of our collaborative research and writing process, which consisted of reflective diary notes from the four researchers. This was the outcome of stage five of our research process.
- *Ethnographic review*: An ethnographic researcher—Dr. Erin Cory—read and analyzed our applications and autoethnographic reflections in order to achieve an outside view on our process. This review has guided our continued autoethnographic research. This was the outcome of stage five of our research process.
- *Statistics and word clouds* of the word count in both our research applications and our autoethnographic reflections in order to *see* what words we have used and to engage a self-critical analytical and deconstructive mode. This was the outcome of stage five of our research process (Figures 2–4).
- Four researchers' individually written *shorter reflections* on the word count we did as the basis for the analysis in our article writing process. Thus, this was the outcome of stages five and six of our research process (Figure 1).

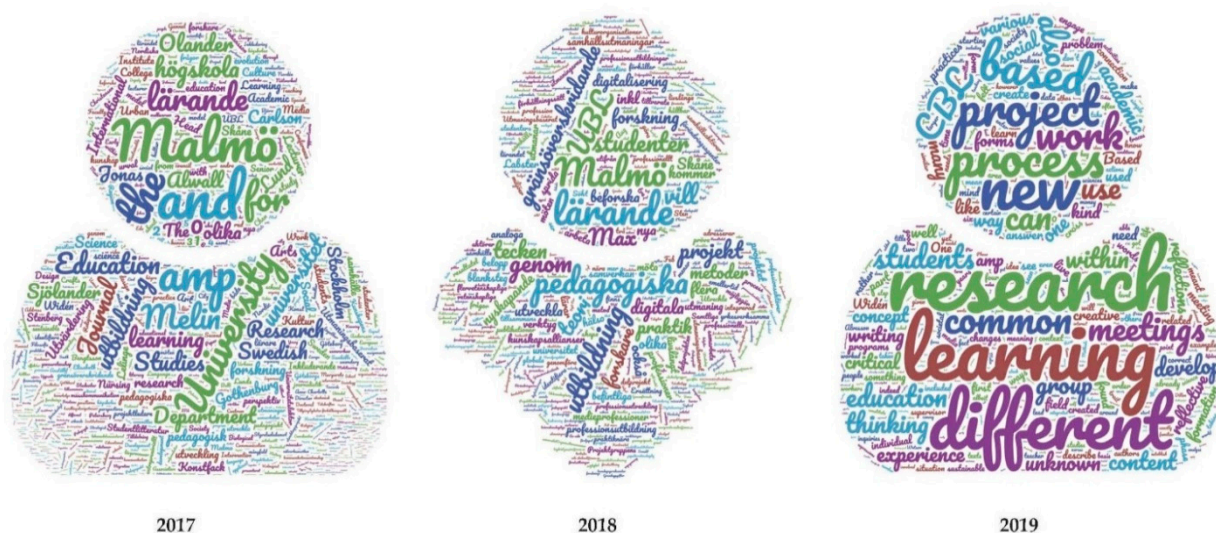


**Figure 2.** Key words articulated by the authors from their self-reflective narratives. The number of key words for the authors are shown with bars: Melin (Media and Communication Studies and Journalism, black), Christensen (Social Science Education, red), Widén (History of Education and Humanities, white) and Ekelund (Biology and Natural Science, blue).





**Figure 3.** Key words and concepts used by the authors in three different research applications. The different colors indicate different research applications to non-disclosed grant funders.



**Figure 4.** Word Cloud image of words used in applications from 2017 and 2018 and the Reflective Table in 2019. (Legend: generated through <https://www.wordclouds.com>), 16 June 2020.

### 3. Results

The results (of the analysis of our empirical materials) are, in the following section, described by the following themes: the challenges of working in collaboration, taking time, knowing the not-known, creating a learning environment, and the challenge of forming common conceptual knowledge.

### 3.1. The Challenge of Working in Collaboration

When our university gathered researchers interested in Challenge-Based Learning, groups were created in order to commence external research applications. This did, however, also give rise to a series of challenges. Our own research group was born in a rather haphazard way, based on excitement and curiosity, as Melin, a Media and Communication Studies (MCS) and Journalism scholar, puts it:

All my professional life, I have worked interdisciplinary and did indeed embrace the challenge this new situation provided. However, getting the 50 [researchers] to create creative and lasting project-groups with the task of writing research applications turned out to be difficult. Interesting round-table discussion was followed by even more interesting round-table discussions, but I felt that nothing happened. In challenging interdisciplinarity I felt I was stuck in limbo. Eventually, and actually mostly by chance, I sat down next to a colleague of mine and his table, and after ten minutes I realised this was a project group consisting of six researchers from four faculties, covering six vastly different subjects. This included my own as I became aware that I had joined the group by sitting down with them. And this was exciting and rather scary (Melin, MCS and Journalism).

In our interdisciplinary group, collaboration was the chosen method to approach the rather complex matter of finding research focus and topics for which to build our project, and as Lang et al. [37] argue, complex problems require constructive input from various communities [8]. This is far from easy and requires a learning process about not only each other but each other's disciplines. Widén, from History of Education and Humanities, reflects on interdisciplinary bridge building:

A lack of knowledge of other researcher's disciplinary knowledge tend / ... / to hinder or at least not nourish academic collaboration. And in contrast an interdisciplinary bridge building in this collaborative project setting has enabled closer professional relations in terms of a mutual understanding and appreciation (both depth and breadth) of old as well as new research fields through the CBL-project (Widén, History of Education and Humanities).

Crossing the interdisciplinary bridges and meeting other fields entailed unexpected synergies in knowledge formation, as the Social Science Education scholar Christensen reflects:

I remember that concrete examples out of societal challenges encouraged colleagues to address these challenges in some new directions only by the fact that the colleagues, in practice, met others with different subject disciplines and backgrounds, strengthened my perception of how synergies in knowledge formation can be achieved through cross-border meetings (Christensen, Social Science Education).

The collaborative venture was also the starting point for a collaborative writing process and using autoethnographic research methods. Both these methods were new to us, and we were, thus, collaboratively taking on both new work models and learning new content knowledge. Meeting the challenges of the complexity of our task demanded an interdisciplinary collaborative way of working. As Lang et al. [37] argue, collaborative research is necessary for producing knowledge beyond problem analysis. We were excited and keen to do so, as the biologist and natural scientist Ekelund reflects:

The idea of working interdisciplinary between different research disciplines / other researchers has been a strong driving force for me during my academic work. Creating a joint educational project that covers different subject areas would be exciting and interesting. From being focused within a fairly narrow research area of biology, I have wanted to make new challenges and find other approaches within my projects (Ekelund, biology and natural science).

### 3.2. *The Challenge of Taking Time*

Ekelund did, however, in his diary notes, also point to facing risks in our project: Is it possible for me, through this project together with colleagues from other disciplines, to develop my own educational thinking? What do we have in common and what differences do we have to face from our different disciplines? (Ekelund, biology and natural science)

Ekelund was correct in worrying about this interdisciplinary process, however not so much the learning process within the group as the risk of spending our time and energy to collectively write research applications and an article such as this. Collaboration, in this sense, is truly time-consuming [50], which evidently showed in our process (Table 2). It takes time to discuss, identify, clarify and reach common problem definitions; make explicit our assumed and expected performances; consider inherent social power relations; deal with new and unfamiliar research literature and develop and integrate friendship and collegiality. All interdisciplinary work takes a large amount of time. The developed relationships within the group have shown that natural, social and humanistic perspectives relate to each other, not being bound by traditional walls but instead providing new and perhaps more sustainable knowledge. That interdisciplinary research takes time was also stated and confirmed by Widén:

In my experience the result of learning new content knowledge is many times dependent on trusting in something that is known to us, either known content knowledge or the use of known work models. And that takes time. Either way, we engage with new knowledge and we support our learning by simultaneously relying on some aspect that is already known to us (Widén, History of Education and Humanities).

In our case, the establishment of a learning environment has worked to support us with a frame that links all our activities together, as the work process was largely about meetings and interaction on individual (professional and personal) and institutional levels cf. [51]. The diversity and pluralistic holism in our learning environments have strengthened our collaborative process by enabling discussions, formal and informal meetings, documentations and oral presentations. However, the time-consuming dimension was not the only challenge we faced. Our professional knowledge as individual researchers also emerged as obstacles at times.

### 3.3. *The Challenge of Knowing the Not-Known*

Having experienced various challenges, has been a necessary part of our melding-together as a research group, as was reflected by all of us:

If you go outside your own comfort-zone, you'll face a risk, however, it also forces you to reflect in new ways (Christensen, Social Science Education).

Four different disciplines, four different linguistic jargons, four different academic practices, but one project group. A group of scholars who have worked through the hardship of writing and having application proposals rejected, as well as receiving research funds. We have got to know each other and our different ways of thinking and doing. During the series of meetings, which indeed have been conflictual, albeit on a very academic low-key level, we have managed to help each other over various gaps, and found bridges over our disciplinary borders to cross (Melin, MCS and Journalism).

The challenges and risks are great when developing cross-cutting projects. Do we understand each other within the group where the subject background shows a high degree of variation? Does it benefit us in our academic merit and if not why then? Do we have patience in a job like this that takes time and may not be appreciated by other colleagues? Daring to take these risks has probably

strengthened our commitment with the goal of creating something in common (Ekelund, biology and natural science).

When it comes to growing and developing our professional knowledge, we are really up for a learning challenge. As academic researchers we are rightfully held by the public, the academic community and by ourselves to be knowledge experts in various respects. In that sense, acquiring a Challenge Based Learning-approach does not come easy. We, who are believed to know things, why should we voluntarily be involved with risks and challenges of practicing and handling things we do not yet know. But in order to learn new things it is imperative that we continuously engage in and develop the approach and mindset of taking risks and put ourselves up to learning (Widén, History of Education and Humanities).

Challenges are related to tensions of the various paradoxes that we experience and live in the “metaphors we live by” [52,53]. Handling the paradoxes, contradictions, the known and not-known, encapsulates both uncertainties, contradictory, preliminary interpretations of everyday complexity of life and actions. This calls for learning both self-reflective practices and our understanding of them as “intellectus practices” [19]. In order to create an interdisciplinary and collaborative learning process, the creation of and awareness of a proper learning environment has been a key. In the collaborative process within the project, the notion or metaphor, “challenges” have worked as catalysts for our critical thinking and creative acting cf. [22].

#### *3.4. The Challenge of Creating a Learning Environment*

We consciously created a research and learning environment that was based on notions of collaboration and physical togetherness. Particularly, the physical room was important [5,54]. We have continuously and consciously met in the same space on campus, albeit forced to meet a few times online but still working in the same manner. The physical meeting place in an open office space on campus was essential to our learning process when it comes to planning, discussing, thinking and writing. The office space integrated our togetherness. Digital tools and platforms did, however, also aid us in maintaining our collaboration activities, e.g., Zoom meetings and sharing and writing in the same digital documents. The digital space created a stronger togetherness, as well as broader learning environment. In this way, our learning environment was essential for our collaborative work process in which we have situated our community of practice [32–34]. Christensen described these experiences as follows:

It is through encounters between people of diverse backgrounds, cultures and frameworks that we are challenged in our notions, not least in learning environments and contexts (Christensen, Social Science Education).

Christensen continued to reflect upon the fact that these meetings instigated different kinds of reflective knowledge exchanges:

The possibility to meet and learn from colleagues from other academic disciplines, encouraged me the most in those first meetings, being a part of a new learning environment. This really helped me to develop my own critical thinking in and about the academic profession. It made things very concrete and raised my awareness of the importance of cross-border meetings. The discussion enabled me to face and handle the question and discussion of various definitions, bringing new insights to the meaning of interdisciplinarity and collegial learning processes (Christensen, Social Science Education).

On the basis of these experience-based reflections, we argue that cross-border meetings added necessary values to the environmental framing of our learning capacity. It became a potential for knowledge when we, as colleagues, with no previous experience of cooperation together, met in the beginning of our process. It was through these meetings that issues of common conceptual knowledge emerged.

### 3.5. The Challenge of Forming Common Conceptual Knowledge

What is knowledge? How does one write academically? These are difficult and important questions in a “traditional” research context, but in an interdisciplinary research group, these questions are essential for the existence of the group. Moreover, what is interdisciplinary knowledge? Mansilla et al. [55] points out that the potential benefits of interdisciplinary research include innovative contributions to disciplinary and conceptual knowledge. As we see interdisciplinary knowledge, it could be characterized as a collaboration between and among scientific disciplines and societal actors cf. [15]. From the interdisciplinary collaboration in the present study, we realized how different questions and discussions can arise and evolve out of these concepts, and, much like Ritchie and Rigano [5], we noticed that we did not fully understand what our fellow colleagues said. As Melin put it, it was like the tower of Babylon:

The project-group (which I will henceforth call it), started up meetings: discussion meetings, theory meetings, writing meetings and more writing meetings. These were nice, fun and interesting and I felt at ease in the group, albeit not at home, or even comfortable. I started to notice that I did not understand what my fellow colleagues said. It was like the tower of Babylon. Six different subjects meant six different jargons and professional languages, which meant that there were words used I had never heard before. We also used the same words, but the meaning was obviously very different. What is knowledge? What is research? What is “societal challenges”? What does “sustainable” really mean? One important piece of knowledge I have gained through this process is that over time, through meetings, by writing together and rewriting and rewriting even more, we have developed common understandings and a common knowledge base. And it is from that base that I write (Melin, MCS and Journalism).

As an example, Christensen (Social Science Education) argued that, when Melin (Journalism) brought in language and literacy as a powerful tool in the discussion, it broadened his view on holistic understanding. In addition, Ekelund (Biology) added ecological perspective to how we face challenges and risks, which developed Christensen’s understanding in professional knowledge and risk-taking. There is a complexity within the concept of interdisciplinarity in itself: it is argued that transdisciplinarity is necessary for effective science and societal change, as it can help uncover underlying assumptions in research and practice and develop methodologies for working with uncertainties and disputed values [37,56]. We, however, argue that this is exactly what we achieved through our interdisciplinary research process, where we truly *met* each other with curiosity and respect, without losing our anchoring in our respective scientific disciplines.

When we, in the project, brought in language and literacy in our discussions, we realized that concepts such as: interdisciplinarity, collaboration and critical and creative thinking were not necessarily exclusive to the research project in itself. They are also commonly used both in public debates and in the academic community. Yet, the meaning of these notions and concepts is always up for various and competing definitions. In order to come to a common or consensual and interdisciplinary understanding of these individual concepts, our professional knowledge needed to be explicitly developed and deepened. Thus, we defined the individual concepts, not on their own but in direct relation to the plurality of concepts we used. We termed these definitions of related concepts a “cluster definition” cf. [52]. Ekelund refer to his own development of conceptual understanding:

The concept of knowledge varies greatly depending on the context in which you are. Scientific knowledge and, above all, natural sciences are, for me, strongly linked to data and facts based on experimental and empirical experience. In many cases, we refer to it as subject knowledge in relation to educational/didactic knowledge, which the debate often revolves around when educating teachers. These discussions have given me the concept of knowledge and a new broader

dimension. Trying to understand new reflections and concepts probably increases my own knowledge (Ekelund, Biology).

Even if interdisciplinary research, collaboration and learning are seen as crucial for achieving urban transformation toward sustainability cf. [7], there is also both a challenge and risk when it comes to growing and developing academic professional knowledge. The question is: do we understand each other within the group when the disciplinary background shows a high degree of variation?

The statistical analysis of our self-reflective narratives showed that the most common words used in the study when discussing the benefits of our professional understanding and personal growth in working across scientific boundaries were: *challenge, knowledge, learning, process* and *education* (Figure 2). It is interesting that we all used these same words but the meaning of them differs between the four researchers. However, it also shows that we share the same frame of reference. This is not particularly surprising, as the researchers in this study are strongly linked to driving and developing processes in education and research, and they all work in an academic professional educational environment and are, of course, strongly influenced by this.

On the other hand, the analysis of how us four researchers used words and concepts in joint scientific applications shows that there is an extension from the self-reflective narratives more toward *profession, wellbeing* and *social phenomena* (Figure 3). The applications are aimed at professional development where the various scientific disciplines are to be linked to joint vocational interdisciplinary courses for students, and the aim was to integrate different scientific disciplines into an interdisciplinary course for students with different professional backgrounds. This was seen as an extraordinary challenge. Melin points to the differences, but also similarities:

Regardless, taken to the core, these professions [nursing, teaching, counseling, media work] are driven by rather similar educational ideals. And still, there is no real agreement amongst us what a professional group nor what professional knowledge is, possibly because the field of Profession Studies is not in agreement about this either (Melin, Media and Communication Studies and Journalism).

The different views of knowledge can be exemplified by one particular meeting, when Melin, senior lecturer at the school of Arts and Communication, was talking wide and loud about the importance of visual knowledge, then Ekelund—the hardcore, hard-fact natural scientist—started talking about the visualization they did in biology. This moment turned the way our group worked. Melin and Ekelund both reflected on this as a pivotal moment:

After that moment, creativity will never carry the same meaning to me. And at the same time, we use the word creativity differently, or not at all. For some of us, the term is revered, and for others it is seen as a threat to proper academic practice. Dwelling, confronting, provoking, discussing, writing together has, however, given an understanding of each other's meanings and practice (Melin, Media and Communication Studies and Journalism).

However, of the somewhat narrow field of natural sciences, my view of knowledge has been developed through this interdisciplinary project. Discussing, analyzing and writing together in an interdisciplinary team (Ekelund, Biology).

These reflections show that interdisciplinary research does not occur without some difficulties, struggles and costs, and our experiences are reflected in more general knowledge of interdisciplinary work cf. [15,36,39]. In retrospect, the descriptions of the learning process and the forming of common knowledge was taken on through decoding and deconstructing some of the texts we wrote in this project, the common discourse used in discussing and writing these texts and some of the linguistic metaphors of learning and writing within the project. This is mainly due to the intense interaction and manifold dimensions of communication we were involved in throughout the project. In other words, this process could very well be described as a self-reflexive or self-critical thinking in practice and what it entails in this project. This process is visualized in Figure 4, below:

Figure 4 visualizes how we as a research group learned and developed a language of commonality. The first image to the left is an application from 2017, the second is an application from 2018 and the third is an image of the reflective texts we four researchers wrote in 2019. Larger words in the figure were more frequently used. What is striking is that, in 2017, we used so many more different words than in 2019. We learned from each other, and more importantly, during the years we created a common language use, which, in turn, contributed to us shaping a common ethos of our collaborative collegiality.

#### 4. Discussion

Based on our results, we want to argue that this interdisciplinary research process has served to cultivate a sense of belonging and a sense of curiosity and inquisitiveness and that it has enabled a collective ethos of handling challenges and fostered an ethos of risk taking and that we have learned to balance thinking and acting critically and creatively.

##### 4.1. Create a Sense of Belonging by Retaining Previous Professional Experience

Identifying, retaining and including each other's ways of approaching research and knowledge were important to our experience in different parts of the process. This was achieved in making use of Melin's journalistic gaze in editing the disposition of texts and structuring text layout of grant applications and articles. Similarly, Widén's linguistic and discourse analytical expertise enabled a foundation for the methodological word count and word clouds, giving form to the research result presentation. Furthermore, Ekelund's biology and natural science experience and numerical skills were needed in the shaping of results, including tables and graphs in statistical forms. From the start of the project, Christensen's vast international and interdisciplinary work experience served an initiating drive for cross-faculty meetings where we all met. On the basis of this, we sought to create a necessary sense of participation and belonging in the interdisciplinary knowledge process. The sense of participation made us all want to commit to making use of what is already known and further investigate the unknown.

We shared the experience of entering a new, and, to us, unknown, research field; thus, we did not approach the challenge of learning with a predefined disciplinary correct answer. Rather, we took it on, governed by a common desire to inquire and learn in and from all aspects of this process. This included an engagement in a new research field in which one needed to define the field and theoretical concepts we used or lived by [52]. Through our different disciplines, we found a common method, autoethnography, which was new to us all. In this way, new and unknown knowledge entails the practice of engaging with new concepts and contributes to knowledge acquisition.

##### 4.2. Cultivating a Sense of Curiosity and Inquisitiveness

The knowledge boundaries, or limits of what is unknown, is closely related to a discussion of interdisciplinary research practices. Our reflective journey had us return to one of research's basic practices, the practice of inquiry and asking questions characteristic to all disciplines of knowledge [21,22,24,57]. The basic principle of research is not, first and foremost, to present scientific truths and answers but to ask and formulate good questions about what is known and unknown. We deem this to be somewhat taken for granted and even, at times, unreflected practice, which faces research and higher education today. To develop interdisciplinary knowledge, we needed to deepen our collegial and collaborative (i.e., interdisciplinary) thinking, rather than putting forward a simple subject discipline answer in that respect. Therefore, developing a desire for an ethos of questioning and inquiring [4] is a far more challenging, fruitful and long-term sustainable learning aspect of research today. In the project, we strived to promote and make use of our different capacities of asking good questions and refining and reformulating them into new questions, which also reflect an understanding of the complexity of learning different matters. Instead of finding and applying a disciplinary specific correct answer, solution or a model to a subject discipline specific problem, we have been dealing with a challenge that

requires a plurality of possibilities and understandings. Our shared project experiences enabled us to handle paradoxes, contradictions, both of which we knew and did not know. It encapsulates both uncertainties [2], contradictory and preliminary interpretations of the everyday complexities of life and our actions. Complexities call for learning both self-reflective practices and an understanding of them as creative and curious “intellectual practices” [19].

#### 4.3. Enabling a Collective Ethos of Handling Challenges

Throughout the research process, we attempted to reach common ground in our thinking and foster a collective approach to the challenges of doing interdisciplinary knowledge [5]. We trace part of this back to being shaped by the fact that we have engaged and committed ourselves to interdisciplinary relations to conduct a research project. Right across the research project, one can identify a theme shaping our participant subjectivity, the commonality of work activities and the knowledge we collectively acquired. This could be described as a collective ethos of handling and approaching challenges in research.

As an effect, an ongoing awareness of the social and relational dimensions of the interdisciplinary work has constantly reminded and challenged us throughout the project activities. By discussing definitions of concepts, the choices of research methods and analytical tools, we engaged ourselves in nurturing a sense of collectivity in our research activities, e.g., writing common grant applications, articles and course plans (Table 2).

Apart from research activities, our interdisciplinary work also provided a social dimension. We had fun together, and through that, we learned to respect and learn more about each other. The group spirit went up and down, but there was always a sense of optimism and no harsh nor demeaning words in the group, which, in turn, allowed critical and creative thoughts. We believe that research and education provide an increased understanding of other people’s views, which, in many cases, can go against one’s own ideas and values. The clash of ideas and thinking with the help of others are, thus, closely linked to social relations. Whenever social relation challenges emanate in terms of frictions, we as a research group faced questions of how to approach this and asked ourselves, what does the other see that I might not see. When all of us find ourselves in a new field, there is always the possibility that one of us misses a point or an argument. In that sense, the social relations and our individual subjectivities in those relations are closely intertwined with seeing something from another angle (i.e., the challenge of conflict and seeing the *other’s* perspectives on the conflict). Throughout the project we have, therefore, several times returned to the concepts of ethos and perspective. We identify this as an ethos of social challenges, which includes an increasing degree of transparency and openness to listening to the social other. By being required to think along alternate perspectives both on ourselves, our disciplinary knowledge, and the task, we grew in awareness of the *other* participants’ critical thinking perspective. This is what in a pedagogical context [58] frames as relational competence and a social and relational supportive approach.

We argue that, based on the discussions we have had in our working group, a relational competence and a social trust was created, i.e., a basis for a collective ethos, which made it easier to adapt to the challenge of creating a common research ground.

#### 4.4. Fostering an Ethos of Risk Taking

An important shared experience was discovering that, over time, we had cultivated and fostered an ethos of taking social and academic risks in order to reach a level of lifelong and robust learning in and between colleagues. A risk is whenever we approach something that is new to us, something unknown, something that we cannot fully control and predetermine. Working interdisciplinary, therefore, promotes acquiring social skills through social risk-taking in relation to learning. Academic researchers are rightfully held by the public, the academic community and themselves to be knowledge experts in various respects, but in order to learn new things, it is imperative to continuously engage in and



develop an approach and mindset of taking risks and put yourself up to learning anew in and through challenges.

This academic risk-taking is closely related to social risk-taking and our collective ethos of handling challenges. We went outside our own disciplinary comfort-zone and faced academic risk of knowledge unknown. This did, however, also force us to reflect in new ways, explore new ways and to take new research-steps. Through this, risk-taking created a sense of belonging to our research group and definitely inspired a willingness to develop our complementary capacities within the group. When we exposed ourselves to risks like this, we experienced that we were moving in the direction of “weak education”, suggested by Biesta [2], and that students should be challenged to take risks. Turning this around, we argue that we researchers have taken substantial academic risks and learned a lot from it.

Working in interdisciplinary collaboration is, indeed, often difficult and costly [36]. One example is the very core of our working process, namely trying to find grants suitable for interdisciplinary research. This showed us that, similar to what Löwgren and Reimer [15] argue, interdisciplinary collaborative research is often not liked by grant-holders. This was also experienced in a couple of rejected research applications. However, receiving comments from reviewers improved our applications and made us sharpen our line of reason with arguments that several simultaneous perspectives enrich our project. Another example is discipline-based critique from other researchers within the university that we, as a group, as well as individual members of our research group, received. We were perceived as walking into other subjects’ territory, and this was seen as a threat. There are subtle processes and borders at work within academia. After reflections and discussions, we, as a group, changed our group structure (from six to four researchers), as well as our research focus.

Rejected research proposals and internal critique develop resilience, which we argue that all interdisciplinary scholar groups need. To handle challenges, taking social risks and learning by collectively acquiring knowledge seem to unfold as a cluster of competences mutually dependent and necessary to use and communicate. In our process, it was a learning process unfolding not according to a linear fashion but more iterative, in terms of going back and forth, in all directions at the same time. This could very well be described by the rhizome metaphor, as used by Deleuze and Guattari [59] to depict a learning process that, like a rhizomatic root system, organically grows in any and in all directions at once and not necessary growing from A to B, from below to the top, nor from center to periphery.

#### *4.5. Learning to Balance Thinking and Acting Critically and Creatively*

Thinking along the metaphor of a cluster of concepts, like risk and challenge, one needs a capacity to balance between different pairs of concepts. For example, when we as researchers discussed and worked interdisciplinary, we tried to come to grips with holding on to what is already known and balancing that with what we do not know. In somewhat different terms, we worked with and based our discussion on research truths, and, at the same time, we promoted a curiosity to inquire after what we did not know. Thinking critically can, thus, be described as leveling critique toward something already existing, like a research field, methods or common knowledge within a certain field. Thinking creatively is about going beyond what we already know, i.e., thinking about the same research in one sense involves thinking in new *and* unknown terms and concepts. Whenever we were attempting to think and act creatively, we, therefore, had to make use of new metaphors and concepts and ask new questions.

Developing an ethos of balancing the different mentioned capacities, such as learning to approach academic risks, handle social challenges, ask good critical questions, lead a process of refining a question and creatively develop it into new questions, all unfolds into a complex process of sustainable and robust interdisciplinary learning. This balance could be said to possibly be about developing an ethos and approach of inquiry based

interdisciplinary research rather than to fall back to the already known of “a correct answer pedagogy” [60], or as Foucault words it:

If you knew when you began a book what you would say at the end, do you think that you would have the courage to write it? What is true for writing and for a love relationship is true also for life. The game is worthwhile insofar as we don't know what will be the end [61].

## 5. Conclusions

This study identified and explored possibilities and challenges of academic interdisciplinary capacities and ethos with the objective that this academic knowledge is useful both to future interdisciplinary research and in higher educational settings.

The results show that interdisciplinary knowledge creation in this context is undervalued by grant-giving institutions and the academic system, in general. It also entails time-consuming and risky research practices. Through taking on these risks, we learned to balance knowledge as both thinking and acting creatively and critically. We also learned to identify the synergies of interdisciplinary collaboration, and, furthermore, we developed knowledge capacities in togetherness without losing sight of our own disciplines.

The results also indicate that approaching the possibilities and challenges of interdisciplinary research creates an innovative, stimulating and sustainable learning environment, which enhances new ways of thinking and doing, in ascertaining each individual's knowledge and competences. Challenge-Based Learning is a valuable way to approach and problematize interdisciplinary research, as it stimulates an interdisciplinary knowledge and learning ethos and enables a sustainable academic professional development.

Why is this important? We argue that a long-term, interdisciplinary and collaborative research process could enhance and raise a critical thinking and creative consciousness among scholars, contributing to a more holistic, sustainable and socially robust learning in research and higher education.

Future research: The research group will, within next year, construct a European survey, which will be implemented at our university and among its partner universities in Europe. In addition, our university has decided to initiate a strategic research program on Challenge-Based Learning. A research program based on interdisciplinary knowledge will enable a more legitimized and accepted form of academic professional development in our university and beyond. This study demonstrates the need of future research on the conditions and challenges involved in applying for and receiving grant funds for interdisciplinary-based research projects.

**Author Contributions:** All authors have participated in writing this manuscript. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Acknowledgments:** We would like to thank Erin Cory for being a critical, friendly reader and supporter and Taghrid Jassim and Petri Gudmundsson for participating in the initial research applications with professional competence. We would also like to thank Malmö University for seed-funding support and for providing a network of collegial support.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*; United Nations: New York, NY, USA, 2015. Available online: [https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A\\_RES\\_70\\_1\\_E.pdf](https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf) (accessed on 17 May 2020).
2. Biesta, G. *The Beautiful Risk of Education*; Paradigm Publishers: London, UK, 2013.
3. Schön, D.A. *Educating the Reflective Practitioner*; Jossey-Bass: San Francisco, CA, USA, 1987.
4. Pryke, M.; Rose, G.; Whatmore, S. *Using Social Theory*; SAGE Publications: London, UK; Thousand Oaks, CA, USA; New Delhi, India, 2003.

5. Ritchie, S.M.; Rigano, D.L. Writing together metaphorically and bodily side-by-side: An inquiry into collaborative academic writing. *Reflective Pract.* **2007**, *8*, 123–135. [CrossRef]
6. Wenger, E. *Communities of Practice and Social Learning Systems: The Career of a Concept*; Springer: London, UK, 2010; pp. 179–198.
7. Vanasupa, L.; McCormick, K.E.; Stefanco, C.J.; Herter, R.J.; McDonald, M. Challenges in Transdisciplinary, Integrated Projects: Reflections on the Case of Faculty Members' Failure to Collaborate. *Innov. High. Educ.* **2012**, *37*, 171–184. [CrossRef]
8. Thorén, H. The Hammer and the Nail: Interdisciplinarity and Problem Solving in Sustainability Science. Ph.D. Dissertation, Lund University, Lund, Sweden, 2015.
9. Watson, L. Educating for Good Questioning: A Tool for Intellectual Virtues Education. *Acta Anal.* **2018**, *33*, 353–370. [CrossRef]
10. Olsson, D. *Improving Teaching and Learning Together a Literature Review of Professional Learning Communities. Research Report*; Karlstad University: Karlstad, Sweden, 2019; p. 23.
11. Rincón-Gallardo, S. *Liberating Learning: Educational Change as Social Movement*; Routledge: New York, NY, USA, 2019.
12. Gallagher, S.E.; Savage, T. Challenge Based Learning in Higher Education: An Exploratory Literature Review. *Teach. High. Educ.* **2020**, *1*–24. [CrossRef]
13. Christersson, C.; Christensen, J.; Ekelund, N.; Lundegren, N.; Melin, M.; Staaf, P. Challenger Based Learning in Higher Education—A Malmö University Position Paper. 2021; in progress.
14. Dychawy Rosner, I.; Högström, M. A Proposal for inquiry of network and challenge-based learning in social work education. *Tilgtai* **2018**, *80*, 43–54. [CrossRef]
15. Löwgren, J.; Reimer, B. *Collaborative Media: Production, Consumption, and Design Interventions*; The MIT Press: Cambridge, MA, USA, 2013.
16. Brink, E.; Wamsler, C.; Adolfsson, M.; Axelsson, M.; Beery, T.; Björn, H.; Bramryd, T.; Ekelund, N.; Jephson, T.; Narvelo, W.; et al. On the road to 'research municipalities': Analysing trans disciplinary in municipal ecosystem services and adaptation planning. *Sustain. Sci.* **2018**, *13*, 765–784. [CrossRef] [PubMed]
17. Power, M. *The Audit Society. Rituals of Verification*; Oxford University Press: Oxford, UK, 2010.
18. Wickström, J. Dekonstruerad länkning: En kritisk läsning av Constructive Alignment inom svensk högskolepedagogik och pedagogisk utveckling. *Utbildning och Demokrati.* 2015, *24*. Available online: <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-282612> (accessed on 13 December 2020).
19. Bornemark, J. *Det Omätbaras Renässans: En Uppgörelse Med Pedanternas Världsherravälde*; Volante: Stockholm, Sweden, 2018.
20. Verger, A.; Parcerisa, L.; Fontdevila, C. The growth and spread of large-scale assessments and test-based accountabilities: A political sociology of global education reforms. *Educ. Rev.* **2019**, *71*, 5–30. [CrossRef]
21. Berasategi, N.; Aróstegui, I.; Jaureguizar, J.; Aizpurua, A.; Guerra, N.; Arribillaga-Iriarte, A. Interdisciplinary Learning at University: Assessment of an Interdisciplinary Experience Based on the Case Study Methodology. *Sustainability* **2020**, *12*, 7732. [CrossRef]
22. Dahlbeck, P.; Widén, P. *En skola som Utmanar. Om att Göra Skola Meningsfull ur Elevers Perspektiv*; Studentlitteratur: Lund, Sweden, 2019.
23. Bruner, J. *Kulturens väv*; Daidalos: Uddevalla, Sweden, 1996/2002.
24. Dillon, J.T. *Questioning and Teaching. A Manual of Practice*; Resource Publications: Eugene, OR, USA, 2004.
25. Bronfenbrenner, U. *The Ecology of Human Development*; Harvard University Press: Cambridge, MA, USA, 1979.
26. Bronfenbrenner, U. The Social Ecology of Human Development: A Retrospective Conclusion. In *Bronfenbrenner, Urie. Making Human Beings Human: Bioecological Perspectives on Human Development, The SAGE Program on Applied Developmental Science*; Sage Publications: Thousand Oaks, CA, USA, 2004; pp. 27–40.
27. Danaher, P.A.; Davies, A.; De George-Walker, L.; Jones, J.K.; Matthews, K.J.; Midgley, W.; Arden, C.H.; Baguley, M. Resilience and Capacity-Building. In *Contemporary Capacity-Building in Educational Contexts*; Palgrave Pivot: London, UK, 2014. [CrossRef]
28. Downes, B.J.; Miller, F.; Barnett, J.; Glaister, A.; Ellemor, H. How do we know about resilience? An analysis of empirical research on resilience, and implications for interdisciplinary praxis. *Environ. Res. Lett.* **2013**, *8*, 014041.
29. Miller, R.C. Interdisciplinarity: Its Meaning and Consequences. In *Oxford Research Encyclopedia of International Studies*; Oxford University Press: Oxford, UK, 2017. [CrossRef]
30. Aboelela, S.W.; Larson, E.; Bakken, S.; Carrasquillo, O.; Formicola, A.; Glied, S.A.; Haas, J.; Gebbie, K.M. Defining Interdisciplinary Research: Conclusions from a Critical Review of the Literature. *Health Serv. Res.* **2007**, *42*, 329–346. [CrossRef] [PubMed]
31. Max-Neef, M.A. Foundations of transdisciplinarity. *Ecol. Econ.* **2005**, *53*, 5–16. [CrossRef]
32. Lave, J.; Wenger, E. *Situated Learning: Legitimate Peripheral Participation*; Cambridge University Press: Cambridge, UK, 1991.
33. Wenger, E.; McDermott, R.; Snyder, W.M. *Cultivating Communities of Practice*; Harvard Business Press: Boston, MA, USA, 2002.
34. Christensen, J.; Thönnessen, J.; Weber, B. Knowledge creation in reflective teaching and shared values in social education: A design for an international classroom. *Educ. 21 J.* **2020**, *2*, 12–23. [CrossRef]
35. Bjeregaard, L.; Mačiulskytė, S.; Aciene, E.; Christensen, J. Towards a Model of Social Innovation: Cross-Border Learning processes in Dementia Care in the Context of Ageing Society. *Soc. Welf. Interdiscip. Approach* **2018**, *1*, 8–23. [CrossRef]
36. Campbell, L.M. Diversity Overcoming Obstacles to interdisciplinary research. *Conserv. Biol.* **2005**, *19*, 574–577. [CrossRef]
37. Lang, D.; Wiek, A.; Bergman, M.; Stauffacher, M.; Martens, P.; Moll, P.; Swilling, M.; Thomas, C. Trans disciplinary research in sustainability science: Practice, principles, and challenges. *Sustain. Sci.* **2012**, *7*, 25–43. [CrossRef]

38. Wiek, A.; Ness, B.; Schweizer-Ries, P.; Brand, F.S.; Farioli, F. From Complex Systems Analysis to Transformational Change: A Comparative Appraisal of Sustainability Science Projects. *Sustain. Sci.* **2012**, *7*, 5–24. [[CrossRef](#)]
39. Daily, G.C.; Ehrlich, P.R. Managing earth's ecosystem: An Interdisciplinary challenge. *Ecosystems* **1999**, *2*, 277–280. [[CrossRef](#)]
40. Gibbons, M. Science's new social contract with society. *Nature* **1999**, *402*, C81–C84. [[CrossRef](#)]
41. McIlveen, P. Autoethnography as a method for reflexive research and practice in vocational psychology. *Aust. J. Career Dev.* **2008**, *17*, 13–20. [[CrossRef](#)]
42. Ellis, A.W.; Young, A.W. *Human Cognitive Neuropsychology: A Textbook With Readings*; Psychology Press: Hove, East Sussex, UK, 2013.
43. Bourdeau, P. Participant Objectivation. *J. R. Anthropol. Inst.* **2003**, *9*, 281–294. [[CrossRef](#)]
44. Adams, T.; Holman Jones, S.; Ellis, C. *Autoethnography: Chapter 1*; Oxford University Press: Oxford, UK, 2015.
45. Villeneuve, D.; Durán-Rodas, D.; Ferri, A.; Kuttler, T.; Magelund, J.; Mögele, M.; Nitschke, L.; Servou, E.; Silva, C. What is Interdisciplinarity in Practice? Critical Reflections on Doing Mobility Research in an Intended Interdisciplinary Doctoral Research Group. *Sustainability* **2020**, *12*, 197. [[CrossRef](#)]
46. Blake, J.; Sterling, S.; Goodson, I. Transformative Learning for a Sustainable Future: An Exploration of Pedagogies for Change at an Alternative College. *Sustainability* **2013**, *5*, 5347–5372. [[CrossRef](#)]
47. Charmaz, K. *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*; SAGE: London, UK, 2006.
48. Moghaddam, A. Coding issues in grounded theory. *Issues Educ. Res.* **2006**, *16*, 52–56. Available online: <http://www.iier.org.au/iier16/moghaddam.html> (accessed on 31 October 2020).
49. Tuckman, B. Developmental Sequence in Small Group. *Group Facil. A Res. Appl. J.* **2001**, *63*, 71–72. [[CrossRef](#)]
50. Daily, G.C.; Ehrlich, P.R. *Population, Sustainability, and Earth's Carrying Capacity BioScience*; Oxford University Press: Oxford, UK, 1992; Volume 42, pp. 761–771. [[CrossRef](#)]
51. Engler, K. A look at how the ecological systems theory may be inadequate. In *A Capstone Project 2007*; Winona State University: Winona, MN, USA, 2007.
52. Lakoff, G.; Johnson, M. *Metaphors We Live by*; The University of Chicago Press: Chicago, IL, USA, 2008.
53. Alvesson, M.; Skoldberg, K. *Reflexive Methodology: New Vistas for Qualitative Research*; SAGE Publications: Thousand Oaks, CA, USA, 2000; ISBN 0-8039-7707-7.
54. Chism, N.V.N.; Bickford, D.J. (Eds.) *The Importance of Physical Space in Creating Supportive Learning Environments: New Directions for Teaching and Learning*; Jossey-Bass: San Francisco, CA, USA, 2002.
55. Mansilla, V.B.; Duraisingh, E.D.; Wolfe, C.R.; Haynes, C. Targeted Assessment Rubric: An Empirically Grounded Rubric for Interdisciplinary Writing. *J. High. Educ.* **2009**, *80*, 334–353. [[CrossRef](#)]
56. Jahn, T.; Bergmann, M.; Keil, F. Transdisciplinarity: Between mainstreaming and marginalization. *Ecol. Econ.* **2012**, *79*, 1–10.
57. Widén, P. Att mäta och att mätas-bedömning, inspektioner och skolledarskap. In *Upplyftande Ledarskap i Skola och Förskola*; Riddersporre, B., Erlandsson, M., Eds.; Natur & Kultur: Stockholm, Sweden, 2016.
58. Aspelin, J. *Lärares Relationskompetens: Vad är Det?: Hur kan den Utvecklas?* Liber förlag: Stockholm, Sweden, 2018.
59. Deleuze, G.; Guattari, F. *Tusen Platåer: Kapitalism och Schizofreni*; Tankekraft Förlag: Hägersten, Sweden, 2015.
60. Kupferberg, F. Farvel til "de rigtige svars" pædagogik. In *Kreativitetsfremmende Læringsmiljøer i Skolen*; Tanggaard, L., Brinkmann, S., Eds.; Dafolo: Fredrikshamn, Denmark, 2009.
61. Foucault, M. "Truth, Power, Self." Interview. In *Technologies of the Self: A Seminar with Michel Foucault*; University of Massachusetts Press: Amherst, MA, USA, 1988.