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Interdisciplinary Collaboration in Pedagogical Design Work

*Academics experiences and insights into their
knowledge integration processes*

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Abstract

The complexity of today's knowledge society today require professionals to collaborate, also across disciplines, to solve complex or ill-structured problems. As a result, interdisciplinary collaboration has become a salient topic in higher education, where academics are increasingly encouraged to undertake interdisciplinary projects in various constellations. While extensive research work has been conducted on interdisciplinary scientific research work, there is limited knowledge about the way such work is conducted in connection with education. There is a need for research knowledge about the strategies used and implemented in interdisciplinary collaboration projects to share, negotiate and integrate knowledge when academics undertake pedagogical design work.

This study examined the experiences of an interdisciplinary team of academics and professional experts that engaged in collaborative pedagogical design work to develop an e-course in intercultural competence. Specifically, this study explored the strategies that an interdisciplinary project team employed to facilitate and manage knowledge integration, their reported experiences and challenges during their participation in the collaborative pedagogical design work.

The dataset consisted of a combination of individual face-to-face and online interviews with academics and professional experts from the Nordic and Baltic countries, who were partners in a European development project. Discussions from the project meeting represented secondary data. The data obtained were analysed using Braun and Clarke's (2006) thematic analysis method; through a combined process of inductive and deductive analysis. An analytical framework was built by drawing on socio-constructivist perspectives, the notions of academic hospitality by Phipps and Barnett (2007) and the modes of interdisciplinarity by Barry and Born (2013).

The study's findings revealed that academics engaged in various knowledge and design-related activities as a part of the collaborative design process. Academics reported that they engaged in knowledge sharing but also questioned and critically reflected on each other's perspectives; thus, they enacted reciprocity between being 'hosts' and 'guests' in the collaboration. Knowledge negotiations were seen as a crucial aspect of the collaborative design process. It helped the team members in working together, build on each other's insights to reach a shared consensus and provided new perspectives to the course design. Furthermore, it benefitted the team as it enhanced their professional knowledge, skills and

practices due to their project participation. To manage the teamwork, the team divided roles and responsibilities in line with their expertise, which appeared vital for achieving the project outcomes. Barriers in linguistic proficiency led to some extent to obstacles in team discussions. Challenges faced in the project were academics inconsistency in complying with the assigned responsibilities, which led to additional efforts from other members to ensure timely project completion. The power dynamics between the team members also shaped their discussions. However, through effective knowledge negotiations, they finalised the course design in the project. As a result, knowledge integration was achieved in the interdisciplinary collaboration.

These findings generate a set of implications for both research and practice. For academics and researchers, it is recommended to consider forbearance, openness and flexibility when working or organising collaboration in interdisciplinary teams. It is essential to engage in mutual feedback to critically analyse and reflect on each other's perspectives throughout the collaboration process to augment team learning and expertise. Organising workshops and training that induct the team into other forms of disciplinary knowledge and expertise can support systematically achieving knowledge integration. Project leaders and administrators are advised to select the right mix of team members that caters to the interdisciplinary project needs. It is suggested that they create enough time and space for ensuring team interactions and effective communication among the team. In addition, it is recommended to use a democratic approach during team interactions, to ensure that all knowledge inputs are adapted in the collaboration.

This study also indicates areas of further research, which may include: follow-up research on the use of the learning benefits obtained through participation into the academics professional practices; a comparative analysis of the strategies used by universities and HEIs to manage their interdisciplinary projects; and evaluation of the designed products to ascertain if it has achieved the project goals.

Dedication

This thesis is dedicated to all my family and friends for their prayers, support and encouragement.

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List of Abbreviations

COP	Communities of Practice
COVID- 19	Coronavirus disease of 2019
GDPR	General Data Protection Regulation
HEIs	Higher Education Institutions
NSD	The Norwegian Centre for Research Data
OECD	The Organisation for Economic Co-operation and Development
RCN	The Research Council of Norway
STEM	Science, Technology, Engineering and Math
TA	Thematic Analysis
TDT	Teacher Design Teams
UiO	The University of Oslo
US	The United States

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1 Introduction

1.1 Background

The current “wicked” problems that affect society are found intertwined in the social, economic, scientific and political frontiers (Egger et al., 2019). These wicked problems refer to “complex, intractable, open-ended or unpredictable” issues (Alford & Head, 2017). Wicked problems like climate change, pollution, poverty, food crises, social inequality are seen as challenging to define and resolve (Desa, 2016; Rittel & Webber, 1973). Addressing and resolving such issues often require to take into consideration several disciplinary perspectives (Pharo et al., 2012; Scanlon et al., 2019; Stone et al., 2009). So, interdisciplinarity is seen as one of the ways to approach and resolve such complex issues (Davé et al., 2016).

Interdisciplinarity was seen a top priority area and was encouraged in research and innovation in the European Union’s (EU) Horizon 2020 programme. It aimed to target the societal challenges by incorporating multiple disciplinary perspectives to solve complex problems (Allmendinger, 2015; Allmendinger et al., 2013). The Research Council of Norway (RCN) also recommends and encourages interdisciplinary research through the provision of financial support. This enables researchers from various disciplines to work collaboratively to create new knowledge that would not be possible otherwise (The Research Council of Norway [RCN], 2019b).

Using interdisciplinary approaches helps to resolve the “wicked” problems that overlap between the diverse disciplines. Moreover, it also helps in facilitating new areas for future research (The Research Council of Norway [RCN], 2019a). Therefore, such endeavours are undertaken in various disciplinary areas, for instance, natural sciences (Borrego & Newswander, 2010), earth sciences (Egger et al., 2019), biodiversity (Lélé & Norgaard, 2005), engineering (McNair et al., 2015), STEM (Science, Technology, Engineering and Math) (Schneider & Pickett, 2006) fields among other areas (Brown et al., 2018; Frodeman et al., 2017; Pharo et al., 2014; Repko et al., 2016; Warren, 2006).

The growing complexity seen in higher education, for instance, how “knowledge is defined and disseminated; how and what students learn; and how higher education can be responsive to its external environment” are challenges faced by academics (Holley, 2017). As a result, using interdisciplinary approaches are seen as a strategy by higher education institutions (HEIs) and universities to cope with such challenges (Holley, 2017; Klein & Falk-Krzesinski,

2017). It entails academics in HEIs combining their diverse knowledge and expertise to design and organise teaching and learning activities as a response to such challenges (Holley, 2017; Damşa & De Lange, 2019).

Newell (1998, 2002) argues that by incorporating interdisciplinary perspectives of academics into the learning activities has various benefits for learners. It enables “higher-order thinking skills, helps students to think, analyse and synthesize information critically and also aid in better conceptual understanding” (as cited in You, 2017, p. 67). Moreover, it provides learners with the opportunities of working with knowledge from various disciplinary domains. It enhances students learning experiences as they are able to integrate the acquired knowledge to resolve complex problems (Holley, 2017). This is crucial specifically for students studying professional education, for instance, health sciences and social work as they are required to learn in and from multiple disciplines (Berg-Weger & Schneider, 1998; Headrick et al., 1996; Lavin et al., 2001; Sternas et al., 1999).

Previous empirical research suggests that designing learning activities through an interdisciplinary approach combines pedagogy and methods in a way that helps students to be more involved in their learning (Duerr, 2008; Nandan & London, 2013). It facilitates “generative and transformational learning” which can further aid in creating “innovative solutions” to the “wicked” societal problems (Nandan & London, 2013; Repko et al., 2016). This enables learners to become “independent, confident individuals” who “learn how to learn” as they participate in the decision-making process when trying to resolve complex problems. It also develops their lifelong learning skills (Manning and Bucher, 2005, as cited in Duerr, 2008, p. 177).

1.2 Interdisciplinary work in Education

With the growing demand for interdisciplinarity in higher education, HEIs and universities are attempting to design and implement new educational programmes. This is to educate learners’ in using interdisciplinary approaches to address and solve complex issues (Egger et al., 2019). Also, it aims to enhance the learners’ interdisciplinary competencies to enable them to meet both the future industry demands and be capable of undertaking interdisciplinary research (Knight et al., 2013; Lyall et al., 2015; Rhoten et al., 2006). An increasing number of student enrolments are, therefore, seen in higher education programmes that incorporate such interdisciplinary perspectives. It is so they can enhance their knowledge, skills and educational experiences in diverse disciplinary areas that go beyond their primary field of

study (Rhoten et al., 2006). However, due to the growing student diversity, HEIs and universities have to frequently adjust their programmes to accommodate and support the diverse learners' needs (Hicks et al., 2001). It can be argued that "not every student learns in the same way" so this complicates the task of creating teaching and learning activities to cater to such diverse learners needs (Altbach et al., 2009, p. 17; Loukkola & Peterbauer, 2019, p. 5).

So how can HEIs and universities ensure that higher education programmes meet such demands and learner expectations? How can they overcome these challenges to ensure that effective and meaningful learning takes place? Loukkola and Peterbauer (2019, p. 5), suggest designing suitable learning environments is one of the ways to support the diverse learners' needs. Designing such learning environments require that the various components that support such learning have a "specific pedagogic intention". It entails using educational resources and tools, curriculum and learning activities that facilitate learning (Battou et al., 2016, p. 1) Using these tools should also assist learners to construct new knowledge as they engage in complex tasks like "problem solving, critical thinking and collaboration" (Oliver & Herrington, 2003, p. 5). Therefore, pedagogical design is considered to be a way through which these learning activities and environments can be developed for educational practice.

Pedagogical design refers to "any systematic choice and use of procedures, methods, prescriptions and devices to bring about effective, efficient, and productive learning" (Halttunen, 2011, p. 62). Pedagogical design provides the environment and the resources that support learning. It also aids in guiding and directing learning activities to ensure that meaningful learning takes place. The learning activities designed through the process of pedagogical design enables learners to understand and interpret "specialized knowledge and practices". This further enhances their "generic skills and competences" (Damşa & De Lange, 2019, p. 10).

In educational contexts, the process of pedagogical design work is done both individually or by collaborating in teams (Kvan, 2000). Although there is no clear definition of 'collaboration' researchers define it as a combined and continuous effort by a group of people to create and maintain a shared idea of a problem (Détienne et al., 2012; Lipponen, 2002; Roschelle & Teasley, 1995). The term 'interdisciplinary' is often used to describe such collaborations. It involves individuals from various disciplines, for instance, faculty members, students, administrators and other stakeholders from HEIs (Holley, 2009b). The individuals working in such teams, can have the same disciplinary expertise or can be a group of

individuals from various disciplinary domains. Individuals work collaboratively to achieve shared goals or to find solutions to a common problem by optimally using each other's knowledge and experiences (Kvan, 2000).

In an interdisciplinary team, academics having various disciplinary knowledge and expertise can collaborate to design courses or learning activities. The team members combine the “strengths of two or more disciplines” to identify the problems, find and apply solutions to resolve them (Holley, 2009b; Klein, 1990, p. 11; Slavicek, 2012). The collaborative design work in such teams is a “social” process as it entails “dialogue and interaction” among individuals having diverse disciplines and expertise (Holley, 2009a, p. 106). During the collaborative design work, academics participate in discussions where they share issues of mutual interest and importance. At the same time, they also mutually explore the relationship between each other's shared knowledge and expertise (Holley, 2017). This enables them to develop an adaptable and realistic outlook to the common goals. They are able to use their knowledge in a way that is beneficial to the team (Mansilla et al., 2016).

Participating in collaborative design work helps the academics to critical think and analyse each other's perspectives during team interactions. As a result, they learn from each other when they exchange ideas/knowledge and it leads to their professional and personal development (Agyei & Voogt, 2012; Bakah et al., 2012; Voogt et al., 2015). This leads to new knowledge creation as the academics are able to combine the various disciplinary perspectives to design learning (Amey & Brown, 2006). Such collaborations often provide innovative results and also “emerging insights and conclusions” that go beyond the individual's own knowledge in his/her area of expertise (Slavicek, 2012).

Working in interdisciplinary teams has several other benefits too; for instance, it allows for a division of the workload amongst members, enables access to expertise and perspectives from educators from various HEIs. It facilitates the cross-fertilization of knowledge and ideas which would not be available in one institution alone (Mellor et al., 2002; Ryan et al., 2017). While working in such diverse teams can enable the possibilities to develop future collaborative partnerships (Holley, 2009a). On the other hand, it can also lead to obstacles amongst the team, if the members are unable to tolerate each other's perspectives or do not share the same enthusiasm towards achieving the project goals (Austin & Baldwin, 1991).

Research conducted by Bell et al. (2005) on the process of interdisciplinary work in two European Union Fifth Framework projects conclude that it is “dynamic” and so cannot be created using a “predetermined recipe” (p. 16). Such collaborations involve using various

ways to organise and manage the working of an interdisciplinary team so that they can integrate their ideas/knowledge to create new knowledge. However, Bell et al. (2005) do not provide any information about the ways of working and managing the teamwork in such interdisciplinary teams. Also, it would be challenging to achieve an integration between the ways of working among disciplines as they are not “homogenous entities with clearly defined borders” but are “heterogeneous” and are characterized by “contrasting scientific paradigms” (Molteberg et al., 2000, p. 321).

1.3 Rationale of the Study

While complex problems and issues are necessary for designing interdisciplinary curricula and programmes, how interdisciplinary teams collaboratively organise and design such learning activities are equally crucial. Not much is known about the various ways used in interdisciplinary collaborations to facilitate idea/knowledge sharing and negotiation during pedagogical design work. Also, while designing learning activities, the team members utilise and integrate each other’s knowledge and expertise to achieve the end outcomes (Pennington, 2016). But it is unclear what strategies they engage in to integrate each other’s ideas/knowledge while designing learning in such interdisciplinary collaborations. Several empirical studies explore the team member’s reported experiences and the barriers in interdisciplinary collaborations. However, they specifically focus on collaborations undertaken in scientific research projects.

In addition, there is a significant contribution from the field of social sciences in enhancing the “human spirit, critical reflection and debate” (Allmendinger et al., 2013). The field of social sciences contributes practically to social, cultural, economic, political aspects by providing education and training in higher education. There is a need to understand how academics in social sciences exchange ideas/knowledge and collaborate with other disciplines and stakeholders (Allmendinger et al., 2013). Hence, this study seeks to ascertain the strategies academics and other experts use to structure their ideas/knowledge while undertaking collaborative design work, and the management and organisation of the teamwork in such an interdisciplinary collaboration. Thus, there is a need for research in interdisciplinary work to understand and be able to support academics who engage in such interdisciplinary collaborations in the field of education.

1.4 Research Problem and Research Questions

While engaging in collaborative design work, academics use various activities that facilitate the process of idea/knowledge sharing in interdisciplinary teams. Furthermore, in such teams they make certain decisions regarding the advancement of the design work, the needs it would cater to and the result/outcome. Although these decisions are taken in every pedagogical design work, they may not be “explicit, conscious or formally articulated” in reality (Edelson, 2002, p. 108). Besides, these decisions can be challenging to take especially when the pedagogical design activities involve creating something new or innovative. The team members often develop a specific set of strategies i.e. “planning and preparation, development, implementation and evaluation, and revision and refinement” (p. 108) to respond to these challenges or in the context in which the task is being created (Edelson, 2002). However, little is known about how academics in such interdisciplinary teams engage in such collaborative pedagogical design work, what strategies they use to organise and manage the teamwork and to achieve knowledge integration.

In interdisciplinary collaborative design work, one cannot assume that academics within particular disciplines share the same research interests, methods or “epistemological perspectives”. So there would be differences in “content, methods and epistemologies” (Lattuca, 2001, p. 3). Also, when individuals collaborate due to common interests or goals these do not necessarily convert into a “research plan” having “predetermined bridges between the disciplines” (p. 967). During such collaborations, some academics might find it stimulating when other team members describe and discuss problems or seek solutions differently based on their disciplinary domains. This enables them in learning new ways of understanding the problem (Lattuca, 2001). On the other hand, many others might feel that it requires too much effort to communicate and share knowledge in such a diverse group. So, academics would resort to their own disciplines where everyone uses the same analytical techniques and disciplinary norms that they are most comfortable in (Lélé & Norgaard, 2005). This could result in “disciplinary clashes” that will interfere with the collaborative pedagogical design process and effectiveness of the team to create new solutions. They may also be unable to expand their perceptions beyond their area of expertise or may disregard another team member’s opinions (Amey & Brown, 2006, p. 2; Gooch, 2005).

Such collaborations may also lead to “challenges in negotiating the interactions” or “questions for credit in leadership” amongst the group members (Lattuca, 2001, p. 388). Thus, such

interdisciplinary teams might struggle during the process of collaborative pedagogical design work unless the underlying issues are addressed and managed efficiently and their success is dependent on the ability to combine and integrate disciplinary expertise to create something new or propose a solution to the existing issues (Bayerl & Steinheider, 2009; Derrick et al., 2011; Mansilla, 2016).

From an empirical perspective, research has predominantly focused on interdisciplinary collaborative work more in natural sciences and little is known about the interdisciplinary collaborations that academics engage in social sciences (Urbanska et al., 2019). Hence, this study focuses on the various ways in which academics organise and manage knowledge integration in interdisciplinary collaborative design work in the social sciences. This study aims to contribute to deepening one's understanding of such collaborations which would further help teachers, researchers and HEIs that engage in interdisciplinary projects.

Davé and colleagues (2016) suggest that participating in such collaborations help in knowledge enhancement amongst the academics. It also widens the scope of other research areas as it offers prospects for future research. On the contrary, Winters et al. (2010, p. 234) suggest that in such interdisciplinary teams, each member might try to retain their own "disciplinary approach" in collaborative work. This would further create "silos" within the team. While this could lead to little or no knowledge integration it can affect the designed learning activities. As a result, the end product may have the relevant pedagogical design but the product might be of a low quality (Winters et al., 2010). Therefore, a thorough in-depth understanding is required of the ways in which various strategies are used to organise and manage the design work in the interdisciplinary collaboration. Also, their reported experiences and challenges that they encounter during their participation in the interdisciplinary collaboration.

To achieve these aims, the following research questions are formulated:

1. What strategies do academics use to facilitate sharing, negotiation and integration of knowledge/ideas in an interdisciplinary collaboration?
2. What strategies do academics use to manage and organise the interdisciplinary teamwork in the project collaboration?
3. What are the experiences and challenges reported by the academics in the interdisciplinary collaborative design work process?

The focus of this thesis is to examine the interdisciplinary pedagogical design practices that were undertaken in an international development project. It comprised of academics from various disciplines (education, sociology, anthropology, economy and technology), school teachers, public sector servants and municipalities from the Nordic and Baltic countries who collaborated to design an e-course in cultural competency. Thus, considering the implicit nature of the study, this thesis used semi-structured interviews with participants recruited through purposive sampling. This was with the aim to understand the various strategies used by academics to facilitate and manage knowledge/idea sharing, negotiation and integration in an interdisciplinary team, their reported experiences and challenges during the collaborative design work.

1.5 Thesis Outline

This thesis comprises of six chapters with subsections.

Chapter 1 provides an introduction of the study and comprises of the background, the rationale of the study, the aims of the study and the research questions.

Chapter 2 discusses the concept of interdisciplinarity and provides prior empirical research conducted in both teacher's collaborative design work and interdisciplinary collaborative design work.

Chapter 3 provides the theoretical perspectives of the study by building on the ideas of social constructivism and outlines the theory of academic hospitality and the modes of interdisciplinarity that are used as a theoretical basis for the study.

Chapter 4 discusses the research methodology and provides details about the research design, empirical context, participants, data collection and data analysis as well as how the methodological quality was ensured in the study.

Chapter 5 discusses the findings that were obtained from the interviews and also uses data from the project meeting discussions to corroborate the interview findings. The results that are obtained are discussed according to the theoretical framework and are categorised according to each research question.

Chapter 6 includes the overall discussion of the findings, linking it to the relevant literature and theoretical concepts in the study. It also includes the recommendations obtained from the study findings that are considered to be valuable for academics, researchers and professional

experts when undertaking interdisciplinary collaborative projects and concludes with the limitations of this study and suggestions for future research.

2 Literature Review

Pedagogical design activities are undertaken by educators in various educational contexts ranging from kindergarten to higher education. These activities can be undertaken either individually or in collaboration with other academics, researchers, professional experts and other stakeholders. The number of team members in collaborative design work depends on the “scope of the design challenge”. The products of such collaborations can either be for their use or for others (Brown et al., 2018; Holley, 2009a; McKenney et al., 2015; Weitze, 2017). This literature review aims to provide an understanding of pedagogical design work activities undertaken in collaborations that are interdisciplinary in nature.

This section starts with existing definitions of interdisciplinarity. Secondly, it discusses interdisciplinarity in educational practice and the various aspects that it entails. Thirdly, it summarizes the concept of interdisciplinarity and operationalizes it in the context of the current study. Lastly, it will draw on empirical studies in both interdisciplinary and teacher collaborations in design activities to discuss the strategies used to achieve knowledge integration, their reported experiences and challenges in the collaborative design activities.

2.1 Defining Interdisciplinarity

The concept of interdisciplinarity is multifaceted, has various perspectives and connotations subject to the context in which it is studied. Research has been conducted on the nature of interdisciplinarity and the complexities it entails. Studies on interdisciplinarity describe the detailed logical processes that it involves in integrating and synthesizing diverse disciplinary perspectives for knowledge enhancement and advancement (Klein, 2008, 1996, 1990; Lattuca, 2001; Mansilla et al., 2009; Repko & Szostak, 2016). Various researchers have tried to define interdisciplinarity by using different synonyms like: multidisciplinary, pluridisciplinarity, cross-disciplinarity and transdisciplinarity in teaching, learning and research (Barry et al., 2008; Bruce et al., 2004; Holley, 2017; Klein, 2014; Lattuca, 2001; Nissani, 1997; UNESCO, 1985).

According to the Organisation for Economic Cooperation and Development (OECD), the definition of interdisciplinarity was broad. It encompassed any form of interaction among disciplines that could range from “simple communication of ideas to the mutual integration of organizing concepts, methodology, procedures, epistemology, terminology, data, and organization of research and education” (Apostel, 1972, p. 25). Hence, this definition

included using methods from other discipline/s to combine the various disciplinary knowledge in the collaboration. It also entailed thinking holistically about the problem in the larger context to obtain an understanding of how the ideas and knowledge from the individual disciplines, relate not only to issue but also to each other (Repko & Szostak, 2016, p. 17).

Klein (1990) provides a general and a frequently used definition of interdisciplinarity as “a means of solving problems and answering questions that cannot be satisfactorily addressed using single methods or approaches” (p. 196). This definition is in coherence with Newell (1990) and Datta (2018) who refer interdisciplinarity as combining and connecting knowledge from various disciplines to obtain an end outcome which would not be possible by only using methods from a single discipline.

Apostel (1972) also view the notion of interdisciplinarity as a group consisting of individuals that are experts in different disciplines who are brought together to resolve a common issue through frequent interactions. On the contrary, Bruhn (2000) emphasizes that having two or more researchers from various disciplines does not necessarily ensure a better quality of work than a researcher that is trained in multiple disciplines. Whether an interdisciplinary team or a single researcher will be able to conduct collaborative work depends on the research focus and the complexity of the research problem. Therefore, interdisciplinary collaborative research is not the same as research done in teams, the problems faced are different and not dependent on the number of people that are involved in the research.

Lattuca and Barry et al. (2008; 2001) also discuss interdisciplinarity by emphasizing on the differences between and interdisciplinary and multidisciplinary work. They state that interdisciplinary projects have a greater level of “integration” and amalgamation among the disciplines than multidisciplinary projects which only combine disciplines or their parts. This concurs with Winters and Mor (2008) who suggest that members retain their individual “disciplinary approach” to the problem in multidisciplinary work which leads to “little or no integration”. Whereas in interdisciplinary work, the members work together on “activities in an interleaved, iterative and integrated manner” with the aim of “coherence” (p. 582). Hence these definitions focus on “integration” being the key criteria in interdisciplinary work that distinguishes it from multidisciplinary work.

For Bruhn (2000) interdisciplinarity is described in the context of research where “two or more” individuals from diverse disciplines “agree to study a problem of mutual concern, and who design, implement, and bring to a consensus the results of a systematic investigation of that problem” (p. 59). This definition infers that interdisciplinary collaboration mostly occurs

in teams. The interaction between the scholars from the various disciplines can enhance creativity and provide innovative insights into resolving multifaceted issues. Repko (2008) discusses interdisciplinarity in the context of science and technical fields highlighting, the collaborative aspect in the interdisciplinary process. In such teams, members are able to combine the contribution of the other team members so that they can jointly solve the problem (as cited in Borrego & Newswander, 2010, p. 64).

Berg-Weger and Schneider (1998) discuss interdisciplinarity in the context of social work education by using the term “interdisciplinary collaboration” and describe it as “an interpersonal process through which members of different disciplines contribute to a common product or goal” (p. 98). The collaboration is labelled interdisciplinary when the individuals from the various disciplines provide their “insights” during interactions. In the process, they “cross the boundaries of expertise” as they participate in “linking, blending, integrating and synthesizing different insights around a common question, problem, topic or theme” (Klein, 2014, p. 2).

Such interdisciplinary collaborations highlight integration among the disciplines and scholarly interactions that brings about a conceptual change amongst the team members (Paretti, 2011). Russell (1983) describes interdisciplinarity is “a specific plan, approach or set of efforts which blends the components of two or more administrative units within a university or among a set of colleagues drawn from a variety of institutional settings” (p. 246). (as cited in Lattuca, 2001, p. 12). The collaborative nature of interdisciplinarity is emphasized in these definitions as it focuses on the process of interdisciplinary work rather than the product.

In contrast, Klein (2014) argues that collaboration in interdisciplinary work does not necessarily mean groups of individuals from various disciplines working together. It could be individuals who may combine various “methods, tools or concepts from other disciplines” (p. 2) while undertaking independent teaching or research activities. This is in coherence with Bruhn (2000) and Salter and Hearn (1997) who point out that there are academics who are trained in more than one discipline and so automatically have an interdisciplinary perspective. Hence, they might employ these diverse perspectives while designing teaching and learning activities, for instance, using various techniques and methods for questioning or assessing students.

2.2 Interdisciplinarity in Educational Practice

Nissani (1997) discusses interdisciplinarity in academia as combining different elements of “two or more disciplines” and covers “knowledge, research and education” (p. 203).

Interdisciplinary knowledge entails understanding the working of these different elements in the disciplines. In interdisciplinary research and education, it integrates these elements to create new knowledge or a course/program (Nissani, 1997). Nissani’s (1997) definition concurs with Rhoten et al. (2006, p. 3) who define interdisciplinarity in education as “a mode of curriculum design and instruction” in which “individual faculty or teams” select and “integrate” information, methods, ideas, viewpoints “and or theories from two or more disciplines or bodies of knowledge”. This is to enhance learners ability so, they can understand and resolve issues by critically analysing them. In the process, the learners also “create new approaches and solutions that extend beyond the scope of a single discipline or area of instruction.” Thus, it is important to acknowledge that interdisciplinarity in education combines distinct ideas from two or more disciplines to generate innovative knowledge for educational purposes.

Amey and Brown (2006) characterize interdisciplinary work in university contexts as “a group of faculty and staff from various disciplinary backgrounds (paradigms) often within a single university, organized to address a predetermined task” (p. 2). This definition focuses on deliberately bringing individuals from various fields to reflect collaboratively on the issue/s. It also entails them in applying their expertise to generate integrated approaches that would help to resolve the complex issues in higher education.

While Austin and Baldwin (1991) argue that university and college faculty mostly conduct research and teaching activities by partnering up with colleagues from other disciplines. These collaborations are unique and depend on the “field of study, institutional environment, and task requirements” (p. 1). Thus, such partnerships take place in various settings, take different forms depending on the team member characteristics and team goals. Such collaborations are a “cooperative endeavor that involves common goals, coordinated effort, and outcomes or products for which the collaborators share responsibility and credit” (p. 5). These definitions are wide as collaborations among faculty and staff differ in many ways. It is dependent on the nature of collaboration (teaching or research), the team members speciality, the HEIs that employed them, the task on hand and other factors (Amey & Brown, 2006; Austin & Baldwin, 1991).

Several studies discuss interdisciplinarity in the context of teaching and learning activities state that it focuses on use of diverse disciplinary methods, “interpretive tools” to address a specific issue or problem. These courses are usually taught by teacher teams where each teacher has an individual responsibility to contribute their disciplinary knowledge to the course design while the team members collectively share the design work tasks amongst themselves (Holley, 2017). The designed courses are seen in the university curriculum where, learners acquire “integrated perspectives and solution-focused strategies” rather than “content-specific knowledge” from only one discipline (Ivanitskaya et al., 2002, p. 108). Learners also obtain a more comprehensive and holistic understanding of various topics due to this interdisciplinary knowledge integration. This enhances their knowledge, critical thinking and problem-solving skills. Also, the learners can transfer the acquired knowledge and skills to understand other issues or apply them in other learning contexts (Ivanitskaya et al., 2002).

Summary

The concept of interdisciplinarity includes integration or synthesis of disciplinary knowledge to reach a shared goal or solve a mutual issue. The extent of the various disciplines participating in the collaboration depends on the objectives; the task or outcomes. Interdisciplinarity also entails the creation of new knowledge or knowledge enhancement among diverse stakeholders. The definitions discussed in the study; offer insights into the various aspects of interdisciplinarity. Thus, it is seen as multi-dimensional and difficult to describe. Therefore, it is essential to define interdisciplinarity in the context of the current study.

For this study, I intend to explore the experiences of an interdisciplinary group of academics and professional experts who collaborated to design an online course in intercultural competence. Hence, the term ‘*interdisciplinary collaboration*’ is chosen to refer to the group of academics and experts that designed the online course in intercultural competence. I operationalise *interdisciplinary collaboration* as individuals from various disciplines working together to integrate their disciplinary insights, perspectives and expertise. Such collaborations are conducted through interactions, discussions and dialogues to solve a problem and achieve a common goal. Furthermore, it aims to enhance knowledge that would not be possible using disciplinary knowledge and expertise from a single discipline.

The term '*interdisciplinary collaboration*' will be further used as a lens to understand the characteristics of collaborative design work. More specifically, it seeks to understand what strategies academics use to facilitate and manage ideas/knowledge and design-related activities in an interdisciplinary collaboration. The strategies used to structure the teamwork to achieve knowledge integration in the collaboration. Lastly, this study seeks to investigate their experiences and challenges while engaging in such an interdisciplinary collaboration.

2.3 Empirical Research in Interdisciplinary and Teacher Collaborations in Pedagogical Design Activities

This section provides an overview of the literature relevant to the study synthesised to identify suitable themes that are useful to analyse the study findings. Overall, the literature review presented in this section comprises of empirical research combining teacher collaboration in design teams and interdisciplinary collaborations among various stakeholders in research settings. This is due to lack of research specifically in interdisciplinary teams of academics and professional experts undertaking design activities; and ways in which they organise and manage the teamwork and idea/knowledge exchange to achieve knowledge integration.

2.3.1 Knowledge Integration process and practices

Knowledge integration is a “core task” and a “cognitive process” in interdisciplinary collaborations. It entails combining various disciplinary methods, concepts, perspectives of team members to jointly create new knowledge (Claus & Wiese, 2019; McMurtry et al., 2012). The team members exchange ideas/knowledge as they participate in the various phases in the interdisciplinary collaborations. This entails goal setting to planning the design activities. The new knowledge created through such collaborations comprises of knowledge artefacts, practices or processes (Kohengkul et al., 2009; Moen et al., 2012).

Individuals engage in various forms of “discourse” that includes discussions, interactions, writing and other activities. This is done so that the team can exchange or share ideas, set goals, examine the issues which can produce the end outcomes (Van Aalst, 2009). The activities undertaken by academics where they exchange ideas/knowledge and experiences can be described as knowledge-related activities (Binkhorst et al., 2015, 2017). Pedagogical design-related activities include discussions about developing learning outcomes to meet the learning objectives, the target audience and the context that the course would be designed for.

It also focuses on the various methods that would be used to “regulate and realize” the course content design process and the expected outcomes (Lowyck, 2002).

Being involved in designing educational resources helps in developing members professional skills and competencies as they work together to not only share but also integrate their diverse perspectives (Almendra & Ferreira, 2020, p. 225; Pennington, 2016). However, it requires academics to have “an intellectual curiosity towards other disciplines, openness to others arguments, and search for connections” (Claus & Wiese, 2019, p. 194). During team interactions, members should not only elicit the diverse ideas/knowledge from each other but also question each other’s ideas during the collaboration (McMurtry et al., 2012).

Such interactions lead to members developing their outlook and abilities in terms of openness in sharing and receiving ideas. Furthermore, it also enhances their disciplinary knowledge and knowledge creation skills as they develop a shared language/terminology, shared understanding of the task. They are also able to adapt and incorporate other team members perspectives and professional experiences into the designed outcome (Kvan, 2000; Steinheider & Legrady, 2004). In interdisciplinary collaborations, knowledge and information from external experts is considered vital. This is because they provide “formal knowledge” and the latest developments in the field (Erickson et al., 2005). It can further support the team in obtaining valuable insights and knowledge necessary for designing learning activities. Also, it helps in providing the structure and clarity needed to design the course (Coenders, 2010).

Participating in knowledge-related activities, for instance, writing and sharing of educational resources, use of diagrams, concept maps and providing mutual feedback can also contribute to developing a shared understanding of the project goal. Hence, it could facilitate the process of effective knowledge integration in the interdisciplinary collaboration (Pennington, 2016). These knowledge and design-related activities are considered to be beneficial in obtaining knowledge integration in interdisciplinary collaborations. Moreover, if team members are from similar disciplines, they can easily combine their disciplinary knowledge by using these ‘traditional’ forms (formal presentations, workshops, seminars) of activities (Pennington, 2016). Whereas, if team members are from different disciplines, these ‘traditional’ activities would not be suitable in obtaining an understanding of the ideas put forth during discussions by members. The interdisciplinary collaborative process should be organised and managed so that the team members can explore the issue using their diverse perspectives. It should also

facilitate their learning as they combine their diverse perspectives to designing learning (Pennington, 2016).

During the collaborative design process, team members exchange and generate various ideas. This requires it to be discussed back and forth several times before arriving at a mutual consensus. This is because quick acceptance and agreement of the shared ideas can hinder the development of new knowledge and teaching practices (Kuusisaari, 2014; Voogt et al., 2016). For instance, Kuusisaari (2014) examined the group discussions of two teacher teams involved in knowledge creation activities during an in-service course. The findings showed that the members listened to each other and questioned the generated ideas during the collaboration. These interactions led to idea generation and development of new ideas. However, the members did not negotiate the ideas enough and rapidly accepted the ideas put forth in the collaboration.

The findings of Kuusisaari's study concur with those of McKenney et al. (2016) who examined four in-depth sub-studies focusing on the different aspects of teacher design discussions during the collaborative design process within six teacher teams. McKenney et al. (2016) also suggest that the team should not work towards an immediate group consensus in the design work process but must try to bring out the diverse disciplinary knowledge perspectives and ideas within the team as it will enrich the final designed product. Stoll et al. (2006) conclude that teacher team collaborations benefit from openness and willingness of team members to share and receive ideas and information. Therefore, it is essential that members not only provide support through giving and receiving feedback but also discuss any idea/knowledge disagreements or any possible conflicts that could arise during the collaboration (Kuusisaari, 2014).

Weiss et al. (2015) used three distinct dynamic phases labelled "blind date, pushing through and authentic partnership" to discuss the collaboration processes of two college faculty members that designed a course in special education and secondary education social studies programs. The first phase involved members sharing experiences, beliefs and goals during the preliminary meetings. While this generated excitement, it was short-lived as the differences in members disciplinary knowledge and perspectives caused conflicting views on the same ideas like particular approaches used in teaching. Although this led to tensions, the team brainstormed collaboratively and negotiated solutions to it. It helped them to challenge their existing disciplinary expertise and further helped in developing a successful collaborative partnership. In the final phase, the participants successfully worked together while

questioning each other's ideas while still retaining a shared understanding of the course goals and considerations for each other's perspectives. The findings suggest that while negotiations helped in the collaborative course design process, however, it was a time-consuming process (Weiss et al., 2015).

McNair et al. (2015) used a case study to investigate the collaborative knowledge exchange practices between an interdisciplinary research team of student and faculty researchers from three US universities (from engineering, biology and chemistry disciplines) while designing an underwater robot. The team was introduced to various disciplinary perspectives during team meetings and discussions. While the participants faced epistemological challenges (different knowledge practices and approaches), they negotiated their conflicting views rather than arguing for the superiority of their own perspectives. Some team members (engineers) also served as "brokers" who provided bridge and artefacts for team members to reach common understandings. Thus, they worked towards a shared understanding to successfully produce collaborative knowledge and helped in contributing to each other's research agenda (McNair et al., 2015).

The findings from McNair et al. (2015) concurs with Tartas and Mirza's (2007) study on an interdisciplinary collaborative European Research and Development project. The team comprised of pedagogical (education, psychology) and technical experts that designed software tools to enhance the argumentative learning skills. The study found that while team members initially faced difficulties in understanding and agreeing to other members perspectives, they found a way to bridge the gap by listening to each other's ideas. Some members mediated idea negotiation and disagreements and in the process, learnt other members disciplinary language and methods. The study revealed that the collaborative design process was nonlinear, had various alterations and changes implying that interdisciplinary collaborations take various forms and evolve over time.

Studies by McNair et al. (2015) and Tartas and Mirza (2007) show that collaborative design work is a "demanding activity" as it requires members to negotiate their diverse perspectives due to differences in their professional experiences, knowledge competencies, interests and responsibilities. Therefore, team members need to compromise to sustain the collaboration and to achieve the project goals (Ruiz et al., 2020).

In interdisciplinary collaborations, designing learning activities is often assumed to be a "group process" as it involves combining and integrating the diverse disciplinary perspectives of the team members (Bammer, 2013, p. 49; Klein, 2014). However, not every team member

has to participate in the knowledge integration process. The members could participate either as “informants” or as “active contributors” but, the final decision could be made by either collaboratively or by the team leader (Scanlon et al., 2019). For instance, Pharo et al. (2014) studied four Australian universities that established Communities Of Practice (COP) approach to effectively organise collaborative interdisciplinary teaching and learning activities to teach climate change. The findings show although the levels of participation among the team members were not the same, the COP approach allowed flexibility in member participation. Furthermore, careful member selection in the leadership roles (activator and facilitator) ensured smooth coordination, overseeing, informing and organising of the team member tasks which sustained participant interest level. This study implies that while not all members participated equally, they jointly integrated their ideas during collaboration to produce the required outcomes.

Summary

Overall, the findings from the studies indicate that academics undertake various knowledge and design-related activities to achieve the process of knowledge integration in an interdisciplinary collaboration. Studies also highlight the importance of effective planning, organisation and facilitation during the collaborative design process to ensure successful knowledge integration. However, few studies have discussed the strategies used to organise and manage knowledge integration and teamwork in interdisciplinary projects. Therefore, this study seeks to address this gap in the literature by examining the strategies used by academics and experts to facilitate and manage idea/knowledge sharing, negotiation and integration in an interdisciplinary collaboration. Thus, the empirical literature in the interdisciplinary collaborations would serve as a useful link to discuss the findings obtained from the current study.

2.3.2 Academics Experiences in Collaborative Pedagogical Design Work

Benefits of Academics Participation in Collaborative Design Work

Research on collaborative design work undertaken in teacher teams shows that their experiences through participation in designing learning activities have a positive effect on their learning. Academics “gain new pedagogical insights” through team interactions as they share their knowledge and experiences (Binkhorst et al., 2017; Kafyulilo et al., 2016). Bakah et al. (2012) study of three engineering teacher design teams in a polytechnic in Ghana showed that participation in the collaborative design work provided teachers with the

opportunities for active team interactions and idea and knowledge sharing on the topic. Also, it further helped the teachers ability to reflect on their designed courses and so could improve it. Nihuka and Voogt (2011) investigated university teachers experiences that collaborated to develop e-learning modules for the Open University in Tanzania. The study found that participation in the team discussions enhanced the teachers' course development skills and learnt how to deliver the e-learning to their students.

Agyei and Voogt (2012) investigated two groups of pre-service mathematics teacher teams in Ghana that worked collaboratively to design technology-enhanced mathematics lessons. The findings revealed that the collaborative design work process led to the development of their technology integration skills. However, they did face challenges in idea generation and creation of learning activities. Also, they were unable to identify and combine suitable technology applications for designing learning.

The studies by Bakah et al. (2012), Nihuka and Voogt (2011) and Agyei and Voogt (2012) reported their participation in the collaborative design work process contributed to the TDTs professional development. The teachers learned how to work collaboratively with each other, thus acquiring collaborative working skills. Participation in the collaboration also prepared them to accept the various members ideas but also handle the idea differences in the team. Through negotiations, they reached a consensus to develop a shared understanding amongst themselves.

Participation in collaborative design work also brings about a change in teacher's teaching practices and educational beliefs as they engage in "new content and pedagogies" (Meirink et al., 2010; Nihuka & Voogt, 2011; Pieters et al., 2019, p. v). For instance, Hindin and colleagues (2007) that studied the collaborative design process for an ongoing literacy programme between three middle-school teachers and a research group found that the collaboration helped the teachers in gaining new insights to teaching, problem-solving and led to a transformation of teaching practices. Kafyulilo et al. (2016) examined the experiences of 12 in-service science teachers that collaborated in design teams to create technology-enhanced biology, chemistry and physics lessons in a secondary school in Tanzania. The findings showed that participation in the collaborative design activities contributed to new conceptual learning among the teachers as they shared knowledge and experiences related to technology, pedagogy and content.

On the other hand, the findings from Kafyulilo et al. (2016) study revealed that the teachers faced difficulties in organising and collaborating themselves in the team meetings. Bakah

(2011) and Binkhorst (2017) state that teachers can face difficulties in collaboratively planning and organising design activities and so require guidance and support in their design work. Voogt et al. (2011; 2016) have shown that support through external expertise has a positive effect on the design quality and to teachers learning. External expertise can take the forms of experts bringing in new ideas and inputs through content, technology and pedagogy that provides the team with new insights to the collaborative design work (Voogt et al., 2011; 2016).

Hubers et al. (2016) qualitative study provide insights into the collaborative processes of knowledge creation in two data teams of school leaders and teachers. The findings revealed that team learning occurred as a result of active involvement in brainstorming and reflective discussions. Thus, this suggests that team learning gains are highly dependent on their engagement levels. Therefore, efforts should be taken to stimulate members engagement levels during brainstorming sessions and reflective exercises while working collaboratively.

The findings from Hubers et al. (2016) study concurs with a mixed-methods study conducted by Binkhorst (2015) that investigated the collaboration in four teacher design teams that designed educational resources. The findings showed that stimulation and facilitation support from the team coach during team interactions was highly beneficial for the teachers. It led to the teachers' development of new pedagogical knowledge, content knowledge, technical skills and professional networking skills.

Similarly, Binkhorst (2017) qualitative case study of three teacher design teams in the Netherlands that collaborated in designing new learning resources found that guidance from the team leaders/facilitators contributes to successful collaboration. Also, it influences the outcomes in teacher's design work activities and leads to their professional development. The study showed that most team members reported acquisition of new pedagogical knowledge and skills through sharing their knowledge and experiences whereas, some teachers acquired new content knowledge about the theme of the content material that they developed. This was attributed to the leadership style used during team discussions.

The leadership style (vertical leadership) used during the team discussions contributed to steering the discussions to encourage participation or making sure that all members had equal opportunity. However, there were instances when the teacher participants (shared leadership) mainly led the discussions. Thus, the study suggests that a combination of both vertical and shared leadership style is required to give structure and clarity in the collaborative process at

the same time, the leaders should create suitable settings for team members to be able to take the initiative (Binkhorst et al., 2017).

Summary

The empirical research consists mainly of teachers experiences in Teacher Design Teams (TDT) in curriculum design in schools and higher education. The findings describe teachers benefits as a result of participation in collaborative design activities. Previous empirical research in TDTs mainly reports teachers professional development due to their participation in collaborative design work. The teachers learning gains are described as acquisition of new pedagogical knowledge, technological and content knowledge and professional networking skills, changes in their teaching practices and educational beliefs and abilities to reflect on their designs and own learning. While there is some research conducted in interdisciplinary collaboration in teacher teams, there is no research specifically conducted, that examines the benefits obtained due to their participation in collaborative design work. Therefore, the current study uses the themes obtained from empirical research on teachers experiences of collaboration in TDT to explore the benefits reported by academics and professional experts due to their participation in the interdisciplinary collaboration. This would be useful in ascertaining the similarities and differences in their reported benefits with the empirical literature on TDT due to their participation in the interdisciplinary collaboration.

Challenges in Interdisciplinary Collaborative Pedagogical Design Work

Teachers prior design experiences, content knowledge and skills are a useful tool in the collaborative design process as it influences the end outcomes of the collaboration (Huizinga et al., 2014; Voogt et al., 2016). Binkhorst et al. (2015) mixed-methods study on exploring teachers collaborative design work found that while most participants had design experience in terms of designing learning activities for their classroom however it did not go beyond the school level. The participants revealed that it would have been beneficial if they had more design experience as it would have been easier to develop new learning resources.

Kang (2001) investigated the challenges faced by the team of experts (professors, instructional designers, project manager, administrators and university leaders) during the process of collaborative design work of developing an online course. He concluded that members need to have appropriate design knowledge and technical skills for successful course development. On the other hand, Brown et al. (2018) study on undergraduate pre-service and in-service teachers collaboration in designing interdisciplinary learning activities

for learners concluded that both teams experienced challenges during the planning, enactment and reflection stage of the collaborative design work. It was despite having prior teaching experiences and disciplinary expertise. The study suggests that collaborative design teams require having a common focus, allowing time for reflection and instructor support along with guidance from other external interdisciplinary experts during idea discussions as it helps in timely creation of suitable outcomes.

Jonker et al. (2019) study on the process of collaborative design work undertaken by six teacher educators showed that the collaboration was a positive experience when the group atmosphere was supportive and inspiring, the goals and tasks were well-defined and were agreed by all members. The members listened and understood each other's ideas during collaborative work which helped them to broaden their perspectives. On the other hand, the members reported negative experiences during the collaborative process when the goals and tasks were ambiguous, unplanned or had variations and when members were unable to decide and collectively agree on the task goals. Thus, studies by Brown et al. (2018) and Jonker et al. (2019) show that prior design experiences, content knowledge and skills can be useful in collaborative design work. However, it is vital to have a common understanding of the goals and appropriate task support and guidance to engage in effective collaboration.

Research shows that participants in the collaboration projects that were selected based on existing consortia or previous contacts and networks were successful. On the contrary, projects that involved participants obtained through "partner search services" faced difficulties due to lack of awareness of participants' competencies and skills (Bruce et al., 2004). Kali et al. (2011) study on interdisciplinary collaborative design work revealed that careful project planning and selection, and selection of the team members (having relevant expertise and pedagogical background) led to the collaboration's success. This supported in reducing the members' differences in disciplinary knowledge and expertise.

Kali et al. (2011) findings concur with the study conducted by Pharo et al. (2012) on an interdisciplinary teacher network that collaborated to design interdisciplinary learning activities in climate change at an Australian university. The study found that the network facilitator was crucial in facilitating members' engagement and participation in the collaborative work process. Although the network facilitator worked part-time, their strong interdisciplinary background and interpersonal skills were significant in mediating team misunderstandings. The facilitator also supported team meetings by reformulating the interactions so that the members having different knowledge could understand the

discussions. Lack of funding for a network facilitator throughout the collaboration meant that members had to organise and manage the project themselves. However, the members were unable to put in the required efforts due to work commitments and, so the collaboration did not sustain beyond the initial year.

Studies by Kali et al. (2011) and Pharo et al. (2012) show that collaborative designing work is a complex process. It not only requires the experts to have design knowledge but also requires careful planning, selection of the project and selection of the right team members to effectively handle the team challenges. Furthermore, having experienced facilitator support throughout the collaborative design process can ensure smooth coordination, participation and stimulate member engagement and accountability throughout the project (Bell et al., 2005).

In interdisciplinary collaborations, the level of team diversity in terms of the participating members disciplinary backgrounds and how their disciplinary knowledge is communicated during design work can influence the team discussions. Team member diversity in terms of disciplinary language, methods and knowledge, professional backgrounds and work experiences can also influence the nature of the collaborative design work (Bruce et al., 2004; Janssen & Goldsworthy, 1996; Tartas & Muller Mirza, 2007). Some studies show that this team diversity is useful in creating new knowledge and designing of learning activities (Akkerman et al., 2006; Derry et al., 1998). On the contrary, other studies describe team diversity to be challenging as it leads to differences in members ideas and opinions. It can further complicate the knowledge integration in the collaborative design process (Edelenbos et al., 2017; Stalmeijer et al., 2007).

Stalmeijer et al. (2007), examined an interdisciplinary collaboration of a team of academics and professionals (doctor, basic scientist, social scientist) experienced in educational development from 21 interdisciplinary teams from a Dutch and a German medical school. The team designed multidisciplinary courses for undergraduate medical education programmes. The results showed that the collaborative design work was affected due to differences in opinions of the task, goals, targets and objective (value diversity). Whereas, the course quality was influenced due to team diversity. The study suggests that collaboration with members having different values and experiences due to disciplinary differences could complicate collaborative work.

On the contrary, Akkerman et al. (2006), investigated an interdisciplinary collaborative academic European project that designed an educational policy for facilitating teaching e-learning in secondary education, concludes that team diversity should not be understood as a

deterrent to prevent shared understanding. All team members should put in vigorous efforts to collaboratively work to accept and appreciate members perspectives that are not clearly understood during the initial stages of the design work process.

All disciplines have their own disciplinary language that is used while theorizing and discussing relevant issues (Reich & Reich, 2006). Schneider and Pickett (2006), argue that it is difficult to share ideas/knowledge and effectively collaborate if the disciplinary language/terminology used by team members cannot be easily understood by each other. For instance, research by Bruce et al. and Bell et al. (2005; 2004) highlighted problems in communication and use of “discipline-specific terms and jargon” as a barrier in interdisciplinary collaborations.

Kim et al. (2011) investigated the process of interdisciplinary research work of 25 researchers from 4 universities and diverse disciplines (architecture, engineering, English literature), found that members faced difficulties while communicating with each other. This was due to differences in their “epistemological paradigm or technical terms”. As a result, it influenced the members mutual understanding of the task; it took extra time and efforts to integrate their work. The findings from Kim et al. (2011) study concur with those of Bell et al. (2005) who examined the processes and problems in collaborative interdisciplinary research work. The studied the experiences of natural and social science researchers and other stakeholders that participated in two interdisciplinary European Commission Fifth Framework projects. The findings showed that while the researchers worked collaboratively, they faced problems in understanding disciplinary language and terminology while integrating their disciplinary knowledge and perspectives.

Bruce et al. (2004) examined the experiences of researchers and research managers in an interdisciplinary European Union project. The study concluded that differences in disciplinary: knowledge, methods and language/terminology hindered team members in developing a shared understanding of the task. The terms, concepts and methods used during discussions were interpreted differently by the team, thus requiring frequent clarifications in the project meetings. Schneider and Pickett (2006) who examined the collaborative design work undertaken by two educators and two students (engineering and science) show that the members faced difficulties during team discussions due to differences in disciplinary language, terminology, ideas and methods.

Studies by Bruce et al. (2004), Bell et al. (2005) and Schneider and Pickett, (2006) conclude that interdisciplinary collaborations are time-consuming as it requires members to develop a

shared understanding of the member contributions. Bell et al. (2005) suggest the importance of ensuring a “balance between disciplines” in interdisciplinary collaborations. It entails that all members have opportunities to voice their opinions and perspectives. This can ensure that members from certain discipline/s do not dominate team discussions. Furthermore, efforts should be made to actively encourage and include all members to participate in team discussions. Therefore, more time is needed for member interactions so that they can work together to ensure the “right balance in the power relations” to collaborate successfully.

Egger et al. (2019) investigated the collaborative design work undertaken by 32 interdisciplinary teams spread across various US institutions. The study revealed that while the team faced challenges due to working across different time zones and institutions, some teams that were in regular contact while developing educational resources made considerable progress in every project meeting. The study emphasized that the team members attending the initial face-to-face meetings were crucial to the success of the course design process. The other teams that could not attend or did not have the whole team present at the first meeting were unable to complete their design task.

Nicolson et al. (2002) examined an interdisciplinary research project consisting of 25 (natural and social sciences) researchers and local residents that investigated the sustainability of small indigenous communities in the Arctic. The study found that despite having funds for the annual project team meetings, it would be benefited if the funds were allocated for frequent face-to-face meetings having smaller working groups of researchers working on the specific project components. The studies by Egger et al. (2019) and Nicolson et al. (2002) show that face-to-face contact meetings should be a part of the budget especially when team members are ‘geographically dispersed’. It helps in idea generation, establishing a common understanding of the project goals, task planning and organising which is beneficial to achieve the project outcomes.

Summary

Research on collaborative design work in teacher teams mainly identify their benefits due to participation in the collaboration, the empirical studies on interdisciplinary collaborations conducted by various stakeholders provide an overview of the challenges or barriers faced in such collaborations. These studies lay the groundwork for a better understanding of the obstacles that academics face in interdisciplinary collaborations. As a result, the themes identified from the literature on interdisciplinary collaborations are categorised as time

constraints, linguistic and epistemological constraints, lack of common ground and clarity in project goals, lack of planning and facilitation support for task execution, the balance of power dynamics among members. The themes obtained from the empirical research will be useful to explore the challenges faced by the interdisciplinary team in the current study as they attempt to negotiate and integrate their ideas/knowledge to achieve the project outcomes.

3 Theoretical Background

This section discusses the theoretical background for this study by building on theoretical ideas taken from constructivism (Piaget & Cook, 1952) and the socio-constructivist perspective (Vygotsky, 1978). Next, I elaborate on the notion academic hospitality (Bennett, 2000; Phipps & Barnett, 2007) and the three modes of interdisciplinarity (Barry et al., 2008) which form the theoretical constructs for this study. Lastly, I will summarize and explain how these constructs will serve as a theoretical framework for the current study.

3.1 Constructivist Perspectives in Educational Practice

Constructivism is a theory of learning that was developed based on the ideas advocated by Piaget (1972; 1952) which describes the process of how individuals obtain knowledge and learn. The constructivist views that there is enough freedom in the “structure of physical and epistemological worlds to allow people to construct their own personal theories of their environments, of what “known” or believed by others about those environments, and of themselves” (The Cognition and Technology Group at Vanderbilt (CTGV), 1991, p. 16). Hence, constructivism views learning as an active process where individuals are “constructing their own knowledge” by trying out various ideas and techniques based on their previous knowledge and experiences. The individuals are able to combine the acquired new knowledge to their prior knowledge and experiences to use it in “new situations” (Kanselaar, 2002, p. 3).

While constructivism is ingrained in psychology, it is widely applicable in educational contexts. Constructivism takes various forms, for instance, cognitive constructivism (Piaget, 1972) and social constructivism (Vygotsky, 1978). Cognitive constructivism takes an “individualistic perspective” in the learning process. It posits that new knowledge is “constructed” by individuals by building on their prior learning experiences than passively absorbing knowledge through their interactions with the environment. Individuals negotiate meaning and understanding based on what they encounter in the new learning situation. It further stimulates their thinking and facilitates the construction of new knowledge and learning by themselves. Thus, this forms the underlying notion of cognitive constructivism (Bada & Olusegun, 2015; Kanselaar, 2002). Hence, knowledge is obtained and structured in the individual’s mind through such experiences (Palincsar, 1998).

In contrast, social constructivism (Vygotsky, 1978) emphasizes the “interdependence of social and individual processes” amongst individuals. Thus, knowledge enhancement occurs as

individuals interact with each other in social contexts and practices (Palincsar, 1998). Social constructivism highlights the social nature of knowledge construction as it's a "dialect process" (p. 16). Therefore, individuals are continually negotiating their disciplinary knowledge through interactions and discussions. As a result, they are able to integrate their ideas and opinions that are most consistent with the others (The Cognition and Technology Group at Vanderbilt (CTGV), 1991).

3.2 Socio-Constructivist Perspectives in Interdisciplinary Collaborative Pedagogical Design Activities

Pedagogical design entails creating learning activities that support learning. So, it requires academics to rely on diverse "knowledge base" for achieving the outcome and project goals (Lowyck, 2002). Academics in interdisciplinary teams, therefore, need to interact with each other and share their diverse perspectives to be able to create meaningful knowledge in the collaboration. However, knowledge creation in collaborative pedagogical design activities is often implicit as it is taken for granted by the academics that it is based on "common sense" (Schäfer et al., 2014). But, knowledge creation includes the development of new ideas and so needs "discourse" (discussions, writing and other activities) among the team members. Members need to interact to set knowledge boundaries and team goals to investigate the problem and provide suitable solutions for it (Van Aalst, 2009). Hence, creating such knowledge is a specific and purposeful activity as it focuses on the creation of an artefact/product (knowledge, service or technology) through frequent interactions and working collaboratively with individuals from various disciplines (Du Chatenier et al., 2009; Yañez-Figueroa et al., 2016).

Disciplines comprise of both cognitive (practices, beliefs, values) and social (rules and mechanisms for sharing, teaching and increasing knowledge) characteristics. When individuals undertake collaborative design work, they interact with each other and are required to integrate both these cognitive and social characteristics. Such interactions lead to an overlap of their disciplinary knowledge base, for instance, practices, beliefs and values. It also enables in new knowledge creation as they integrate disciplinary perspectives obtained from other team members. This further enhances their learning and knowledge base (Baird et al., 2004, pp. 12–13). So, the process of knowledge creation is an inherently active social process as team members can make sense of the "socially accepted and shared notions" when they interact with each other and can construct new knowledge (Kanselaar, 2002, p. 2;

Valsiner et al., 2000). The fundamental notion being that social interactions between the individuals facilitate learning as they share and negotiate ideas during collaborative work (Vygotsky, 1962 as cited in Adams, 2006, p. 245). Such social interactions enable team members to combine their disciplinary knowledge and experiences, which helps in gaining a broader outlook on various aspects (Karppinen et al., 2019, p. 60).

Through continuous negotiations of their disciplinary knowledge, prior experiences, approaches and so on team members can interpret and construct new knowledge that is mostly “consistent with each other” (The Cognition and Technology Group at Vanderbilt (CTGV), 1991). Therefore, individuals gain “new strategies and knowledge” and can “internalize the effects of working together” (p. 351-352) as they engage in interdisciplinary collaborations (Palincsar, 1998). Furthermore, such collaborative practices not only influence individuals to understand other disciplinary perspectives but also provides opportunities to convince other team members to understand their perspectives (The Cognition and Technology Group at Vanderbilt (CTGV), 1991).

This thesis draws on theoretical ideas from constructivism, as it is useful to understand how the academics interact and negotiate ideas/knowledge when they design the e-course in an interdisciplinary team. Also, their reported learning gained due to their participation in the interdisciplinary collaboration. Social constructivism theory provides an understanding of how individuals interact with the world and how their ideas are linked through their experiences. Social constructivism is of significance to understand how academics in interdisciplinary teams combine their pre-existing knowledge with the new knowledge obtained through their interactions and how this knowledge advances as they engage in discussions with others (Palincsar, 1998).

Social constructivism posits that learning cannot be separated from its social environment. For new learning to occur there has to be a consensus among the team members in collaborative work. The team members need to not only accept knowledge received from others but also contribute to the knowledge sharing in the team (The Cognition and Technology Group at Vanderbilt (CTGV), 1991).

3.3 Academic Hospitality

This thesis further employs the notion of academic hospitality and the modes of interdisciplinarity to understand how academics engage in the dialogical process when they share and negotiate ideas/knowledge in an interdisciplinary collaboration. The concept of

academic hospitality was first introduced by John B. Bennett (2000) who defines academic hospitality as a “key virtue” in academic life and is the “extension of self to welcome the other by sharing and receiving intellectual resources and insights.” (Bennett, 2000, p. 1). It comprises of individuals being “intellectually hospitable” by being open and considerate to the idea of mutual “sharing and receiving” knowledge and disciplinary perspectives while engaging in discussions or dialogues. This is highly essential, as it could either complement their existing learning and experiences or modify it (Bennett, 2000). Hence, academic hospitality echoes the ideas of social constructivism, wherein for learning to take place, one needs to be “intellectually hospitable” to the ideas and opinions of others (Bennett, 2000).

Bennett (2000) further classifies between two levels of hospitable conversations where firstly the individual shares his own disciplinary knowledge/ideas and is receptive to the disciplinary knowledge/ideas shared by others. The first level entails that each individual holds his own insights or beliefs about the issue that is being discussed. The goal in the first level is not to modify each other’s views but to give them an understanding of the issue from their own disciplinary perspective. It is only after the process of disciplinary knowledge sharing is sufficiently carried through discussions in the collaboration; it is suitable to move to the next level. In the second level, individuals analyse each other’s ideas, perspectives, provide mutual feedback and critically analyse the problems/task and the new perspectives that could surface during their interactions in the collaboration (Bennett, 2000).

Drawing on Bennett’s (2000) ideas, Phipps and Barnett (2007) further discuss the idea of academic hospitality by suggesting how academics need to be both “hosts” and “guests” when they jointly partake in designing learning activities (Phipps & Barnett, 2007, p. 239). As “hosts” they need to be hospitable and considerate with each other while engaging in such knowledge creation activities. As “guests” they need to equally participate and be able to share their knowledge/ideas in the design-related activities (Phipps & Barnett, 2007). They further discuss how individuals share and accept these “intellectual resources and insights” from each other (Bennett, 2000, p. 1) by describing the various forms it entails, for instance, *epistemological* hospitality and *linguistic* hospitality (Phipps & Barnett, 2007).

Epistemological hospitality discusses the practice of academics being open to sharing new ideas, techniques or concepts and accepting the ideas or viewpoints of others. Hence, it places importance on academics being open-minded to the other perspectives (p. 240).

Whereas, *linguistic* hospitality refers to the language used by academics when they communicate with each other. This is essential especially when the academics are from

various disciplines, they need to suitably engage in discussions where they can exchange knowledge/ideas from their disciplinary domains, but also easily understand the knowledge/ideas put forth by the others (p. 241). Phipps and Barnett (2007) emphasize engaging in constructive dialogue being the essential element for effective communication and successful academic collaborations. It places every academic at the same level without having any hierarchy or domination by another. Both *epistemological* hospitality and *linguistic* hospitality can overlap and can exist together at the same time. These forms consist of “both hosting and guesting” which further places a variety of demands on the academics (Phipps & Barnett, 2007).

3.4 Modes of Interdisciplinarity

Barry and Born (2013) used qualitative research methods to study how the actors involved in various interdisciplinary projects discuss, negotiate and work together. They classify three distinct “modes” that suggest how such interdisciplinary collaborations are undertaken. This is based on empirical research conducted in various interdisciplinary projects in various fields like environmental and climate change research, ethnography in the IT industry and art-science. In the *integrative-synthesis* mode, the already existing disciplines are presumed to combine in a balanced way to construct a new discipline. In contrast, the *subordination-service* mode, one discipline maintains a “master” position, whereas the other discipline/s assists or serves so that it can support it. Lastly, in the *agonistic-antagonistic* mode, interdisciplinarity is guided by a “critical opposition to the limits of existing disciplines” (p. 28-29) whereby existing disciplinary knowledge, ideas and concepts are challenged or criticized. These three modes are important in understanding interdisciplinary collaborations.

3.5 Conceptual Framework for the Current Study

Bennett (2000) emphasized academic hospitality to be “an epistemological necessity” (p. 3) without which teaching is only reduced to “mechanical transmission” (p. 26) of knowledge, individual learning is only seen as a passive reception of information. Thus, individuals would not be able to successfully incorporate the new knowledge acquired into his/her existing learning. For academics, the possibility to integrate their ideas/knowledge while designing learning in an interdisciplinary collaboration is only when they are receptive to “new ideas”, disciplinary knowledge and insights from other team members (Bennett, 2000, p. 1; Phipps & Barnett, 2007, p. 239). Academics working in such collaborations need to practice academic

hospitality without which they would be unable to integrate their various disciplinary perspectives, ideas and concepts.

Moreover, such collaborations enable the team members to learn from each other through idea/knowledge exchange. They can negotiate their individual perspectives during discussions and resolve their idea/knowledge differences. The interdisciplinary team can create “integrative frameworks” through such negotiations. In the collaborative process, they can develop “new insights, disciplinary relationships and integrative constructs” (Bruun et al., 2005, p. 29). In the context of the current study, academic hospitality will be operationalized as a process of give and take which involves team members in sharing and negotiating disciplinary knowledge/ideas, accepting new ideas and adapting to the changes to design the learning activities.

The concept of academic hospitality proposed by Phipps and Barnett (2007) provides a useful lens to explore how academics in interdisciplinary collaborations integrate their disciplinary knowledge and perspectives as they jointly engage in pedagogical design activities. This can be incorporated into the current study to understand how team members in interdisciplinary collaborations as “academic hosts” need to be open and willing to receive “new ideas” and perspectives that are shared by team members from other disciplines. This contributes to enhancing their overall learning experiences (Bennett, 2000; Phipps & Barnett, 2007, p. 240). Also, team members as “guests” need to put forth their ideas and perspectives in a way that are valuable to the team and allow the members to critically analyse and reflect on each other’s perspectives (Phipps & Barnett, 2007). Exchanging knowledge/ideas in interdisciplinary collaborations entails members being mutually open to the other disciplinary perspectives and letting others to question each other’s perspectives (Weiss et al., 2015).

More specifically, the idea of *epistemological* hospitality (Phipps & Barnett, 2007) is used to interpret the various ideas that the members put forth when they engage in dialogue during interdisciplinary collaborative design work. Also, essential in understanding how disciplinary knowledge that is shared by academics is negotiated and integrated in a synthesized way during their interactions in designing the course is the *integrative-synthesis* mode of interdisciplinarity proposed by Barry and Born (2013). The *integrative-synthesis* mode builds on the idea that disciplines that participate in the collaborative process combine their disciplinary knowledge and perspectives in a synthesized manner to create new knowledge. Hence, in the context of the current study, this mode will use to interpret how disciplinary

knowledge and perspectives that are shared by team members is negotiated and integrated while designing the course in intercultural competence.

During interdisciplinary collaborative work, team members come across various new terms and concepts from the other disciplines that generate perplexing situations (Pennington et al., 2013). This can pose challenges during designing learning activities. Academics need to identify and understand these terms and concepts to successfully integrate these while designing learning activities (Pennington, 2016). McNair et al. (2015) suggest that even the most collaborative activities can face challenges due to differences in disciplinary knowledge between the participating members. Each member has its own knowledge base, ideas and practices; causing “friction and breakdowns in communication”. Academics can find it challenging to combine and integrate disciplinary perspectives if they use discipline-specific language that is not easily understood by the others (Barry et al., 2008; Gooch, 2005). Therefore, this study uses *linguistic* hospitality (Phipps & Barnett, 2007) to interpret how these team members can communicate their disciplinary perspectives while engaging in dialogue in designing the online course in intercultural competence.

In interdisciplinary collaborations, the degree of power differences among academics from some disciplines will only serve to supplement what is required from them (Choi & Richards, 2017). Whereas, team members from certain disciplines might provide their disciplinary inputs and occupy more space during team interactions in the collaboration. However, for the enactment of the *integration-synthesis* mode, the participating academics from various disciplines have to take up the “service” or “subordination” role depending on the circumstances; or it will lead to conflict and result in a low-quality artefact (Winters & Mor, 2008). Therefore, the *service-subordination* mode (Barry et al., 2008) will be used to interpret the disciplinary ideas/knowledge that is being brought by the team members and how they are organised and integrated into the course design in the interdisciplinary collaboration

When team members share disciplinary knowledge and ideas in collaborative design work, it is in different degrees or varying proportions. This can create conflicts and tensions if the various disciplinary perspectives are not taken into consideration. It can hinder collaborative design work if the differences are not negotiated and accommodated effectively (Datta, 2018). Hence, the *agonistic-antagonistic* mode will be employed to analyse the stance team members take when they undertake interdisciplinary collaborative design work.

4 Research Methodology

This section outlines the methodological framework for the study. It discusses the research design and the research methods used in the study. Next, it presents the empirical context for the study, the project participants and recruitment of the study participants. Lastly, it describes the data collection and data analysis procedures followed by the discussions of ensuring the methodological quality for the study.

4.1 Research Design

A research design is a “plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry and specific methods” (Creswell, 2009, p. 5). Thus, it is a plan used by a researcher to respond to questions that he/she intends to investigate and helps in providing information about the particular choices made in the study. A research design comprises of the design used in the study, ways of selecting the study participants, data collection and analysis methods and discussion of the findings (Kumar, 2011, p. 396).

Choosing a suitable research design is very important to help the researcher obtain ‘valid findings, comparisons and conclusions’ (p. 24).

Research design entails quantitative research methods that focus on investigating the significance of the sum of the various reasons for a “social phenomenon”. Whereas qualitative research focuses on the “world views” of specific members of a “social group” and how they explore, understand and “interpret” a “social or human problem” (Bryman, 2012, p. 41; Creswell, 2014, p. 5; Merriam & Merriam, 2009, p. 5). Qualitative research believes that “reality is socially constructed” and there are “multiple realities or interpretations of a single event” (Merriam & Merriam, 2009, p. 8). Qualitative research tries to understand, interpret and explain these “varied” meanings that are “constructed” through the individuals’ experiences (Creswell, 2009). Thus, a qualitative research method was found to be appropriate for the study as it is concerned with understanding the social phenomena from the viewpoint of people being studied. Also, it was used to explain and interpret “how” the study participants engaged in the process of pedagogical design work in an interdisciplinary collaboration.

Qualitative research depends on the “participants’ views” of the phenomenon being studied. Therefore, it is important to explore the participants’ diverse views than limiting it to a few ideas which can be obtained through open-ended questions (Creswell, 2009, p. 8). Posing

open-ended questions enable the researcher to get the participants in-depth viewpoints as it allows them to create meaning of the situation by reflecting on their experiences.

Furthermore, collecting in-depth information from the participants allows the researcher to categorize the information into suitable themes (Creswell, 2009). In this study, a qualitative research design was used to interpret and explain the experiences and challenges reported by the team members during the interdisciplinary collaborative pedagogical design work.

Also, qualitative research is undertaken when the study is “exploratory” in nature, and not a lot of research has been conducted on the issue, or the individuals that are being studied (Creswell, 2009, p. 18). Since the study, investigated the strategies to organise and manage disciplinary knowledge sharing, negotiating and integration while undertaking pedagogical design work in an interdisciplinary collaboration, a qualitative approach was used in the study.

4.2 Empirical Context

The empirical context consisted of an international development project funded by the ERASMUS+ programme. The project consisted of academics from various disciplines (education, sociology, anthropology, economy and technology), school teachers and public sector servants from municipalities from the Nordic and Baltic countries. The project had an aim to develop an e-course in cultural competency training, specifically aimed at educating personnel of universities and municipalities. The e-course intended to increase employee's knowledge of different cultures and cultural norms, develop their expertise for teaching in intercultural and diverse settings and provide tools and training for how to operate in diverse settings. The course was planned as part of the lifelong learning programme for professionals, promoting sustainability in a field that needs continuous education. It was planned to be online, to reach a large number of participants (Project description, 2017)

The project lasted three years. Project activities consisted of three two-day project meetings on site (held in three different country locations) and remote work in-between project meetings. The materials produced during project meetings and remote work were uploaded and managed through a Google drive shared with all participants. The online course was made available online through the platform edX and consisted of various types of materials, such as video, text and various exercises.

4.3 Project Participants

In total, the project amounted to 16 participants from Iceland, Norway, Sweden, Finland and Latvia. Only 8 were included in this study, as they were permanent participants in the project activities and provided informed consent (see Appendix D). The project included predominantly women, with three male participants being involved in some of the project meetings and activities. The disciplines represented by the participants with academic positions (researchers or lecturers in universities or colleges) were education (and multicultural education), sociology, anthropology, economy and technology. The teachers were active in high school or secondary school level, with two of them being in leadership positions. The public servants were in charge of various educational projects at the municipality or regional level in Iceland, Finland, Sweden and Norway. The project manager was a university administrator from Iceland.

4.4 Recruitment of Participants

The list of the participants who were a part of the international project was obtained from the supervisor and used to contact potential participants. Purposive sampling was used as a method of selecting the target participants, as they were relevant to the study. The sample population in this study was purposively sampled because “the goal of purposive sampling is to sample cases/participants in a strategic way so that those sampled are relevant to the research questions that are posed” (Bryman, 2012, p. 418). This would help in getting answers to the research questions of the study and help in achieving the research goals (Bryman, 2012).

Participants were contacted via email with information describing the study details and the purpose. The email invitation has been attached in Appendix B. This would help the participants to gain information about the study purpose and its implications. It would enable them to decide whether they wish to participate in the study or vice versa (Bryman, 2012, p. 140). In total 18 emails were sent out to the interdisciplinary team members of the project. In total 8 team members expressed interest in participating in the study. The information about the participants’ disciplines and professional experiences is summarized in Table 1.

Table 1: Overview of study participants' disciplines and professional experiences.

<i>Name</i>	<i>Discipline</i>	<i>Professional Experience</i>
<i>P1</i>	<i>Anthropology, Educational Sciences</i>	<i>Teacher Educator & Academic Researcher</i>
<i>P2</i>	<i>Educational Sciences</i>	<i>Municipal School Education Expert</i>
<i>P3</i>	<i>Anthropology,</i>	<i>Manager</i>
<i>P4</i>	<i>Educational Sciences</i>	<i>School Teacher for Adult Migrants</i>
<i>P5</i>	<i>Behavioural Science</i>	<i>Freelance Consultant & Migration Issues Expert</i>
<i>P6</i>	<i>Political Science</i>	<i>School Teacher</i>
<i>P7</i>	<i>Anthropology, Educational Sciences, Political Science</i>	<i>Program Leader & Multicultural Expert</i>
<i>P8</i>	<i>Educational Sciences</i>	<i>Teacher & Pedagogical Expert in Multilingual Education</i>

4.5 Methods of Data Collection

Data was collected from project meetings, interviews with participants who provided consent and materials produced by the project team. For this thesis, interviews with the participants were primarily used as a method for collecting data with the use of project meetings discussions to supplement the findings obtained from the interviews.

4.5.1 Interviews

Data collection in qualitative research entails various methods, for instance, focus groups, observations and document analyses. One of the common methods used to collect data is through interviews (Bryman, 2012; Douglas & Hilson, 2008). Studies that employ interviews as a method for collecting data is because the researcher is interested in understanding the participants' viewpoints, feelings and experiences about a particular topic (Bryman, 2012; Douglas & Hilson, 2008). This study used interviews as the primary source for collecting data

in the study to understand the participants' insights about the phenomenon. Interviews were considered to be suitable for the study as it helped to thoroughly explore the participants' opinions, feelings and insights about their reported experiences and challenges while collaboratively designing learning in an interdisciplinary team. Furthermore, investigating how the team organised and managed the interdisciplinary teamwork to facilitate idea/knowledge sharing, negotiation and integration in the design work process are important to address to contribute to the research gap.

The study used semi-structured interviews as a method for data collection. While semi-structured entails "predetermined" but "open-ended questions" that allows the researcher to "explore themes" that develop in the course of the interview process. It ensures that the essential elements in the study are explored but at the same time allows "flexibility" to the study participants (Douglas & Hilson, 2008, p. 21). Semi-structured interviews also provide the researcher with the opportunity to ask individually tailored questions and does not limit the field of inquiry (Douglas & Hilson, 2008, p. 23). Semi-structured interviews were suitable for the study as it ensured that the respondents were not limited in their responses but at the same time had flexibility and freedom and to express themselves (Bryman, 2012, p. 471). Questions posed were open-ended that allowed participants to describe the strategies used to organise and manage disciplinary knowledge sharing, negotiation and integration in the interdisciplinary collaboration. Participants were able to describe their experiences and challenges in the collaborative design work. This also allowed them to express their additional viewpoints during the interviews.

4.5.2 Group Discussions during Project Meetings

While the study used interviews as the main source of data collection, it also used the recorded project group discussions that discussed the content of the e-course. These were a part of the three project meetings in the Nordic and Baltic countries. The project discussions were transcribed using the f4 program software and were used to supplement the ideas obtained from the interviews. The reasons for the selection of these data collection methods was to help corroborate the findings obtained from the study (Merriam & Merriam, 2009). Hence, the interview findings can be triangulated with the group discussions held during the project meetings.

4.5.3 Interview Guide, Pilot Interview and Training

Interview Guide

Prior to the collection of data, an interview guide was designed for the study having elements of “probing, specifying and direct questions” as suggested by Bryman (2012, p. 497). The interview questions were framed to answer the research questions. An interview guide was developed that was used in conducting the interviews. The interview guide provided structure while giving the participants flexibility in expressing their views. The interview guide contained questions about participants background, the process, approaches and use of pedagogical design to creation and structuring of the interdisciplinary course content, their experiences and challenges in it. It is important to note that some participants were unfamiliar with the term ‘pedagogical design’ and so a brief explanation was given to elicit participants viewpoints on how it was used in the interdisciplinary collaboration. The interview guide was designed to encourage the participants to reflect on their participation experiences in the interdisciplinary collaboration, and to gather insights from it that would be beneficial as guidance for future interdisciplinary collaborative work. The detailed interview guides are attached in Appendix A.

Pilot Interview and Training

Douglas and Hilson (2008) describe interviewing to be a “complex process” which requires the researcher having adequate knowledge and skills. Before the commencement of the actual interviews, I conducted a pilot interview with the supervisor to get familiar with the method of conducting interviews along. This also helped in training and practising my interview skills. I received guidance and feedback from the supervisor on how to cope with the different challenges in the interview, for instance, following the sequence of the interview questions, asking probing and follow-up questions.

During the pilot interview process, the questions for the interview were tested. The pilot interview was beneficial as it helped me in gaining experience in conducting the interview. It helped in identifying issues in the interview guide such as ambiguous questions and was useful in modifying it further (Bryman, 2012, p. 474). The interview guide was adjusted and edited to ensure that the questions were suitable and specific to the study objectives before the commencement of the actual interviews.

4.5.4 Data Collection Process

The interviews were conducted during the period between March and May 2020. Seven interviews in total were conducted, of which one interview was a face-to-face interview. Six interviews were conducted online, this allowed the researcher to reach the study participants as they were based in different Nordic and Baltic countries. The online interviews were conducted via Skype and Zoom, as this facilitated in smooth recording and storing of the interview data. All interviews were scheduled and conducted as per the participant's convenience. The interviews ranged from 30 minutes to 60 minutes in length. All interviews were audio-recorded using two digital audio recorders as it facilitated in easy access, management and systematic storing of the collected interview data (Douglas & Hilson, 2008).

During the interview process, participants were encouraged to share and freely express their viewpoints and experiences. Furthermore, they were encouraged to elaborate on their responses and were also given time to recall and reflect on their experiences. Towards the end of the interview process, participants were asked if they wanted to provide any further information that was relevant to the study but was discussed during the interviews. The interviews led to the collection of rich and elaborate responses.

Since the interviews for the study were held during the COVID-19 pandemic, it was difficult to reach all participants. Due to this reason, the interview guide was modified and structured to contain specific questions to gather written responses (see Appendix A). This was sent along with the follow-up emails to participants who did not respond to the initial email invitation. (see Appendix C). It yielded one written response from a participant.

4.6 Data Analysis

Data analysis is a complex process which involves “consolidating, reducing and interpreting” of the data by “moving back and forth between the concrete data and the abstract concepts” to derive meaning from it (Merriam & Merriam, 2009, pp. 175–176). Therefore, data analysis needs to be conducted systematically so that the findings are clear and can be accurately presented (Douglas & Hilson, 2008). In the study, the data analysis involved an initial inductive analysis and interpretation of the interview transcripts. Bryman (2012, p. 577) states that this is so the researcher does not lose contact with his/her data and the perspectives and interpretations of those being studied. In the study, using inductive analysis was a useful starting point for generating broad categories for meaningful data analysis (Creswell, 2009). The second stage involved a deductive data analysis by looking for concepts and themes

based on previous empirical research. This was useful to reflect on the themes that were observed in the data (Bryman, 2012).

The current study aimed to understand the strategies used by academics to organise and manage collaborative design work in an interdisciplinary team, their experiences and challenges in the interdisciplinary collaboration. Hence, in the current study, Thematic Analysis (TA) was considered a suitable approach for investigating the various viewpoints of the participants, “highlighting similarities and differences, summarizing the key features and generating unanticipated insights” (Braun & Clarke, 2006, p. 97). According to Braun and Clark (2006), Thematic Analysis (TA) is “a method for identifying, analysing and reporting patterns (themes) within data” (p. 79). It is a flexible and direct approach to data analysis which provides a detailed description of the data. TA helps in actively identifying and organising of “emerging” themes by looking through the various aspects of the issue (Braun & Clarke, 2006). Thus for the study, the emergent themes that explained how participants organised and managed the design work in an interdisciplinary collaboration and their experiences in it were actively identified and reported.

Braun and Clarke (2006) provided a six-phased method for developing a TA analysis of the data. These phases were used as a guide to analysing the gathered data in the study. While the phases described in the study seem linear and straightforward, however, the six-phases are a “recursive process” that takes time to develop and progress. It comprises of continuously moving back and forth forward between phases (p. 86). The six-phases followed in the study are discussed below.

1. Getting familiar with the data

This step entailed that all the interviews were immediately transcribed verbatim using the f4 program software after each interview. The interview recordings were frequently rewound to check for accuracy of the transcriptions (Douglas & Hilson, 2008). The transcription resulted in a total of 45 pages of transcribed data. The transcriptions were read through several times and sections of transcriptions that were considered important and interesting to the study objectives were highlighted. The initial ideas were manually jotted down next to the highlighted text. This step helped in getting a comprehensive overview of the data and gave a starting point for thinking about various patterns for analysing and interpreting participants perspectives.

2. Generating Initial Codes

Initial codes were created from the transcribed interview data using the NVIVO software tool for qualitative research. NVIVO was beneficial in systematically categorising and identifying the codes for the interview dataset in an organised manner. The codes were created by iteratively reading each interview transcript and labelling each of initial code derived through rigorous line-by-line coding. The initial coding was “data-driven” to completely record the participants’ viewpoints and was done by allocating a word or a short phrase to describe the excerpts of the interview data. Thus, this process helped in categorising the interview data into “meaningful groups” (Braun & Clarke, 2006). Although the initial coding generated a long list of codes, it helped in getting an overview of the common key ideas and patterns that reoccurred in the data. Each code was organised into relevant categories in NVIVO and the codebook was exported from NVIVO into a Microsoft Word Document.

3. Searching for themes

The exported codebook containing the initial codes were organised and refined several times using the theoretical framework and empirical studies which helped in determining the broad themes for analysis. The initial codes in the codebook were further sorted, adjusted and combined in Microsoft Word from which potential broad themes were identified. The codes obtained were further compared and contrasted and organised systematically based on the participant’s viewpoints.

4. Reviewing themes

According to Braun and Clarke (2006), it is essential to “capture the essence” of the data that has been coded with regards to the research questions and check if the themes are suitable for the context of the study. Therefore, it entailed reviewing the obtained themes and further refining them. Codes that were ambiguous, not relevant to the research questions and those that did not appear frequently in the data were discarded. Themes were further refined by combining similar themes.

5. Defining and naming themes

This step entailed suitable labelling of the obtained themes so that they indicated the participants’ views and opinions. It involved identifying patterns and themes from the data and further refining them by using terms that were suitable to represent the data.

6. Reporting the Findings

This final step of the thematic analysis involved writing the findings, discussion, recommendations and conclusion. This included referring to the research questions, literature and the theoretical framework to provide a clear explanation for the study. Hence, a coherent and logical explanation of the data was provided through the use of extracts obtained from the interview and project meeting discussions to support the study findings.

4.7 Ensuring Methodological Quality

This section outlines how the methodological quality was ensured by describing how the ethical issues and concerns of validity, reliability and generalizability were addressed in the study.

4.7.1 Ethical Issues

According to Merriam and Merriam (2009, p. 209) following ethical guidelines while carrying the investigation for the qualitative research study ensures validity and reliability in the study. The present study followed the research ethics guidelines provided by the Norwegian Centre for Research Data (NSD) and the General Data Protection Regulation (GDPR). This study was a part of a research project and had already received ethical approval from NSD for data collection and data management (see Appendix E).

As this study involved human subjects, ensuring sensitivity to the information provided by them and ensuring their anonymity was essential. This included ensuring that all participants that chose to participate of their own free will and would be fully informed regarding the procedures of the research project before they participated in the study (Bryman, 2012, pp. 138–139). Anonymity and confidentiality were explicitly ensured for all participants before the interviews. The participants were informed that they were free to withdraw at any time, for any reason during the interviews. All participants provided their signed consent before the interviews. Also, their verbal consent was explicitly asked for during the interview process. There was no incentive given to the participants of the study as it would affect the results of the study. The data collected from the interviews were anonymized and stored on UiO's secured server following the university's guidelines on the general data protection regulation (GDPR).

4.7.2 Validity, Reliability and Generalizability

Validity in qualitative research refers to using specific methods that determine the accuracy of the findings (Creswell, 2009). Whereas reliability refers to the degree to which the study findings can be reproduced and also having “consistency” in the study findings (Douglas & Hilson, 2008, p. 34; Merriam & Merriam, 2009). Furthermore, Lincoln and Guba (1985) and Guba and Lincoln (1994) suggest trustworthiness as criteria for ensuring validity and reliability. Trustworthiness consists of credibility, transferability and confirmability (as cited in Bryman 2012, p. 390).

Tracy (2010, p. 843) suggested using “thick descriptions and triangulation” as a means to achieved credibility in qualitative research. Providing thick descriptions entails selection of suitable “samples and contexts” that provide a detailed description of the findings to convey a “rich rigor” in the study. It will further help in ensuring “transparency” in the research process by selecting, classifying and organising choosing the data (Tracy, 2010, p. 841). Firstly, this was done by choosing appropriate study participants and the context suitable for the objectives of the study. Next, credibility through rigor can also be done by describing the study findings in detail. In the current study, this was done by providing a step-by-step explanation of the use of Thematic Analysis (TA) and NVIVO to show how the obtained data was transformed and structured into the findings.

The second method used to ensure validity and reliability in the study was triangulation. According to Bryman (2012, p. 635), triangulation can be used to “corroborate” findings. This can be done by comparing the study findings by using various data methods that help in identifying similar patterns(themes) that can be seen across the data thereby corroborating the participants’ viewpoints (Douglas & Hilson, 2008). The study analysed the project meeting discussions that helped to authenticate or verify the findings from the interviews.

Confirmability is concerned with ensuring that the researcher has acted in good faith and not allowed his/her personal values or theoretical inclinations manifestly to sway the conduct of the research and the findings (Bryman, 2012, p. 392). While full objectivity is close to impossible, the creation of the interview guide and analysis of the interviews was done while keeping the viewpoints of the participants in mind. Throughout the study process, careful attention was paid that the researcher’s own opinions, views and thoughts about the topic were irrelevant and the awareness to be neutral and unbiased.

Generalizability refers to the degree to which the study findings can be applied to other contexts and parallels to Lincoln and Guba's (1985) transferability (Bryman, 2012; Creswell, 2009, p. 223). It would be difficult to generalise the study findings beyond the study participants who participated in the creation of the e-course in intercultural competency in the international project. However, thematic analysis and the study findings would generate "thick descriptions" that could help other researchers with a database to make judgements on the possibility of transferring the findings to other contextual settings. Hence, further research on collaborative pedagogical design work by interdisciplinary experts can be done in similar contextual settings.

5 Findings

This section presents the main themes that emerged from the interviews with the various participants. It also uses the project meeting discussions of the interdisciplinary collaboration to corroborate the interview findings. The findings are presented according to the specific research questions and conclude with an overall summary answering each research question.

5.1 Strategies used by academics to facilitate knowledge/idea sharing, negotiation and integration

This findings section outlines the various strategies described by the interview participants to facilitate knowledge/idea sharing, negotiation and integration into the interdisciplinary collaboration. Some interviewees described the strategies that were undertaken in the interdisciplinary collaboration to be generic. Whereas, for others, these were described as specific activities. These were categorized as knowledge and pedagogical design-related activities that were used to facilitate team member ideas and knowledge into the project.

1. Knowledge-related activities

The knowledge-related activities during the project meeting discussions included exchanging ideas through brainstorming, sharing professional and work experiences, lectures by external expertise to provide information on work done in similar domains and providing each other with mutual feedback.

a. Brainstorming and sharing professional knowledge and experiences

Some interviewee participants reported various strategies used for facilitating and incorporating team members ideas. This was in the form of brainstorming where members shared and exchanged their disciplinary knowledge, ideas and professional work experiences which were considered to be useful for designing the course. It guided them in collecting the various educational resources that would be required to design the course.

This was highlighted in the interview excerpts:

[...] I would share my experience, I would share my knowledge from participating in research and then we started to look for examples to provide or are supposed to read or tools to provide within the course. (Interview, Municipal School Expert)

[...] so I think that was for the first meeting and it just began thrown all the ideas out there. Just a free flow of ideas and just putting everything down on paper and just brainstorming more. (Interview, Manager)

This was also observed in the project meeting discussions where a participant asked members to express and share their ideas and opinions: *Since we are such mixed team, from different schools, with different subjects, different backgrounds, we have different ideas about this course, obviously. Should we now have open discussion? Anyone who wants to express interest, opinions? (Discussion, Project Meeting 1)*

Thus, the extracts showed that through brainstorming, the team members welcomed each other's disciplinary knowledge, professional experiences and ideas during the project meeting discussions.

b. Exposure to external professional expertise

The project invited external professional experts from various countries to share their knowledge and expertise in the field of intercultural competence. It was to ensure that the activities in the collaborative design work process could be facilitated in achieving the project outcomes: *The strategies that were used were different. We had people who were giving short presentations describing some examples, some discussed what we were reading, we would watch something and discuss what we were watching and then we would talk in the big group. (Interview, Municipal School Expert)*

The presentations from the external experts were extremely valuable as they provided insights and up-to-date information on the current practices in intercultural competence. It helped the team members to get clarity on the core themes for the course and also helped to form the basis for the creation of team member responsibilities: *[...]we had very good presentations from people working in the field so all of us participating in the project got the same kind of information[...] the focus that was given in the presentations in [...] helped us to make the circle of what should be the main core themes of the course and there we came down to something that we could start to take different responsibilities for different projects. (Interview, Municipal School Expert)*

It was also observed in the excerpts from the project meeting discussions that team members expressed using/accessing their own professional networks to search for interdisciplinary expertise. This was done so that the external expertise could provide valuable guidance and inputs in the domain of intercultural competence:

I am thinking of the plan for the next meeting. It is really important to contact teachers, people with their own experience. (Discussion, Project Meeting 2)

I will contact persons from country X [...]so I can ask from the municipality and persons from university. It would be good to cooperate, because we are talking about the same topics, good to change ideas. (Discussion, Project Meeting 2)

The extracts showed that the project participants were open and welcoming to include insights from external professional experts. The new insights were further utilized to supplement their disciplinary knowledge and expertise. This helped them in providing clarity and developing and concretizing their ideas to structure the course design.

c. Email exchange to share ideas and educational resources, providing mutual feedback

The interviewees also expressed that they discussed and exchanged ideas and educational resources through emails. They also provided mutual feedback on the course content during team meeting discussions. Feedback was also given and received on the educational resources that were written collectively for the course: *I think we did with email exchange, giving each other feedback on the sessions, sending materials back and forth we had one of the methods that we had like we wrote a synopsis[...] and then the other participants could give feedback to that (Interview, Freelance Consultant & Migration Issues Expert)*

This was also observed in the project meeting discussions where team members asked for and also provided suggestions and feedback from members on the course content:

But I think that we could start with going through the three themes and you could make some suggestions or problems that we would need to address or material that would like to have in each theme if we would like to begin with that and see how long that takes. (Discussion, Project Meeting 2)

You can look at it in so many different ways. My take is what is influencing my world views there can be so many different ways the other take would be what is my personal identity which is a complicated concept in itself which would create barriers and the third could be what groups or collectives am I a member of and how they are shaping me that is the hybrid part so it depends a bit on where from which angle you want to tackle this topic (Discussion, Project Meeting 2)

The excerpts revealed that the team members provided each other with mutual support through giving and receiving feedback and openly discussed the different member viewpoints

during the collaboration. These interactions helped them to critically reflect on each other's perspectives and also provided new insights in the course design work, as they were receptive to each other's inputs and incorporated the suggestions into the designed course.

d. Using visual techniques to map ideas and disciplinary knowledge

Interviewees expressed that they used graphic and visual representations while brainstorming ideas in the project meeting discussions. This helped them to visualize the various elements in the course design and could concretely combine their ideas to structure the course content:

[...] we used a lot of thing like writing on the white board while people were brainstorming trying to see how the flow was [...] like a chart and how it was supposed to be the sequence of it and I think that actually helped a lot because you could visualize it. (Interview, Manager)

Some interviewees expressed that the team members faced difficulties in integrating the various ideas and disciplinary knowledge. Hence, they took on a dominant role in the project meeting discussions to incorporate the diverse ideas and reach an agreement in the collaborative design work: *[...] I feel that I was maybe a bit dominant in that meeting because we needed to pinpoint and reach an agreement on how we should do this and then I ended up with drawing kind of a model with the different elements in the course just to make it more like symbolic or visual for the people so it became much more concrete during that meeting. (Interview, Teacher Educator & Academic Researcher)*

Also, it was observed in extracts from the project meeting discussions: *We suggested we start by writing here on the whiteboard, brainstorm about these concepts before we go into groups. [...] We can develop from these concepts and put it in Google Docs. Academic material and best practices related to this. (Discussion, Project Meeting 1)*

These extracts showed that while members faced difficulties in incorporating various ideas and disciplinary perspectives, certain members took the lead to resolve the issue and obtained knowledge integration in the collaboration.

2. Pedagogical design-related activities

The findings from the interviews described the use of pedagogical design-related activities to develop the course. It is important to note that not all participants had a clear understanding or were familiar with the term 'pedagogical design'. Therefore, once I provided the participants with a brief definition of what it meant, some were able to express and describe how it was used in creating the course content and structure. Also, the interviewees' contribution to the

course design was through its various components. As a result, their responses in the use of pedagogical design activities in the interdisciplinary collaboration varied.

a. Discussion and formulation of learning outcomes

Some interviewees expressed the use of pedagogical design in terms of designing the learning objectives for each course module and the course as a whole. The learning objectives would be useful to learners undertaking the e-course to understand the learning outcomes they would obtain irrespective of whether they would undertake only certain parts of the course: *When we were working on putting up the course we had to find out what is the objective of each module what you are going to be learning in this module. So for each module we had some objectives [...] and in the beginning of the course. When you go into the course you can see the course objectives and what you will be learning in each module and also something that will help you if you're just going to take parts of it, what you will be learning in the modules.*

(Interview, Manager)

This was also observed in the project meeting discussions where various participants emphasized the importance of providing learning objectives for the various course modules so that it would provide the learners with an awareness of the learning obtained: *For example, will we have some self-assessments at the end? To see if people reached they goals, objectives, it means that the objective per module needs to be clear from the start.*

(Discussion, Project Meeting 2)

Another interviewee emphasized the importance of having clear goals and activities connected to the learning outcomes. However, s/he expressed that since the team comprised of members who were not from academia, not all focused explicitly on thinking about the use of pedagogical design-related activities during the collaboration:

I also think it's very important to have a kind of a clear goal and target and activities connected to the goals, etc. just the way like the way we do lessons in a classroom [...] I mean in the group there were definitely participants that were thinking about the pedagogical design but not everyone and that's the way we deal with it in a group like this where in you have people from different subjects coming in (Interview, Teacher Educator & Academic Researcher)

Moreover, they added that a visiting researcher for the project was invited to provide ideas and suggestions on the various aspects of pedagogical design. It was because s/he was considered to be an expert on the topic: *S/He was kind of a researcher for the group but we*

asked him/her to.. because this is his/her field we asked them to give us comments on pedagogical design which was very useful I think. (Interview, Teacher Educator & Academic Researcher)

This was also observed in the project meeting discussions where the visiting researcher provided his/her inputs on the various aspects of pedagogical design work: *There are a number of things from a pedagogical perspective. If I would have to decide what to put in course, first of all the theme is here and it has several sub-themes or elements that could be taken in or left out, because I think it is a lot. And then it is the objectives. What do we want to achieve with this module? And who is the target audience? And then how the objectives are formulated on that. (Discussion, Project Meeting 1)*

The extracts indicated that the team members discussed the use of specific learning objectives in the course design that would be required to achieve the learning outcomes. Owing to the interdisciplinary nature of the team, not everyone was able to provide design-related inputs. As a result, the team asked for certain members to provide their design-related knowledge and expertise. It was done to complement/fill up for the other members knowledge and expertise so the project outcomes could be easily achieved.

b. Use of examples, concepts based on teaching practices and professional experiences

Some interviewees emphasized the idea of including real-life examples based on their teaching practices and professional experiences in the digital content of the designed course. This would provide the learners with the opportunity to gain knowledge and understanding of the designed content, further enhance their critical thinking and reflection skills. Also, it would enable them to use the obtained knowledge in their professional practices:

For me to a learning outcome of any digital content I need something concrete. [...] I want to give them examples [...] we made a list of ten questions that we really like and we wanted this list to appear in the digital content [...] that was my pedagogical thought I wanted to give concrete things that can be used by others teachers or other people working with minority background. (Interview, School Teacher for Adult Migrants)

If I can talk about my module it's as close as to you can come to as some kind of an experiential learning that you try give some knowledge but the knowledge will also end up as some kind of reflection in the participants (Interview, Freelance Consultant & Migration Issues Expert)

In contrast, an interviewee pointed out that designing and structuring the course content was influenced by their work and professional experiences and knowledge obtained by reading previous academic research. Thus, the standard design tools that were normally used in designing the topic were not used:

I need to do redesigning everything because as I said all the books are kind of like boring so I needed to kind of like to start showing this video and trying to talk about this but it's a process for me as well to implement this because there's not much course material anywhere else that I have seen that has kind of like angle to this it's all kind of like standard and very oriented[...] don't think outside of that box at all but that's how the educational material is that needs to be changed. (Interview, School Teacher)

The extracts revealed that the participants negotiated the need for inclusion of different aspects and inputs in the designed course based on their knowledge and professional experiences. It would provide the learners with the resources to enhance their learning and allow them to critically reflect on their learning as they undertook the designed course. This was also observed in the project meeting discussions:

Then a bit about what is important that if we have an introduction to the concept we give some kind of fundament and then it is important to give them something to work with further. Either some idea for workshops, if you do this in a group of employees, you need to say now you work on these aspects and make some kind of assignments. So workshops, reflection questions, online games, quizzes, different aspects like that. That needs to be included so that they can work with it further. Not to be finished when they watch the video, they need to work for themselves. (Discussion, Project Meeting 1)

What I see is that if you have some kind of an input, explain the concept in some academic terms then you would have to add some resources, ideas, reflections so that people can work further with it wherever they are. (Discussion, Project Meeting 1)

c. Use of practical learning tools to provide learning support and scaffolding

The interview findings also revealed that some team members did not explicitly discuss the concept of pedagogical design. However, they discussed the various design aspects in terms of designing the educational content of the course, task advancement for the learners and inclusion of different practical and interactive components that would provide learners with the tools to scaffold and build on their own learning: *We were not talking around the concept of pedagogical design but we talked about how to design the pedagogy of the course, the*

importance of going from simple tasks to the more difficult tasks and providing something really practical using different tools[...] so building this scaffolding through the course was off course what we were trying to look at (Interview, Municipal School Education Expert)

The various aspects of pedagogical design were discussed during the project meeting discussions. This helped the members to question each other's perspectives during the process of collaborative design work. It allowed them to critically reflect on their professional practices, experiences and beliefs, thereby providing them with new disciplinary insights and perspectives. This was observed in the project meeting discussions as expressed by participants:

At the same time, I think the best of it is that you can see where you are approaching and the furthest of it is something that you can't achieve and then you need to be self-reflective that where I am in this and it can also be done with colleagues that where are we in this point, what's the next step for us because I think the whole thing for us is about scaffolding the skill (Discussion, Project Meeting 2)

I think at least from my perspective the teachers really like some kind of things that they can just take bring with them to the classroom and can use. So we always struggle about.. we talk about theoretical frame and then they just get confused they can't translate it into practical things so I think that's definitely some kind of focus that we need to have (Discussion, Project Meeting 2)

3. Knowledge negotiation of the team members various perspectives based on professional and work experiences

The findings from the interviews revealed that the team members had diverse perspectives due to their professional and work-based experiences. So they tried to put forth their viewpoints during the discussions. While these viewpoints required frequent negotiations among them, but the team members made efforts to incorporate the diverse ideas by reaching a compromise and integrated the perspectives to achieve the project objectives:

I read the article by [...] and then I already had an experience using a lot of my time in Africa and postmodern political fragments in this case I had the confidence to say I don't believe it should be like this and after that we followed that path. (Interview, School Teacher)

I had to argue with [...] at the university[...] as well I think we got through this view [...] and after discussing it locally I think adopt that perspective together even though we had a little bit back and forth about it and the digital content as well shows. (Interview, School Teacher)

The extracts revealed that while team members were supportive towards each other during the discussions, they not only questioned each other's ideas and perspectives but also negotiated for the acceptance of their ideas through the team discussions. Through such negotiations, members were able to critically reflect and challenge their existing disciplinary knowledge and expertise and reach a consensus to integrate each other's perspectives into the designed course.

4. Integrating team members' ideas, knowledge and expertise

The findings from the interviews revealed that while some participants acknowledged that all team members diverse disciplinary perspectives were incorporated in the course design, however, they were unable to share the explicit strategies in which it was done: *I think all the participants, all the disciplinary backgrounds of the disciplines were included one way or another but as you know we had different expertise and mine is really related to all the modules in the course I would say that my background and knowledge is related to all of these modules. (Interview, Program Leader & Multicultural Expert)*

Whereas, some interview respondents revealed that the main focus of disciplinary knowledge contribution was from academia. However, the team members were open and welcomed their ideas and knowledge contribution to the collaboration. This was despite the team members coming from other disciplines and having no academic expertise: *[...] I was quite happy to say that academia was so open towards having me coming in. I mean I am not a researcher but I was still welcome to contribute to the group with my knowledge and thoughts and that's not always the case and I did appreciate that a lot in this case. (Interview, Freelance Consultant & Migration Issues Expert)*

I think the openness of the project was everyone was open minded was a great success factor..critical factor. (Interview, School Teacher)

The above extracts revealed that the team members were open and welcoming to the ideas and knowledge of the other team members. This encouraged members to willingly share and contribute their disciplinary knowledge and experiences.

Summary

Overall, the extracts revealed that members engaged in knowledge and design-related activities that guided the collaborative design work process. They encouraged team members to share their perspectives by asking for each other's ideas and also, engaged in each other's different ways of working and knowing. This was done through writing and sharing of educational materials and providing mutual feedback in the collaboration, thereby building upon each other's ideas in the collaboration. Moreover, they incorporated external guidance and expertise to facilitate a better understanding of the issue and clarity on working to achieve the project outcomes. This provided members with the opportunities to gain new insights and perspectives in the domain of intercultural competence and contributed to enhancing their knowledge in their respective disciplinary domains. The pedagogical design activities further helped them to follow a structured approach towards organising the course design in the collaboration. Team members also critically questioned and negotiated their ideas during discussions which helped them to further reflect on their existing practices and incorporate the new disciplinary insights into the designed course.

5.2 Strategies used by academics to manage and organise the interdisciplinary teamwork

This section presents the various strategies used to manage and organise the interdisciplinary teamwork during the interdisciplinary collaboration project. It is interesting to note that not all interview participants that were a part of the interdisciplinary collaboration were a part of the project meeting discussions that were held in the different Nordic and Baltic countries. Furthermore, the participants provided inputs on the various components within the design course; therefore, not all participants were aware of or expressed uncertainty in how the interdisciplinary teamwork was organised/managed in the project collaboration.

1. Division of roles and responsibilities based on disciplinary knowledge and expertise

The interview findings revealed that the team members were divided and organised into smaller groups based on their disciplinary knowledge, interests and expertise in the interdisciplinary collaboration. This division helped them to not only collaboratively discuss and work on each of the course themes but also collectively write a synopsis describing the main content of the course themes: *We would have smaller groups working on each of the*

themes and then we did like a page describing what should be the main content of each theme. We did divide the roles between the participants to be responsible for each of the.. not the modules but the tools within the modules. (Interview, Municipal School Expert)

Thus, organising members in smaller groups helped in structuring the course content and enabled the division of roles and responsibilities among the team members so that they could individually work further on the course content. This was also observed in the project meeting discussions:

Now we need to divide the tasks. We need to worry about the message and course now. What if we divide the groups like somebody wants to work around a game, other wants to work based on a lecture. (Discussion, Project Meeting 2)

We can be more productive in smaller groups because we have to do it quite quickly. Then people come together and share from the groups. None of us are experts in everything, so I think working in groups would be more dynamic. (Discussion, Project Meeting 1)

The extracts indicated that the interdisciplinary work was organised in a manner that allowed the team members the choice to participate and contribute where they deemed suitable. Furthermore, members had diverse expertise, so this division helped members in complementing each other's knowledge and skillset by working collaboratively in smaller groups.

2. Use of project management skills support to knowledge integration activities

An interviewee expressed that while s/he did not specifically contribute to providing disciplinary knowledge in designing the course, however, used his/her project management skills to organise and facilitate the collaborative course design process: *I was not contributing to the academic side of things but I think my project management skills that was used in this course to organise and keep people on track and see how best to put up the course on the online platform (Interview, Manager)*

The team member's project management skills were used to organise and coordinate the interdisciplinary team. This helped to steer the teamwork during the project meetings and manage the project agenda during the collaboration. Also, they ensured that contact and communication between the members were maintained throughout the interdisciplinary collaboration. This was essential after the face-to-face project meetings since members were

geographically dispersed in the various Nordic and Baltic countries. It was vital to maintain team members participation, and engagement levels in the collaboration since physical contact with the team were not possible.

3. Democratic process: allowed flexibility in participation and contribution

An interviewee expressed that all members had the chance to provide their inputs and voice their opinions during the meeting discussions. Also, different members took the lead based on the modules in the course during the discussions implying that despite having a program leader, they followed a democratic process and allowed flexibility in member participation: *In the discussions, we all had the chance to develop and to influence the end product so we all had our inputs and also during the discussions different people took the lead in different modules (Interview, Program Leader & Multicultural Expert)*

Furthermore, s/he added that they divided the various course modules among the members so that they could select where and how they could join and contribute as suitable. Thus, it was described to be a democratic process: *[...] we sort of divided the modules in-between us and then people could choose where they could join and what they could contribute in each of these. So, the process was quite democratic and people had the choice [...] and contribute as it would be suitable. (Interview, Program Leader & Multicultural Expert)*

This was also observed in the project meeting discussions where members were asked to contribute and participate as they deemed it to be suitable:

If someone is interested in writing about the academic concepts, so that we can have about one page about each theme. (Discussion, Project Meeting 2)

We pick one person who is responsible for one theme, who will be leading the discussion with the group, so how do we understand this theme, what are the sub-themes, and after this those who are interested in these three themes can go in small groups. (Discussion, Project Meeting 1)

The extracts revealed that the program leader ensured that the interdisciplinary teamwork was managed democratically. S/He created a congenial atmosphere where all members had equal opportunities to participate and provide their inputs during the project collaboration. The project leader ensured member flexibility during the collaboration by not only allowing members to put forth their ideas but was also accepting of the suggestions and opinions of other team members.

Summary

In sum, the interdisciplinary collaboration project was structured by allocating team members their roles and responsibilities based on their disciplinary knowledge and professional expertise. It allowed opportunities for all members to articulate their diverse ideas, disciplinary perspectives and professional experiences. The project facilitated opportunities for members to discuss and question each other during the collaborative work process. The project manager played a key role in ensuring the facilitation of communication and interactions between the members during and within the project meetings. The project manager acted as a bridge between the program leader and team members in sustaining member participation and engagement during the duration of the project. Despite having a program leader that led the project, the collaboration followed a democratic process where members were given opportunities to lead or coordinate activities during the project meetings. The project leader also exercised flexibility in the decision-making process to advance the course design. This was also enacted during the division of responsibilities in the collaborative design work whereby members had the freedom to contribute to the course design work according to their abilities and competencies.

5.3 Academics reported experiences and challenges in the interdisciplinary collaboration

This section presents the experiences described by the interview participants during their participation in the development of the course design in the interdisciplinary collaboration. The findings regarding participants experiences in the interdisciplinary collaboration are presented in terms of their benefits and challenges in participation.

1. Benefits of Participation in an Interdisciplinary Collaboration

a. Enhancement of critical thinking and reflection skills

The interview participants were asked to identify the learning that they gained during their participation in the interdisciplinary collaboration. The findings show that participation in the interdisciplinary collaboration allowed them to think and reflect on their disciplinary knowledge and teaching practices through a reading of academic research material shared by members in the project: *[...] I think reading people with strong opinions. I think that's interesting and I think we should do it more because I think that a lot of what I read as a teacher it is so boring because it's common sense all the way but this time when I read about*

it, it was a very critical angle and I like that a lot because it made me think and it gave us kind of a platform for interesting discussions (Interview, School Teacher for Adult Immigrants)

The team discussions served as a platform for team members to share new ideas during the collaborative design work. The interactions with the team members helped them gain new perspectives and insights through negotiation and critical reflections of the ideas put forth during the discussions. This enhanced their critical thinking and reflection skills. It helped them to apply the academic knowledge received in their professional practices, thereby further deepening their own disciplinary knowledge and enhancing their professional practices.

b. Stimulation for own knowledge development

For some interviewees, the participation increased their professional confidence. This was because they could freely share and negotiate their knowledge/ideas in the team meetings based on their professional practices and work experiences; so it could be included in the course content. Furthermore, participation in the interdisciplinary collaboration project also encouraged them to continue working towards their personal knowledge development in the field of intercultural competence: *What I learnt is that if the process in the beginning is brought like where you brainstorm when there is acceptance for not having to look down the other people's opinion, the openness we had in this project was revelation I think and what I learnt about interculturality. I got a lot of inspiration to further develop my own sense of the literature so I started of reading a lot of more post-colonial literature. (Interview, School Teacher)*

The interview respondents attributed their participation to be a positive experience as the team members were open and receptive to their ideas during the team discussions. It led to them gaining more knowledge in the field of intercultural competence.

c. Professional network development and widening of disciplinary networks

Some interview respondents also revealed that participation in the interdisciplinary collaboration helped them in meeting new people and in establishing new contacts from academia and the municipalities from the different Nordic and Baltic countries. As expressed by participants:

[...] But the nicest part is to get to know people because I didn't know all the partners definitely not and that's a nice and effective project to connect and widen the network and see that we actually have a lot of things in common and that we can build on in the future in new projects (Interview, Teacher Educator & Academic Researcher)

Well I think generally participating in you know projects across countries and disciplines is always a rich experience [...] to get to know people from different countries and different levels, also municipals as well as academics (Interview, Program Leader & Multicultural Expert)

The extracts revealed that the participation helped them in widening their professional networks as the collaboration aided in finding members having common interests that could be useful in future project collaborations.

d. Awareness of work in similar domains in other countries

The interviews also revealed that participation in the interdisciplinary collaboration project helped some respondents in obtaining up-to-date information on the work done by the municipalities, experts and working professionals in other Nordic and Baltic countries. Their presentations in the project meetings helped in obtaining knowledge in the various areas of intercultural competence: *I particularly liked to learn about what municipalities in other countries are doing because I have been working more with academics than with municipal people so I think that it was quite interesting so for me it was a learning experience as always but I cannot speak for the team as a whole so but I think that my feeling was that people were enjoying this process and also learning from discussions and cooperation throughout the project (Interview, Program Leader & Multicultural Expert)*

Thus, the extracts indicated that the team members benefitted through their openness to listening to other members perspectives. They also learnt about each other's diverse ways of working through sharing their professional experiences during their interactions with each other in the interdisciplinary project.

e. Diverse disciplinary perspectives led to an enrichment of the course design

The interview findings revealed that having team diversity helped in providing diverse disciplinary inputs to the collaborative course design activity, thus, covering broad content areas that would otherwise not be possible. As a result, it allowed the team members from the various participating disciplines to learn from each other and to complete each other: *[...] I think working across disciplines is always a very rich process[...]there are so many different aspects that one discipline will never be able to cover for example inputs from language issues, from identity issues and all these different aspects that one discipline will not be able to cover as in a richer way (Interview, Program Leader & Multicultural Expert)*

The extract revealed that by including team members from diverse disciplines and professional expertise helped members to identify and draw out each other's strengths. They thereby worked together to complement each other's disciplinary knowledge and expertise in the collaborative design work. Consequently, this further contributed to the enhancement of the course design due to the inclusion of diverse perspectives.

f. Development of intercultural competence skills, project management experience and skills

Interviewees expressed that they benefitted through their participation in the collaborative discussions as it helped them listen and understand each other's perspectives, thereby developing tolerance towards each other. They further learnt how to cope with the different perspectives; by being more open-minded and showed the willingness to understand each other. Thus, the designed course was a beneficial tool in helping them train to understand each other's perspectives and so developed their intercultural competence skills: *[...]so I think that so we were also developing cultural competence within the group of listening to each other and trying to understand each other, trying to empathize with what you were saying or I was saying so we had to use the same course for ourselves in the big discussions that we were trying to develop for people to be able to use. So we were not masters of intercultural competence either, we had to train (Interview, Municipal School Expert)*

Whereas for some interviewees, participation in the collaboration was beneficial in gaining project management experience as they organised and facilitated the interdisciplinary project. Participation in the collaboration added to their project management skills which could be useful for working on similar projects in the future: *[...] this is a little bit of a different project than I am usually working with so this is something that could be helpful in other research projects to have people from other sectors or NGOs.. something that come with different perspectives into the project. (Interview, Manager)*

Thus, the extracts revealed that the team members made active efforts to listen to each other's perspectives. This developed the members ability to understand each other's viewpoints. It further helped them to reach a shared understanding of each other's perspectives. As a result, they acquired intercultural competence skills and it enhanced their professional development as they gained experience in managing the interdisciplinary project.

Summary

The project made it possible for team members to combine their ideas, knowledge, learning resources and tools, which led them to question and further reflect on their teaching and work practices. This indicated that the participants in this interdisciplinary collaborative project were open to new approaches and contributions from other disciplines. In the process, they gained pedagogical and content knowledge and insights on new methods, concepts, and transformation of their teaching and work practices. They also developed professional competencies and skills as they learnt how to work collaboratively with each other, by negotiating perspectives and collectively reaching a compromise to create a mutual understanding of the project outcomes.

2. Challenges of Working in an Interdisciplinary Collaboration

a. Delay in obtaining timely member inputs

The participating team members were from different countries and had different levels of engagement in the collaborative design work process. The findings from the interviews highlighted that some team members did not consistently adhere to their responsibilities and the project timelines. This situation contributed to delaying the course design process, as it was difficult to obtain individual member contribution at the requested time. This can be seen in the following excerpts:

I think the challenges were mainly when it came to contributing inputs, texts, articles and so on we had to wait quite a bit for people to contribute [...] because in projects like this is mainly during meetings and in-between meetings it's so difficult to get what you need on time in terms of materials and inputs (Interview, Program Leader & Multicultural Expert)

[...] I think that some of us got a bit frustrated on the way because things went slowly or people didn't come in with their inputs and that's a common thing when you have people from different countries... different engagement in activities like this. (Interview, Teacher Educator & Academic Researcher)

I mean the big challenge is that when you are working in a democratic way there is no one really responsible to control the end product [...] you have to go through all the huss and fuss of what people think and sometimes you don't agree and then you have people who are really responsible and do things within the time framework that is given and others who do not (Interview, Municipal School Expert)

Thus, the above extracts indicated that, despite the interdisciplinary project being flexible and democratic in the division of team members roles and responsibilities, it posed a challenge in the collaboration. This was due to the members being inconsistent in adhering to the project timelines and their project responsibilities, indicating a lack of sense of ownership and accountability to the project. As a result, it required for some participants to take on additional responsibilities in the project: *[...] so we had a lot of phone calls specially in the last bit of the project just to finalize things and help out with translations. Yes, that was also a part of my extra thing that I didn't know that I had to do but I just decided to do. (Interview, Teacher Educator & Academic Researcher)*

Hence, despite the unequal participation and engagement levels, some team members supplemented the efforts of other team members by undertaking extra tasks to meet the project deadlines and achieve the end outcomes in the collaboration.

b. Balancing out perspectives and finding consensus

The relationship between the participants in the interdisciplinary collaboration project was characterized by power where professional and academic experiences conferred influential positions to some participants. According to some interviewees, some team members regularly tried to impose their ideas during the collaboration, thus leading to disagreements among team members. This was identified as a challenge and attributed to the differences in members work experiences, professional experiences and academic backgrounds, thereby, having different viewpoints and so found it difficult to collectively agree on it: *[...] because we had very different backgrounds with people with a lot of research experience, theoretical knowledge and then people working in the field just dealing everyday with the issues, so people that became very philosophical, theoretical I mean off course they have research knowledge but they don't often know what's it about. (Interview, Municipal School Expert)*

These differences between members led to difficulties in reaching a shared consensus on deciding the course content during the collaborative design work process. Therefore, it required substantial time and effort for members to obtain a balance between their diverse perspectives and prevent members from certain disciplines on becoming too dominant in the collaboration.

c. Epistemological and linguistic constraints

The interview respondents expressed both differences in disciplinary language and linguistic differences as a challenge in the interdisciplinary collaboration. This was attributed to team

diversity as members consisted of individuals from various countries, disciplines and had diverse professional expertise. Hence, they faced difficulties both in communicating and understanding the diverse disciplinary knowledge, ideas, experiences that were shared and also reaching a common understanding during team meetings.

While the team meetings were conducted in English, it is not a commonly spoken language in the Nordic and Baltic countries. As a result, some members found it difficult to understand diverse shared ideas and disciplinary knowledge that was exchanged during the project meeting discussions. So, this limited their participation and idea contribution in the project discussions:

[...] we came from different countries the people participating and I mean some were working with adult immigrants some were doing only research so people coming from very different aspects and disciplines. (Interview, Municipal School Expert)

The language when you are joining teams and individuals from different countries and different disciplines we all bring different languages as well so that can be a challenge. (Interview, Program Leader & Multicultural Expert)

My personal challenge was to cope with the academic subjects in English. (Interview, Teacher & Pedagogical Expert in Multilingual Education)

As a result, this impacted the interviewee's engagement and confidence levels as s/he was unsure if his/her skills, suggestions and knowledge contributions to the course design were respected and valued: *I suggested I would present a process of getting aware of and improving the role of multilingual pupils in a school. I myself was aware of the research behind the positive effects of this kind of acts but I don't remember clearly if my team mates wanted to know this background. (Interview, Teacher & Pedagogical Expert in Multilingual Education)*

These excerpts revealed that bringing team members from diverse disciplines and professional fields across different countries was ambitious. Some respondents felt that it required the team members to be familiar with each other's disciplines to be able to understand the shared ideas, knowledge and beliefs that were brought in during their interactions in the project meetings. This would help members value and appreciate their shared diverse disciplinary perspectives and expertise with each other. Also, it would inculcate a sense of belongingness among the team.

d. Insufficient organisation and preparation for task execution

Some interviewees highlighted that there was somehow lack of coordination for the recording of the digital content for the e-course, thereby making it difficult for them to execute their assigned tasks in the interdisciplinary collaboration. Whereas some other interview respondents reported that the team members faced some confusion about how to proceed with the collaborative design work process: *Basically in [...] it was kind of then after that or during that meeting because then before that meeting I think people were a bit confused about how should we design this course? (Interview, Teacher Educator & Academic Researcher)*

[...] We really had to take long and many loops on where to put the focus. I thought after that meeting we didn't have any success because even though we had been discussing for two days and tried to build some themes we did not agree on the themes or the aspects. (Interview, Municipal School Expert)

The findings indicated that the project meetings faced initial difficulties as members lacked focus on arriving at a consensus on the various aspects of the course content. However, in any collaboration, initial team interactions are driven by ideas that seem relevant to the project goals. These ideas are progressively constructed through dialogue and negotiation. Thus, it required time and rigorous efforts from all members to negotiate suitable solutions to achieve synergy between the diverse perspectives.

e. Time Constraints

Some interviewees expressed difficulty in engaging in meaningful member discussions and for all members to be able to express their ideas and opinions. The findings indicated that it was frustrating as respondents felt that there was lack of enough time to engage in intellectual dialogues in the project collaboration: *[...] during these meetings off course the big problem is time constraints because you want to say so many different things and there are so many competent people in the room. So first you have to spend some time on getting to know each other and to have a good exchange you need to like each other and it takes some time. So that's one challenge I would say it's hard to get into this deep and fruitful discussions. (Interview, Freelance Consultant in Migration Issues)*

This indicated that the interdisciplinary collaboration required more time allocated. This was needed for all members to work through their disciplinary differences among themselves to be able to fully engage and contribute efficiently in the collaboration. Also, more time was

required for members to interact with each other to reach a shared understanding of the project and be able to systematically integrate their ideas, perspectives and expertise.

Summary

Overall, the interviews revealed that the project encountered challenges during the various stages of the collaborative design process. These challenges were attributed to the unaligned understanding of the project goals, difficulty to reach a common ground due to abundance of perspectives, organisation and structural issues in the collaboration, lack of timely inputs from members. Also, they faced epistemological, methodological and linguistic challenges due to differences in disciplinary methods, knowledge, practices and linguistic difficulties. These challenges, along with the lack of sufficient time allocated in the interdisciplinary project, made it difficult for team members to integrate and combine their ideas in the collaboration. Thus, the findings showed that interdisciplinary collaborations were time-consuming and required a significant amount of organisational and interpersonal skills for members to be able to work through these challenges to achieve integration. Moreover, in any collaborative work, it is a challenge to work together and therefore requires team members to compromise together to reach a consensus to achieve the common project goals.

6 Discussion of Findings

This study aimed to obtain a deeper understanding of the strategies used by academics and other professionals to manage and organise the interdisciplinary teamwork, and how knowledge-related work is done in an interdisciplinary collaboration. Furthermore, the study focused on understanding their experiences and challenges with the interdisciplinary collaborative design work process. In this section, the key findings are discussed in relation to the empirical literature in interdisciplinary collaboration, the theoretical concepts of academic hospitality (Phipps & Barnett, 2007) and the modes of interdisciplinarity (Barry & Born, 2013). Lastly, the chapter concludes with recommendations for academics, researchers, project administrators and project leaders for effective organisation and management of interdisciplinary collaborations and suggestions for future research.

6.1 Strategies used to manage idea/knowledge sharing, negotiation and integration

The first research question in the study addresses the various strategies used to manage idea/knowledge sharing, negotiation and integration in the interdisciplinary collaboration. The findings revealed that the academics and professional experts undertook various knowledge-related activities, like brainstorming during discussions and email exchange for sharing their ideas, professional knowledge and work experience. Through such activities, the team opened up the space for intellectual interactions as members could freely express their ideas and disciplinary perspectives. These strategies reflect elements of ‘sharing’ and ‘receiving’ of ideas/knowledge, thus, confirming the enactment of *academic hospitality* (Phipps & Barnett, 2007).

Stoll et al. (2006) suggest that openness during team interactions helps in communicating willingly and enthusiastically with each other, thereby, welcoming each other’s perspectives. This was also observed when members sought external expertise and guidance. They invited professionals from other countries to share their knowledge and expertise in intercultural competence. Moreover, they invited inputs from a visiting researcher on the various elements of pedagogical design during the course design. This shows that the *service-subordination mode* (Barry & Born, 2013) was enacted when the team actively sought each other’s perspectives but also incorporated external expertise to supplement the ideas/knowledge that was brought during the interdisciplinary collaboration. It gave the team access to a wide range

of ideas/knowledge, that was essential for designing the course that would not be possible without working in an interdisciplinary collaboration. As a result, it provided the team with new insights and clarity while designing the course and helped in the creation of new knowledge (Coenders, 2010; Voogt et al., 2011; 2016).

In the interdisciplinary collaboration, team members mediated by being both a “host” and “guest” in terms of showing a willingness to listen to other perspectives. Concurrently, they welcomed new disciplinary insights brought forth by other team members. These findings illustrate how *epistemological* and *linguistic hospitality* (Phipps & Barnett, 2007) was enacted by team members while undertaking knowledge and design-related activities. Therefore, the interdisciplinary collaboration project opened up the possibilities and opportunities for the team to learn from each other, confirming the findings of Bakah et al. (2012).

Team members used visual and graphical forms of representations to map the diverse ideas which helped in concretizing the various elements to be included in the course design. Pennington (2016) suggests that using diagrams, concept maps, flowcharts help in providing inputs to draw logical cognitive connections between diverse perspectives and enable effective knowledge sharing among the team. However, this contradicts Pennington’s study (2016), which suggests that undertaking these activities is not conducive of obtaining a collective understanding when team members are from different disciplines.

The interdisciplinary team in the study consisted of members from diverse disciplinary (education, sociology, anthropology and economy), professional and technical expertise. However, these fall under the “traditional social scientific disciplines” and so are already “integrated around a common framework” (Lin et al., 2007). This can be interpreted as members already being oriented towards integrating disciplinary knowledge, as they were from similar disciplines. This illustrates the *integrative-synthesis* mode (Barry & Born, 2013), as the team managed to combine their various contributions into the different components of the course design, thereby enriching it the collaborative process.

However, the findings from the current study partially contradict Pennington (2016). Despite being affiliated to similar disciplines, some members assumed a dominant position due to difficulties in reaching a shared consensus during knowledge integration. Therefore, they took an agnostic stance during the collaborative course design so that the various components could be finalised. This illustrates an *agonistic-antagonistic* mode (Barry & Born, 2013) in the interdisciplinary collaboration. Thus, this confirms the findings of McNair et al. (2015) that, while certain team members took the lead, however, it meant that the others had to take

an antagonistic stance to facilitate knowledge integration. This illustrates that the *agonistic-antagonistic* mode (Barry & Born, 2013) had to be enacted to achieve knowledge integration in the interdisciplinary collaboration.

The findings from the current study correspond to the suggestions by McKenney et al. (2016), who recommend that it's essential to engage in negotiation to capitalize on the knowledge diversity. It will help to draw out the various perspectives in the team that will further lead to an enriched course design. Similar findings were reported by several empirical studies by Bakah et al. (2012), Agyei and Voogt (2012) and Nihuka and Voogt (2011).

While the current study reports that knowledge integration among disciplines was achieved, however, it is difficult to describe how the *integrative synthesis* mode (Barry & Born, 2013) was explicitly enacted as it was not fully represented in the dataset. Yet, evidence from the interview findings revealed that it was achieved and included in the course design. Overall, the study findings suggest that the team members worked well together, as it comprised of individuals who were interested in working in the interdisciplinary collaboration work and therefore were open to each other's ideas and perspectives.

6.2 Strategies used to manage interdisciplinary teamwork

The second research question in the study addresses the strategies used to manage/organise the interdisciplinary teamwork in the project collaboration. The findings from the current study show that both academics and professional experts performed work in smaller subgroups, based on their diverse knowledge and professional expertise. As a result, it facilitated the team to be able to access diverse expertise and perspectives through member interactions and combine it to design the e-course. It also proved beneficial in dividing the members workload solely based on their expertise, as previously reported by Ryan and colleagues (2017).

Interdisciplinary collaborations entail dialogical interaction. So, tasks must be divided according to the team members knowledge and expertise. This enables opportunities for members to be fully engaged in the discussions and can build on each other's expertise to develop their ideas further (Holley, 2009a). This was observed in the current study, as members required each other's support to complement their knowledge during the discussions. This was essential for the enactment of the *service-subordination mode* (Barry & Born, 2013), whereby members used task division as a tool to supplement each other's

disciplinary knowledge and expertise to achieve knowledge integration in the collaborative design work.

The study findings also reveal that the project manager played a significant role in organising and managing the project collaboration. S/he used their project management skills along with various strategies to involve team members in the various phases of the collaboration: from goal-setting to planning, coordinating and collaborating together during the meetings. The facilitation continued throughout the project, as it was essential to ensure and maintain contacts between members so they would follow and work according to the agreed timelines to achieve the project outcomes. The project manager acted as a ‘bridge’ between the team members and provided support for facilitation of the collaborative activities throughout the interdisciplinary project. This finding is consistent with studies by Pharo et al. (2012, 2014), who suggest that project facilitators/managers are vital to ensure smooth member participation and engagement levels.

The study findings indicate that the interdisciplinary team followed a democratic work process, whereby all members had the chance to pitch in their ideas and put forth their perspectives during the project meeting interactions. The project leader stimulated member interactions during discussions and balanced their leadership role by asking various members to lead the project meeting discussions based on their expertise. This is in line with the findings of McNair et al. (2015) that show that the project leader demonstrated the importance of being open to learning from the team during the collaborative design process, thereby showing that they enacted the practice of both *epistemological* and *linguistic hospitality* (Phipps & Barnett, 2007). This is evident in the current study, as all members were provided equal participation opportunities and flexibility in the project participation.

Overall, the interdisciplinary project followed a mix between a “shared” and “vertical” leadership style, with the project leader mediating between being a “knowledge broker” for members to reach a shared understanding of the project goals (Binkhorst et al., 2015; McNair et al., 2015). These findings concur with the study by Binkhorst et al. (2017), who showed that having a balanced leadership style was vital in aligning the project goals with the diverse expertise of the team.

6.3 Academics Experiences of the Interdisciplinary Collaboration

The third research question in the study addressed the experiences reported by the academics and professional experts due to their participation in the interdisciplinary collaboration. The

findings show that their experiences varied, with participants experiencing both benefits and challenges during their participation in the interdisciplinary collaboration.

The findings indicate that team members also showed reciprocity towards each other's ideas, by engaging in critical dialogue and provided support in the form of mutual feedback while developing the e-course. Furthermore, they assumed a learners role when they listened to each other, thereby encouraging open-mindedness and mutual respect to each other's perspectives (Tartas & Muller Mirza, 2007). It also helped in reducing the dominance of certain disciplines (Bakah et al., 2012). This can be interpreted as the enactment of the *agonistic-antagonistic* mode (Barry & Born, 2013) as members engaged in critically analysing and reflecting each other's perspectives. Taking this stance was vital in the knowledge integration process, as it further led them to develop the new idea/knowledge within the team (Coenders, 2010).

Several empirical studies also suggest that disagreements, as well as negotiation and agreements, are essential in collaborative work. This is because they enable team members to learn from each other. Consequently, they help in transforming the team members disciplinary knowledge and professional practices (Kuusisaari, 2013; McKenney et al., 2016; McNair et al., 2015; Tartas & Muller Mirza, 2007; Weiss et al., 2015). This was evident in the current study, as the interview respondents found team interactions stimulating when other members discussed the various course design elements based on their experiences and practices. It enabled them to gain knowledge about new ways to approach the design work (Lélé & Norgaard, 2005). As a result, the academics augmented their own professional practices as they adapted to and adopted each other's approaches during the collaboration, which confirms the findings of McNair and colleagues (2015).

Despite the various positive experiences stated by the academics and professional experts in the interdisciplinary collaboration, they encountered some challenges, some of which are seen inherent in collaborative work. Other challenges are concerned with the interdisciplinary backgrounds of the team members that participated in the study. The study revealed that team members inconsistency in adherence to their assigned responsibilities meant that some team members shouldered additional responsibilities and dedicated extra efforts to contribute to achieving the end outcomes of the project.

Drawing on Barry and Born's (2013) modes of interdisciplinarity the finding from the study can be interpreted as an enactment of the *service-subordination mode* in the collaborative work to ensure the timely achievement of the project outcomes. On the other hand, it can be

interpreted that members from certain disciplines provided more inputs, thereby influencing the course design and occupying more space in the interdisciplinary collaboration.

The current study revealed that members from certain disciplines exerted dominance during team discussions by trying to promote and impose their own ideas/knowledge and expertise on other members. This caused initial disagreements and was identified to be challenging to obtain a consensus during the collaborative design work. It further affected the project agenda as a lot of time was spent on negotiating the inclusion of certain topics in the course content during the project meeting discussions. This adheres to Barry and Born's (2013) *agonistic-antagonistic mode*, as it is evident that while members from certain disciplines assumed a dominant position to put forth their ideas, they negotiated their conflicting views to develop a shared understanding and achieve knowledge integration.

The findings attributed these differences to members' disciplines, professional background and work experiences. This is consistent to the findings from a study by Stalmeijer et al. (2007) which shows that difficulties in the collaboration are due to the nature of team member diversity, as members have diverse values and experiences. While diversity in ideas and expertise can act both as a catalyst and an obstacle in interdisciplinary collaborations, they require time and effort from members to reflect on their ideas as well as willingness to listen to other perspectives (Weiss et al., 2015). Therefore, the current study suggests that it would be beneficial if the team members use time in the project meetings to deliberate how they can link and integrate each other's perspectives in the course design.

The findings also revealed that some members felt that the other team members did not respect or value their ideas and information that was put forth during the team meeting discussions, and were maybe reluctant to understand others' viewpoints. These challenges are aligned with the findings from several studies which reported the barriers in an interdisciplinary collaboration to be that the knowledge contributions from team members were not valued or accepted to be equal to the scientific knowledge put forth by certain members of the academia (Bell et al., 2005; Bruce et al., 2004; McMurtry et al., 2012).

Moreover, there were concerns regarding member limitations in understanding the meeting discussions and the lecture presentations, due to foreign language proficiency concerns. This could suggest that it limited certain members from being able to freely share and contribute their ideas and knowledge during the project meeting discussions, despite having the required professional knowledge and expertise. It can be interpreted as an enactment of the *service-subordination* mode (Barry & Born, 2013), whereby certain team members provided their

contributions in the project based on what was expected from them but were limited in providing additional inputs due to linguistic constraints.

This shows that despite the enactment of *linguistic hospitality* (Phipps & Barnett, 2007), during the collaboration where all project meetings and correspondences were conducted in English, it was not sufficient to achieve a common understanding among the team. The study suggests that members can engage in using translations (Phipps & Barnett, 2007) if possible; to ensure that all team members understand the project discussions. This is so they can effectively contribute their inputs to the course design, and their disciplinary expertise is efficiently utilised in the project.

Another finding worth noting is that there was a lack of sufficient time in the face-to-face project meetings for team members to engage in deeper team interactions and further develop their ideas in the interdisciplinary collaboration. This indicates that while the *integrative-synthesis* mode (Barry & Born, 2013) was enacted to achieve knowledge integration in the collaborative design work, it is plausible that they were unable to integrate their ideas/knowledge and expertise systematically. This is consistent with the findings of Bruce et al. (2004) that indicate that it requires time for team members to engage in interactions to be able to develop a shared understanding of the diverse expertise and perspectives to be integrated systematically. Active efforts should be made by all team members to develop fruitful collaborative relationships to manage these challenges. This can be achieved by familiarizing oneself with each other's expertise and disciplinary ways of working.

6.4 Limitations of the Study

The current study has provided insights into academics ways of knowledge sharing, negotiation and integration activities in interdisciplinary collaborative design work, their experiences and challenges in it. However, the study findings should be considered in view of the following limitations.

First, a limitation is the sample size included in the research. A total of eight participants were interviewed for this study. Due to time constraints, the study has primarily relied on the dataset obtained from the interviews to inform the findings of the thesis. The study would have further benefited from a document analysis of the educational materials that were prepared for the designed course. This would have helped in drawing comparisons between the interview data to confirm if knowledge integration of all participating disciplines was achieved in a systematic and balanced manner in the interdisciplinary collaboration.

Secondly, the study found that face-to-face interviews were more effective than online interviews, as they provided more rich data in terms of certain themes. Since the interdisciplinary project comprised of participants from the Nordic and Baltic countries, it was not feasible for the researcher to conduct all face-to-face interviews. Also, while some interviews could be conducted in-person, they were held online due to the COVID-19 pandemic situation.

Thirdly, this study used a qualitative approach to investigate the interdisciplinary collaboration project and relied on the researcher's competencies and skills. However, the researcher tried to avoid subjective interpretations by using the project meeting discussions to corroborate the interview findings wherever deemed suitable. The study findings were shared with the supervisor to confirm if the interview data had been suitably interpreted. This allowed the researcher to address inconsistency in the instrument and analysis.

6.5 Suggestions for Future Research

The interdisciplinary collaboration exposed members to a variety of disciplinary practices, technological and pedagogical expertise and practical learning tools. These were identified in the study to be beneficial for their professional development. Future research could be conducted as a follow-up study to investigate how these learning benefits are being incorporated into their professional practices.

Second, the current study focused on only one international interdisciplinary project undertaken at one major university and in the social sciences. Future research could be conducted in larger contexts and include interdisciplinary projects from other disciplines and universities. Further research can consider comparing and contrasting the strategies used by these diverse disciplines and universities to organise and manage their interdisciplinary projects.

Lastly, the interdisciplinary project made use of specific pedagogical design tools that were used to design the course to achieve the project outcomes. Therefore, an area of further research would be to assess and evaluate the effectiveness of the course design(s) and confirm whether it is useful in meeting the learners' expectations and providing them with knowledge relevant in the field of cultural competence.

6.6 Recommendations

The study aimed to provide insights into the various strategies used by academics to achieve knowledge integration in collaborative pedagogical design work, their reported experiences and challenges while participating in an interdisciplinary project. The findings from the study highlighted several recommendations for effective management and organisation of the interdisciplinary collaboration. Since the study comprised of a diverse group of individuals from various educational sectors, as well as professionals working in the public sector, the recommendations, valuable for academics, researchers and professional experts when undertaking interdisciplinary collaborative projects are outlined below.

6.6.1 Recommendations for Academics and Researchers

All members that participate in the interdisciplinary project bring with them their own diverse institutional cultures and disciplinary cultures. Therefore, team members need to be aware of and acknowledge these cultural differences while working collaboratively. It is recommended that academics and researchers who are part of an interdisciplinary team treat all members as intellectual peers and respect their diverse disciplinary knowledge, experiences and practices that they bring in during in the collaboration. It requires all members to be open and accepting of these differences. By being patient and flexible towards each other's perspectives during team interactions, they can negotiate their way towards developing a shared understanding of goals. This would also be useful in creating a cordial atmosphere and open up space for all members to discuss their ideas constructively. Thus, it would help the team in coming up with creative solutions to address the project goals.

It is recommended that more time is allocated during the initial stages of interdisciplinary projects to stimulate interpersonal connections. This is vital so that all members can understand the value of the contributions that other disciplines bring in. One way to achieve this would be to organise occasions for social interactions among members during meetings so individuals can form stronger interpersonal connections in a relaxed environment (Bell et al., 2005). The current study also recommends that additional funding should be allotted for organising such activities in interdisciplinary projects as it essential for the effectiveness of interdisciplinary collaborations.

The study findings emphasized the importance of academics approaching the interdisciplinary project with humility, to be able to collaboratively work together. Nicolson (2002) states that while the interdisciplinary team of academics and researchers may be experts in their

respective fields however they are all likely to be “amateurs when it comes to the system as a whole” (p. 383). Therefore, it requires all team members to be humble about their disciplinary knowledge and expertise and take the time to question each other’s methods, ideology, assumptions. All members should also be open and willing to have their disciplinary knowledge and expertise be questioned by the others and to learn from each other. Understanding that one’s perspective is not superior compared to others would help members in enhancing their knowledge, and thereby widen their disciplinary knowledge and understanding. Also, it can help in ensuring a suitable balance among the various members’ disciplinary perspectives and prevent a discipline/s from becoming too dominant.

This would not only facilitate a better interdisciplinary collaboration but also contribute to smooth integration and synthesis of their perspectives to achieve the end outcomes. The current study recommends organising workshops and training to expose the team members to each other’s disciplinary ways of working and professional expertise. It will help the team learn how to collaborate effectively as well as learn how to systematically integrate their knowledge and expertise to address the project goals.

Another element that is a crucial aspect of any collaborative work is the process of peer-feedback. This is an important step while undertaking interdisciplinary work, as it helps the team in making adjustments and adapting the course design to suit the learners’ needs. So it requires all team members to provide feedback to each other in a timely and consistent manner. This can help the team in critically reflecting on their disciplinary knowledge and professional practices, thereby providing new insights to the collaborative design work. Furthermore, it can also enhance their professional knowledge and expertise, as they would be able to incorporate the new insights into their professional practices.

The process of mutual feedback should be iterative through all the stages of the collaborative design work. Brown et al. (2018) suggest the use of “feedback loops” to enrich critical thinking and reflection among the team and identify elements in the course design that need to be modified or changed. Thus, the study recommends that dedicated time and space could be organised during project meetings for members to provide mutual feedback on the various educational resources that have been created for the course design so that suitable alterations can be made. This can also contribute to enriching the end outcomes of the course design process.

6.6.2 Recommendations for Project Administrators and Project Leaders

Interdisciplinary projects require team members who are familiar with the various aspects that collaborations entail. So, the members in charge of the project may carefully select the right individuals to be a part of the interdisciplinary team. Such projects require team members having diverse disciplinary competence, relevant knowledge and professional expertise that would be uniquely suitable to the project needs. It is essential that the individual members' competencies, knowledge and expertise not only complement each other, but they can also appropriately use it to focus on addressing the project goals. This can enable a smooth collaboration process as members would be able to discuss and negotiate their perspectives to reach a shared understanding of the project.

Austin and Baldwin (1991) assert that while there are no “uniform strategies” that can be used to collaborate effectively in interdisciplinary projects, however, it requires taking certain steps to ensure that the academics participating in interdisciplinary collaborations work effectively together. This study recommends that it is beneficial to use design thinking, social innovation or methods that help in planning and structuring the project tasks in a way that it not only focuses on achieving the project objectives but also ensures meeting the project timelines in the collaboration. This entails focusing on setting realistic aims in the project by the project manager or program leader to help structure and organise the members' tasks and responsibilities systematically as it contributes to a better outcome.

The current study also revealed various strategies that are recommended to be beneficial in organising and managing interdisciplinary collaborations. These include explicitly incorporating time for collaborative brainstorming during meetings for team members to share and discuss ideas/knowledge and expertise. The team can also make use of visual representations like diagrams, graphs and concept maps to structure and finalise the design work. Lectures from external experts could be useful for members to obtain insights and the latest information in the respective research fields. The information obtained could be used to develop and formulate new ideas that would ultimately enrich the course design. It would further aid in the facilitation of achieving the project outcomes. This could also open up avenues for guiding interdisciplinary teams into undertaking future research projects.

Task division among the team members should be based on their disciplinary knowledge and expertise so that members are enthusiastic about their participation. This will motivate them to provide valuable contributions to the project. In addition, it is essential to create a concrete

work plan that delineates the member roles and expectations from each member, with the time investment required from members to contribute towards the project. This can help the members working in the collaboration to gain awareness and clarity of their roles, responsibilities and expected contributions from the beginning of the project. It can also help members to engage in the collaboration in a practical and structured manner, and work effectively to achieve the shared project goals.

Project leaders and managers may need to ensure democratic ways of working between team members in collaborative design work. This entails striking a right balance between the leadership styles. It includes following a mix between ‘shared’ and ‘vertical’ leadership styles. The ‘vertical leadership’ can guide the team working in the collaboration to ensure that all members clearly understand and follow the project agenda for the timely achievement of the project goals. At the same time, involve team members to undertake ‘shared’ leadership roles in the collaboration where they take the lead in planning, coordinating and guiding the other members working in the team (Binkhorst et al., 2017). This can help to strengthen the sense of ownership and accountability among the team members in the collaboration.

The strategies from the current study are also recommended to project leaders and managers undertaking interdisciplinary projects. They can follow a democratic process during project meetings, to ensure that all members can provide their inputs and voice their opinions during the team discussions. This can be facilitated by allowing flexibility in the participation, where team members are allowed to lead the project discussions based on their competencies and expertise. Thus, it will instil a sense of confidence and encourage all members to participate in the collaboration process. This can not only stimulate member interactions but also make them fully engaged in team discussions.

Interdisciplinary collaborations require a lot of organisation towards arranging team member meetings and coordinating between members throughout the project timeline. To help facilitate effective collaborative work between members, it requires organising time and space to foster suitable communication and interactions between members. Project managers may ensure that quality time is scheduled during face-to-face team meetings for members to discuss and socially interact to understand each other’s disciplinary ways of working. It includes organising frequent face-to-face team meetings that bring together all members that are a part of the project. This can help in establishing a rapport among the team members as they engage in initial interactions with each other and further contribute to developing a good working relationship in the collaboration.

Establishing communication among members is essential to sustain the team members levels of engagement and participation in the collaboration and develop a sense of ownership and responsibility towards the project. Therefore, it is important to include all members in the team meetings, as they can help in providing inputs to scheduling the planning and organisation of the design work process. This can lead to a better task structure and focus for the collaborative design work process, and facilitate the smooth division of roles and responsibilities among them. The study recommends using a combination of different modes of conducting meetings with some members attending in person whereas others can participate using online video technology tools. This can ensure flexibility in working and can assist in active involvement of the team in the collaboration.

6.7 Conclusion

This qualitative study aimed to explore the various strategies used to organise and manage academics and professionals knowledge integration in pedagogical design work in an interdisciplinary collaboration project. Also, it sought to deepen the understanding of their reported experiences and challenges faced during the interdisciplinary project.

An empirical investigation was carried out by primarily conducting semi-structured interviews with academics and professional experts from Nordic and Baltic countries, who participated in the interdisciplinary project for designing an e-course in intercultural competency. The current study used a combination of interview techniques (face-to-face interviews, online interviews and written interviews) to collect data, and comprised eight interviews in total. The study used thematic analysis for qualitative analysis of the data. The analytical framework was constructed based on the notion of socio-constructivist ideas. The study employed the concepts of academic hospitality and modes of interdisciplinarity as interpretative tools.

Findings from the study provide insights into how academics organise and manage knowledge integration in an interdisciplinary collaboration. The key findings indicate that, while academics used knowledge and design-related activities to organise and manage the collaborative design work, the enactment of academic hospitality was crucial for achieving knowledge integration. Knowledge negotiations in the collaboration supported members in critically analysing each other's perspectives and was vital in providing new insights to the course design. It further benefited the team as it enhanced their professional competencies and

practices. Task division in the interdisciplinary project was organised so that it complemented members expertise and was essential in achieving the project outcomes.

Language constraints caused difficulties in comprehending team interactions and deterred members to engage completely and contribute to the project meetings. Some inconsistency in adherence to project responsibilities meant that additional efforts were required from members to ensure the timely completion of the project. While the power relations among the team influenced their interactions; however, through knowledge negotiations, they arrived at a consensus, thereby finalising the course design. This helped in achieving knowledge integration in the interdisciplinary collaboration.

Based on this study, several practical recommendations have been proposed. Academics and researchers are recommended to be tolerant, flexible and hospitable to each other's ideas/knowledge when working in interdisciplinary collaborations. Thus, the study recommends using mutual feedback in all the phases of the interdisciplinary collaboration. This would mutually benefit the team, as they would engage in critical analysis and reflect on the ideas/knowledge brought in during team interactions. It can facilitate mutual learning and also widen their disciplinary knowledge and expertise. The recommendations include organising workshops and training to expose the team members to other disciplinary knowledge and professional expertise. This can help the team to learn how to systematically integrate their knowledge/ideas when working in an interdisciplinary collaboration. Project leaders and managers are recommended to ensure a balanced member selection when undertaking interdisciplinary projects. Dedicated time and space should be created for discussing contents and communication between team members in the collaboration. It is recommended to follow a democratic approach during team meetings, to ensure that all knowledge contributions are flexibly adjusted and accommodated in the collaboration.

To conclude, interdisciplinary collaborations are complex endeavours. So, there are no one-size-fits-all strategies that can be used when undertaking it. Therefore, it is essential to consider the disciplines that form a part of the project so that their diversity and expertise can be effectively combined with the strategies to facilitate knowledge integration.

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Appendix A: Interview Guides

1. Interview guide – Oral

Background questions

1. Could you tell me a little about your background: disciplinary background, work experience and/or research interests?
2. As you recall it, could you describe the objectives of the interdisciplinary project? *What did the project focus on?*
3. How were the participating members chosen for the project? Were there any specific reasons for selecting certain partners?
4. Could you provide a brief description of the course you designed in the project?
5. Can you describe your role and contribution in the project?

Interdisciplinary content and process

6. Can you recall the way the discussions in the project started? *Was there anything special or challenging when engaging in the discussions?*
7. How did the course themes emerge?
8. How was the interdisciplinary content of the course decided upon? What preceded the decisions to include these themes?
9. Was research-based knowledge was important when deciding about the course content?
10. How was the final course structure and content finalized?

Pedagogical design and approaches to working with interdisciplinary contents

11. Were ideas of pedagogical design used to frame course content and structure? If so, how?
12. How was your disciplinary background and knowledge incorporated in the course content?
13. In your opinion, did the project focus on incorporating knowledge from the disciplines involved in the course content? If so why was it important? *If not, was there a concrete reason not to?*
14. What strategies were used to facilitate that the ideas of different team members were incorporated into the course content?

Challenges

15. Were there any challenges encountered while working in an interdisciplinary team? How did you/team manage these challenges?
16. In your opinion, is there anything that could have been approached/done differently to facilitate this interdisciplinary collaboration?

Concluding Questions

17. Do you think the designed course would have been different if created by a mono-disciplinary team? If yes, how and why?
18. What learning gains could you identify, for you and for the team, based on participation in this project?
19. Based on this experience, what do you think are the factors for successful collaboration in interdisciplinary teams?
20. Is there any other information that we haven't discussed and you feel is relevant?

2. Interview guide – Written

Questions about collaborative pedagogical design work in interdisciplinary teams

1. Describe your disciplinary background, work experience and research interests.
2. Describe the objectives of the Interdisciplinary project.
3. How were the project members selected and any specific reasons for including certain partners?
4. Describe your role and contribution in the project.
5. Describe the course designed in the project.
6. Describe start of the initial project discussions and any challenges if any during these discussions.
7. Was research-based knowledge important in deciding the course content? If so, why?
8. How were the course themes and content finalized?
9. Were ideas of pedagogical design used to frame course content and structure? If so, how?
10. How was your disciplinary background and knowledge incorporated into the course design?
11. How were the other team members disciplinary background and knowledge incorporated into the course design?
12. Describe any challenges encountered during the team work and how they were resolved?
13. Could anything have been done differently to facilitate this interdisciplinary collaboration?
14. How would the designed course be different if created by a mono-disciplinary team?
15. What learning gains could you identify through this project participation?
16. What do you think are the factors for successful collaboration in interdisciplinary teams?
17. Is there any other information that you would think is relevant and would like to add?

Appendix B: Initial Interview Email invitation sent to participants

Dear Participant,

My name is Carol Rodrigues and I am currently a second year Master's in Higher Education student at the University of Oslo. I am working on a research project under the supervision of prof. Crina Damsa. I will conduct my master thesis project on the topic of collaborative interdisciplinary design work and examine data collected during the meetings and activities of the interdisciplinary project you have taken part in. I would hereby like to extend an invitation to an interview, which will complement the dataset collected by my adviser during the project period.

The master thesis aims to generate knowledge about how interdisciplinary teams like yours, was in the interdisciplinary project and engaged in collaborative pedagogical design. The interview with each project participant will help gather your own impressions and experiences with engaging in such work. The interview will take approximately 60 minutes and will set up through an online communication channel. It will include questions about your views and experiences on the collaborative interdisciplinary work process. Digital recording software will be used to record the interviews.

I will schedule the interview at a date and time convenient for you. I would very much appreciate if you could provide me with two alternative dates and times, to make scheduling possible.

Your participation in the project is voluntary. If you choose to participate, you can withdraw your consent at any time without giving a reason. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

I sincerely hope that you are willing to contribute to the study and share your views.

Thank you very much.

Sincerely,

Carol Rodrigues

Appendix C: Written interview email sent to participants

Dear Participant,

My name is Carol Rodrigues and I am currently a second year Master's in Higher Education student at the University of Oslo. I am working on a research project on the topic of collaborative interdisciplinary design work under the supervision of prof. Crina Damsa.

You participated in the Interdisciplinary project where participants with different interdisciplinary background team came together to develop an online course in Multicultural education. The aim of this research is to generate knowledge about how interdisciplinary teams like yours, was in the Interdisciplinary project and engaged in collaborative pedagogical design work. Hence, I am inviting you to share your experiences by answering a few questions related to this interdisciplinary collaboration. This will complement the dataset collected by my adviser during the project period.

I would very much appreciate if you could respond to the attached questions in writing and send them to me via email. Your participation in the project is voluntary. There will be no negative consequences for you if you choose not to participate or later decide to withdraw. The responses will be transcribed and anonymized, and our report will not identify you as respondent. The responses will be deleted as soon as the data has been analysed and finalised.

I sincerely hope that you are willing to contribute to the study and share your views.

Thank you very much.

Sincerely,

Carol Rodrigues

Appendix D: Information Letter and Informed Consent Form

Project title: Learning design in interdisciplinary teams

Thank you for your providing access to your project, 'E-course - Cultural competency training'

Purpose of the project

Learning design is an activity through which learning activities and environments are being developed for the educational purposes. I view design as one of the important components of the educational process, entailing complex dependencies and interdependencies between various actors and factors, ranging from the teachers/educators conceptions of knowledge and learning, pedagogical vision, teaching methods, but also contextual factors (institutional, cultural) and the approach to the design process itself. There are few empirical studies of pedagogical design, and even fewer of pedagogical design by interdisciplinary teams. When setting up such a study in this project, I intend to examine design processes and practices, not only the product, that can give the users (educators or learners) a central position, while at the same time, catering for the achievement of broader (institutional or otherwise) goals. In addition, I intend to identify and depict how various resources and expertise come together to in the design process in the project.

Who is responsible for the research project?

University of Oslo, Department of Education is the institution responsible for the project.

What does participation involve for you?

I would like to follow your discussion and work in this project through participatory observation. The discussions will be recorded upon consent from all participants. I would appreciate it greatly if I could also get access to presentations, resources and products used and produced in the online environment. Besides the observations we would also like to follow your email communication and (if possible) interview you about your ideas about learning design and experience with working on this e-course design. The interviews would last half an hour and would be planned conveniently, in breaks during the project meeting or online. All the private information or anything irrelevant will be excluded or pixelated.

Participation is voluntary

Your participation in the project is voluntary. If you chose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you chose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

Only the two students and their supervisor will have access to the personal data. Your name and contact details will be replaced with a code. The list of names, contact details and respective codes will be stored separately from the rest of the collected data. The data will be stored in encrypted remote desktop of University of Oslo.

What will happen to your personal data at the end of the research project?

The research project is scheduled to end 31 of December 2021. The personal data, including any digital recordings will be anonymised at that time.

Your rights

So long as you can be identified in the collected data, you have the right to:

- access the personal data that is being processed about you
- request that your personal data is deleted
- request that incorrect personal data about you is corrected/rectified
- receive a copy of your personal data (data portability), and
- send a complaint to the Data Protection Officer or The Norwegian Data Protection

Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent.

Based on an agreement with University of Oslo, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have questions about the project, or want to exercise your rights, contact:

- University of Oslo via Crina Damsa, by email: crina.damsa@iped.uio.no
- Our Data Protection Officer: Maren Magnus Voll, by email: personvernombud@uio.no
- NSD – The Norwegian Centre for Research Data AS, by email: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.

Yours sincerely,

Crina Damsa

Informed consent

I am aware of the aims of the project and what it means to participate. I am participating voluntarily in this project.

Name in block letters: _____

Location/Date: _____

Signature: _____

Appendix E: Ethical Approval from NSD

11/15/2020

Meldeskjema for behandling av personopplysninger



NSD sin vurdering

Prosjektittel

Learning design in interdisciplinary teams

Referansenummer

996953

Registrert

25.03.2019 av Crina Damsa - crinad@uio.no

Behandlingsansvarlig institusjon

Universitetet i Oslo / Det utdanningsvitenskapelige fakultet / Institutt for pedagogikk

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Crina Damsa, crina.damsa@gmail.com, tlf: 22040725

Type prosjekt

Forskerprosjekt

Prosjektperiode

01.04.2019 - 31.12.2022

Status

27.03.2019 - Vurdert

Vurdering (1)

27.03.2019 - Vurdert

Our assessment is that the processing of personal data in this project will comply with data protection legislation, so long as it is carried out in accordance with what is documented in the Notification Form and attachments, dated 27.03.2019, as well as in correspondence with NSD. Everything is in place for the processing to begin.

NOTIFY CHANGES

If you intend to make changes to the processing of personal data in this project it may be necessary to notify NSD. This is done by updating the information registered in the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes.

<https://meldeskjema.nsd.no/vurdering/5c992e2d-f30b-4bd2-96cc-9410c0d2972e>

1/2

TYPE OF DATA AND DURATION

The project will be processing general categories of personal data until 31.12.2022.

LEGAL BASIS

The project will gain consent from data subjects to process their personal data. We find that consent will meet the necessary requirements under art. 4 (11) and 7, in that it will be a freely given, specific, informed and unambiguous statement or action, which will be documented and can be withdrawn. The legal basis for processing personal data is therefore consent given by the data subject, cf. the General Data Protection Regulation art. 6.1 a).

PRINCIPLES RELATING TO PROCESSING PERSONAL DATA

NSD finds that the planned processing of personal data will be in accordance with the principles under the General Data Protection Regulation regarding:

- lawfulness, fairness and transparency (art. 5.1 a), in that data subjects will receive sufficient information about the processing and will give their consent
- purpose limitation (art. 5.1 b), in that personal data will be collected for specified, explicit and legitimate purposes, and will not be processed for new, incompatible purposes
- data minimisation (art. 5.1 c), in that only personal data which are adequate, relevant and necessary for the purpose of the project will be processed
- storage limitation (art. 5.1 e), in that personal data will not be stored for longer than is necessary to fulfil the project's purpose

THE RIGHTS OF DATA SUBJECTS

Data subjects will have the following rights in this project: transparency (art. 12), information (art. 13), access (art. 15), rectification (art. 16), erasure (art. 17), restriction of processing (art. 18), notification (art. 19), data portability (art. 20). These rights apply so long as the data subject can be identified in the collected data.

NSD finds that the information that will be given to data subjects about the processing of their personal data will meet the legal requirements for form and content, cf. art. 12.1 and art. 13.

We remind you that if a data subject contacts you about their rights, the data controller has a duty to reply within a month.

FOLLOW YOUR INSTITUTION'S GUIDELINES

NSD presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

To ensure that these requirements are met you must follow your institution's internal guidelines and/or consult with your institution (i.e. the institution responsible for the project).

FOLLOW-UP OF THE PROJECT

NSD will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded.

Good luck with the project!

Data Protection Services for Research: +47 55 58 21 17 (press 1)