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STUDENTS' AND SUPERVISORS' EXPERIENCES OF SUPERVISION AND TRAINING IN CLINICAL LEARNING ENVIRONMENT

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Students' and supervisors' experiences of supervision and training in clinical learning environment

THESIS FOR DOCTORAL DEGREE (Ph.D.)

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Till mamma, pappa, Ellen och Hannes

Du som kan,
lev dina
vill.

Pia Eriksson -
Korsdragspoesi

POPULAR SCIENCE SUMMARY OF THE THESIS

Health profession students do an essential part of their education in a clinical setting. It is essential for them to learn from participating in daily clinical practice. For the students, the most important person is their supervisor, who provides them with constructive feedback. Beneficial clinical learning experiences support students in transforming theoretical knowledge into practice, whereas negative experiences adversely impact students' achievement of intended learning outcomes.

The overarching aim of the current thesis was to provide a deeper understanding of the clinical learning environment. Study I compared physiotherapy, medical, speech-language pathology, and nursing students' perceptions of their clinical learning environments using the Undergraduate Clinical Education Environment Measure. In studies II, III and IV, students' and supervisors' experiences of the clinical learning environment were explored, through individual and group interviews.

The first study showed that students generally had positive perceptions of their clinical learning environments, but students from different study programs rated their environments differently. The interviews with the physiotherapy students showed that the learning outcomes were in focus during clinical training and that they highly regarded supervisors who established a relationship and fostered active participation in the community. The interviews with the medical students showed that ad hoc solutions in supervision occurred, and they experienced that the educational responsibilities were downgraded. The interviews with the physiotherapy supervisors showed that providing feedback to students is a challenging task, involving continuous development. Regardless of experience and level of education, they learned and found support within their workplace network.

In conclusion, undergraduate students are generally satisfied with the clinical learning environments, but the medical students' low ratings need attention. Furthermore, it is important that supervisors take the initiative to establish a relationship with students and that learning outcomes have a central role. Supervisors in turn, need support in prioritizing their educational duties, to achieve the best possibilities of clinical training for the students.

POPULÄRVETENSKAPLIG SAMMANFATTNING

Hälso- och sjukvårdsstudenter genomför en stor del av sin utbildning i kliniska miljöer. Det är viktigt att studenterna under handledning erbjuds att lära genom att delta i dagliga kliniska aktiviteter. Handledaren är den viktigaste personen för studenternas lärande, och ett av de viktigaste momenten i handledning är att ge återkoppling. Studenterna påverkas av den kliniska lärandemiljön. Positiva upplevelser underlättar för studenterna att omvandla teoretisk kunskap till praktisk. Negativa upplevelser å andra sidan påverkar deras möjlighet att uppnå lärandemålen.

Det övergripande syftet med avhandlingen var att erbjuda en djupare förståelse för de kliniska lärandemiljöerna. I delstudie I undersöktes och jämfördes den kliniska lärandemiljön för fysioterapeut-, logoped-, läkar-, och sjuksköterskestudenter. Till denna studie användes instrumentet The Undergraduate Clinical Education Environment Measure. I delstudierna II, III och IV undersöktes studenters och handledares erfarenheter av den kliniska lärandemiljön genom individuella- och gruppintervjuer.

Den första studien visade att studenterna generellt har en bra lärandemiljö, men att studenter från olika program upplever sin kliniska lärandemiljö olika. Intervjuerna med fysioterapeutstudenter visade att lärandemålen var i fokus under klinisk handledning och att studenterna uppskattade handledare som etablerade en relation och eftersträvade att studenterna deltog aktivt i gemenskapen på arbetsplatsen. Intervjuerna med läkarstudenterna visade att de upplevde att handledningen delvis bestod av tillfälliga lösningar och att handledarna nedgraderade utbildningsuppdraget. Intervjuerna med fysioterapeuthandledarna visade att handledarna upplevde det svårt att ge återkoppling till studenter, och att det kräver kontinuerlig utveckling. Oavsett erfarenhet och utbildningsnivå, stöttade och lärde handledarna sig av varandra via det sociala nätverket på arbetsplatsen.

I sammanfattning, studenter på grundutbildningen är generellt nöjda med upplevelser i sin kliniska lärandemiljö. Däremot behöver läkarstudenternas låga skattningar uppmärksammas. För studenterna är det viktigt att handledarna tar initiativ till att etablera en relation med dem och att lärandemålen har en central roll. Handledarna i sin tur behöver stöttas i att prioritera utbildningsuppdraget för att uppnå bästa möjliga förutsättningar för studenterna i klinik.

ABSTRACT

Clinical training for health profession students is important prior to commencing their future professions. The literature describes a tension between the education assignment and patient care in clinical environments with high demands. Understanding students and supervisors' experiences in the clinical learning environment is important to enhance the quality of clinical education.

The overall aim was to explore the clinical learning environment from students' and supervisors' perspectives. Study I compared physiotherapy, medical, speech-language pathology, and nursing students' perceptions of their clinical learning environments. Study II explored physiotherapy students' experience of supervisors' preparedness and supervision practices during their first clinical placement. Study III explored medical students' experiences in the early stages of clinical training. Study IV explored clinical physiotherapy supervisors' experience of giving feedback to students. To describe and compare students' perceptions of their clinical learning environments, the Undergraduate Clinical Education Environment Measure was used. Individual semi-structured interviews were conducted with physiotherapy and medical students. Focus group interviews were performed with physiotherapy supervisors.

The findings suggests that students experienced their clinical learning environment differently, the medical students scoring lower than the other students. The physiotherapy students appreciated supervisors who established a relationship with them, encouraged cooperation in the community, and used intended learning outcomes. The medical students were encouraged to push themselves forward in the clinic and ad hoc solutions concerning supervision occurred. Rather than trying to change the circumstances, they opted to adapt to the busy clinical learning environment. The physiotherapy supervisors found it challenging to provide feedback to students but found support within their network.

Undergraduate students are generally satisfied with their clinical learning environments, but medical students' low ratings need attention. It is important that supervisors take the initiative to establish a relationship with students and that focus is given for learning outcomes. Supervisors, need support in their educational role, which otherwise risks being downgraded, resulting in clinical training of variable quality for students. The workplace network provides key support for supervisors' development of their ability to provide feedback to students.

Preface

We are all learners, always. Having that said, learning is a complex matter. A child learns to walk, and an adult learns how to cultivate. We learn consciously and unconsciously. We learn voluntarily and involuntarily, maybe under difficult conditions, at best under positive circumstances. It is not difficult to grasp that there are several views of learning.

Before I became a doctoral student, I worked within inpatient health care for 25 years. I considered learning to be the acquisition of knowledge, and my perspective had the teacher mainly in focus, with knowledge being transferred from someone experienced to someone else. I was a supervisor for undergraduate and international students as well as for colleagues during their specialization. I worked as a clinical teacher and was a member of a teacher team. As time went on, my perspective on learning moved toward a learner-focused view. I have always been in a context where learning has been highly valued, and time has been set aside for learning with great opportunities to influence the structure of the students' clinical education. With this preunderstanding I became a PhD student.

During my years as a doctoral student, I have considered my subject to be medical pedagogy, which I understand as the means that faculty use to provide health professions students with opportunities to learn. My interest is learning in the clinical environment, where health professions students learn during encounters and interaction with clinical teachers, supervisors, patients, relatives, peers, and those in other professions. I want to understand how those of us who work in the clinical environment best create circumstances to develop the training of our future colleagues. In this thesis, I contribute knowledge that is applicable to clinical learning environments, and I hope that this work will be of use to supervisors and students in those environments.

LIST OF SCIENTIFIC PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals.

I. **Sellberg M**, Palmgren PJ, Möller R. A cross-sectional study of clinical learning environments across four undergraduate programs using the undergraduate clinical education environment measure. *BMC Medical Education* 2021, 21(1), 1-13.

II. **Sellberg M**, Halvarsson A, Nygren-Bonnier M, Palmgren P. J. Möller R. Relationships matter: a qualitative study of physiotherapy students' experiences of their first clinical placement. *Physical Therapy Reviews* (under review).

III. **Sellberg M**, Palmgren PJ, Möller R. Balancing acting and adapting: a qualitative study of medical students' experiences of early clinical placements. *Manuscript.*

IV. **Sellberg M**, Skavberg Roaldsen K, Nygren-Bonnier M, Halvarsson A. Clinical supervisors' experience of giving feedback to students during clinical integrated learning. *Physiotherapy Theory and Practice* 2020, 38(1), 122-131.

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LIST OF ABBREVIATIONS

CLE	Clinical Learning Environment
CoP	Communities of Practice
COREQ	Consolidated Criteria for Reporting Qualitative Research
DREEM	Dundee Ready Education Environment Measure
ECTS	European Credit Transfer and Accumulation System
EHEA	European Higher Education Area
ILO	Intended Learning Outcome
KI	Karolinska Institutet
UCEEM	The Undergraduate Clinical Education Environment Measure

1 INTRODUCTION

Learning in a clinical workplace is necessary for health professions students. Indeed, a large part of their education takes place in clinical learning environments (CLEs), where they learn to transform theoretical knowledge into the practical skills necessary for their future profession (Yardley et al., 2012). To develop confidence and competence, students also require supervision by more experienced health professionals (Biggs & Tang, 2011; Dornan et al., 2014). In the present work, the term *health professions students* refers to students of any health profession (e.g., medical, nursing, physiotherapy, and speech-language pathology) across the continuum of health care education.

Learning environments may affect students in several ways. Positive experiences enhance learning and are associated with resilience, a strong teaching culture, and becoming a part of the community (Gruppen et al., 2018). Unfavorable experiences, by contrast, constrict learning and participation (Gruppen et al., 2018). Some studies even show that the quality of the learning environment predicts the quality of care provided by graduates for years after graduation (Asch et al., 2009; Tamblyn et al., 2005).

Supervisors are essential to students' experiences in CLEs (Boor et al., 2008; Kilminster et al., 2007; Pitkänen et al., 2018), but understaffing and increased patient numbers complicate the conditions of supervision (Dornan et al., 2019; Pitkänen et al., 2018; Weiss et al., 2018). Clinical supervisors often lack time for supervision and must balance that task with clinical duties and patient care (Chuan & Barnett, 2012; Kilminster et al., 2007). Clinicians may give student education a lower priority than their clinical duties, and supervision assignments are not always seen as "real work" (Irby & O'Sullivan, 2018; Manninen et al., 2015). Additionally, clinical experience and content knowledge alone are often believed to adequately qualify a supervisor in health professions education (Biggs & Tang, 2011), so clinicians may lack pedagogical knowledge of supervision and learning and thus feel unprepared for supervision (Hall-Lord et al., 2013; Irby & O'Sullivan, 2018).

During supervision, it is essential that supervisors provide feedback to students so that the latter understand the extent of their progress toward the intended learning outcomes (ILOs) (Ramani & Leinster, 2008). To improve the conditions for students learning in CLEs we must better understand students' and supervisors' perceptions and experiences of these settings. This is the subject of this thesis.

1.1 OUTLINE OF THE THESIS

The thesis is organized into seven chapters. The introduction provides a brief overview of the topics covered. Chapter 2 introduces a deeper description of the subject's theoretical and empirical foundations while Chapter 3 presents the research aims, and Chapter 4 describes the philosophical underpinning of the thesis as well as the research methodology. The main findings are presented in Chapter 5, followed by a discussion in Chapter 6. Finally, Chapter 7 offers conclusions and implications.

2 BACKGROUND

This chapter outlines the scientific field of the thesis and the relevant literature. It describes the theoretical framework, identifies knowledge gaps, and provides a rationale for the conducted research while offering insights into CLEs, feedback, outcome-based education, and clinical training and supervision.

2.1 DEFINING THE CLINICAL LEARNING ENVIRONMENT

Health professions students learn in diverse contexts, often referred to as *learning environments* (Gruppen et al., 2018), which are understood as complex, psycho-social-physical constructs that are co-created by individuals, groups, and organizations in a specific setting and are shaped by contextual climate and culture (Palmgren, 2016). Formal learning environments are distinguished from informal ones, which comprise a variety of places (e.g., cafés, homes, and Facebook) where learning occurs in a nonstructured, spontaneous manner (Isba, 2013). Formal learning environments (e.g., universities) have been described as having a set of features that gives each circumstance and institution a personality, spirit, and culture that determine what it is like to be a learner within an organization (Holt & Roff, 2004).

CLEs have been defined in various ways, but their nature is elusive, and their complexity is recognized by many authors (Gruppen et al., 2019; Isba et al., 2020; Nordquist et al., 2019; Papastavrou et al., 2016). Some of the definitions are globally comparable across disciplines, distinguished from one another by the specific field and by what is considered to have the greatest influence on learning. Dunn and Burnett (1995) described a CLE as "an interactive network of forces within the clinical setting that influence students' clinical learning outcomes." For Papp et al. (2003) the CLE comprises anything that surrounds the student whereas Saarikoski and Leino-Kilpi (2002) (2002) emphasize the ward culture in health CLEs and Newton et al. (2010) describe the complex sociocultural entity.

Nowadays, both LEs and CLEs are often described by a four-domain model, including a personal, a social, an organizational, and a material dimension (Irby et al., 2021). Both Gruppen et al. (2019) and Flott and Linden (2016) use four-domain models to support their definitions of the CLE and the learning environment. Gruppen et al. (2018) synthesize several conceptual frameworks and identify four elements of a learning environment: personal, social, organizational, and physical/virtual. Flott and Linden (2016) synthesize research on

the CLE and found four characteristic attributes that affect students' learning experiences, i.e., the physical space, psychosocial and interaction factors, organizational culture, and teaching and learning. The physical space is necessary and includes functioning equipment while the psychosocial and interaction aspects refer to the communication and interaction between everyone in the CLE. The organizational culture in their model refers to the entire social climate of the CLE, and the teaching and learning components refer to the effectiveness of supervision, variation in the opportunities provided and students' own engagement in the learning process. Importantly, the domains coexist, affect one another, and shape students' experiences, perceptions, and learning (Josiah, 2018). In the current thesis, the CLE is defined as "*any area where students apply theory to practice by conducting actual or simulated patient care to gain experiential knowledge about skills, attitudes, and decision-making abilities to become a competent entry-level healthcare provider"* (Flott & Linden, 2016).

2.1.1 Measuring the clinical learning environment

An early scientific description of learning environments is found in the work of Lewin, who in 1936 observed that a student's behavior results from interactions between the student and the environment (Lewin, 1936). Based on Lewin's theory, Murray and McAdams (1938) suggested that personality influences the perception of an environment. Thirty years later, the first instruments to assess environments were developed. Walberg and Andersson (1968) developed the Learning Environment Inventory to assess students perceptions of classroom climate, and Moos (1973) developed questionnaires to assess diverse environments, including hospital wards and classrooms. These authors are often seen as pioneers in the field of learning environments.

CLEs are complex and, therefore, challenging to evaluate (Schönrock-Adema et al., 2012). What can be assessed are stakeholders' perceptions of the CLE, in the shape of quantifiable elements on psychometric scales. Several inventories have been developed, validated, and refined to assess students' perceptions of their CLEs (Chan, 2002; Saarikoski et al., 2002; Strand et al., 2013). Because of the relationship between CLEs and students' achievement and satisfaction, it has been suggested that assessing CLEs should be a part of educational institutions' practices and a component of program evaluation (Soemantri et al., 2010). As the health care system is in constant change, the tools for evaluating its CLEs should evolve accordingly (Colbert-Getz et al., 2014).

There is an abundance of instruments to quantitatively measure the CLE (Table 1), some of which derivations from other instruments. One frequently used instrument is the Dundee Ready Education Environment Measure (DREEM), developed for a campus-based learning environments, and having only a few variables for quantitative measurement of the clinical context (Roff et al., 1997). An instrument derived from DREEM, the Postgraduate Hospital Educational Environment, assesses postgraduate medical doctors' CLEs in hospitals (Roff et al., 2005). Other instruments are specifically designed for a narrow CLE, e.g., the Anaesthetic Theater Educational Environment Measure (Holt & Roff, 2004), the Operating Room Educational Environment Measure (Irby et al., 2021), and the Surgical Theatre Educational Environment Measure (Cassar, 2004). Some instruments are used to assess specific levels of education, e.g., the Dutch Residency Educational Climate Test (Boor et al., 2011) and the Scan of Postgraduate Educational Environment Domains which are designed for postgraduate studies. Recently, the Healthcare Education Micro Learning Environment Measure was developed with the purpose to measure the CLE for students of diverse health professions who spend a shorter time in clinics (Isba et al., 2020). It is the only instrument developed for a diversity of health care students.

Most of the instruments to evaluate CLEs have been developed for the medical and nursing student populations (Irby et al., 2021). Thus, educators and researchers may experience difficulty in choosing an appropriate instrument to study the CLE. To support clinicians and educators, Irby et al. (2021) identified six instruments designed to assess the CLE in medical education. They collected key information based on what aspects or domains of the learning environment the educators most wish to measure. Another challenge is that some of the instruments lack a grounding in contemporary workplace-learning theories or have been identified as not being psychometrically stable (Schönrock-Adema & Cohen-Schotanus, 2010), which prompted Strand et al. (2013), guided by sociocultural learning theory, to develop the Undergraduate Clinical Education Environment Measure (UCEEM).

Table 1. An overview of commonly used instruments to measure the CLE and the studied populations.

Authors	Instrument	Abbreviation	Environment	Population
Saarikoski & Leino-Kilpi (2002)	Clinical Learning Environment and Supervision evaluation scale	CLES	Clinical environment	Undergraduate nursing students
Chan (2001)	Clinical Learning Environment Inventory	CLEI	Hospital environment	Nursing students
Cassar (2004)	Surgical Theatre Educational Environment Measure	STEEM	Operating theatre	Undergraduate medical students
Holt & Roff (2004)	Anaesthetic Theatre Educational Environment Measure	ATEEM	Anesthetic theatre	Postgraduate medical doctors
Roff et al. (2005)	Postgraduate Hospital Educational Environment Measure	PHEEM	Hospital environment	Postgraduate medical doctors
Kanashiro et al. (2006)	Operating Room Educational Environment Measure	OREEM	Operating room	Postgraduate medical doctors
Nagraj et al. (2007)	Mini-Surgical Theatre Educational Environment Measure	mini-STEEM	Operating theatre	Undergraduate medical students
Boor et al. (2011)	Dutch Residency Educational Climate Test	D-RECT	Clinical environment	Postgraduate medical doctors
Dornan et al. (2012)	Manchester Clinical Placement Index	MCPI	Clinical environment	Undergraduate medical students
Riquelme et al. (2013)	Ambulatory Care Learning Education Environment Measure	ACLEEM	Ambulatory setting	Postgraduate medical students
Strand et al. (2013)	Undergraduate Clinical Education Environment Measure	UCEEM	Hospitals	Undergraduate medical students
Schönrock-Adema (2015)	Postgraduate Educational Environment Domains	SPEED	Educational environment	Postgraduate medical education
Pololi et al. (2017)	C-Change Resident Survey	C-CRS	Perceptions of culture	Postgraduate medical students
Isba et al. (2020)	The Healthcare Education Micro Learning Environment Measure	HEMLEM	Learning environment of any clinical placement	Students from any health care profession

2.2 OUTCOME-BASED EDUCATION

Outcome-based education is a pedagogical model that may be defined in several ways. The most widely used definition is that of William Spady, an educational psychologist and sociologist who is considered the father of the model. According to him, outcome-based education organizes the curriculum, instruction, and assessment around the essential competencies that all students should possess at the end of the learning experience (Spady, 1994). Spady describes four principles of outcome-based education (presented in Table 2). An outcome-based curriculum differs from a traditional, teacher-based one in that the latter describes what the teacher will bring up while the former describes what a student will be able to do after the learning experience (Biggs & Tang, 2011). Thus, outcome-based education should be learner centered, individualized, and directed toward standards. Consequently, students are not graded on a bell curve and assessed according to how well they perform compared to one another but assessed on their mastery of the ILO itself. Implementing these principles in all learning situations may be challenging, but the challenges should be weighed against the outcome of successful learners (Spady, 1994).

Table 2. Spady's four principles of outcome-based education (Spady, 1994)

Principle	**Explanation**
1. Clarity of focus	Everything that teachers do must focus on what students should know, understand, and do.
2. Backward design	The design of the curriculum is inspired by the learning outcomes, after which all decisions are made on the basis of ensuring that students achieve the desired results.
3. High expectations	The aim is that, with the support of teachers who facilitate successful learning, all students will achieve the outcomes at the end.
4. Expanded opportunities	Intellectual accomplishment should be expected of all learners, implying that teachers must strive to provide expanded opportunities for all students. A basic premise is that all students can learn and meet high standards if they are given opportunities to do so.

2.2.1 Outcome-based education in Sweden

The progress toward outcome based education in Sweden accelerated in 1999 when ministers of several European countries signed an agreement at the University of Bologna, that outlines the fundamental principles of what today is known as the Bologna Process (Patrício & Harden, 2010). Besides actions to achieve quality in education, the key objectives of the Bologna Process are greater mobility of staff and students, and employability in Europe (Patrício & Harden, 2010). The member countries of the European Union have comparable degrees, a system based on the levels of undergraduate and graduate, and a common system of credits, the European Credit Transfer and Accumulation System (ECTS) (Table 3.) One academic year corresponds to 60 ECTS credits. In 2007, Sweden introduced a new education and degree structure (in Swedish called *Högskolereformen*) in line with the Bologna Process. Higher education became outcome oriented, requiring that program and course syllabi transparently state what students are expected to know and do after completing a program.

Table 3. Overview of the cycles of higher education qualifications according to the Bologna Process

Cycle	First	Second	Third
ECTS	180–240	60–120	120–420
Degree	Bachelor	Master	Doctoral
Years	3–4	2	2–4

2.2.2 Defining intended learning outcomes

An important element of outcome-based education is the statement of ILOs, i.e., the learner's competencies at the time of course completion or graduation (Harden, 1999). The ILOs essentially answer the question: *what will the student learn*? Stating the ILOs serves multiple purposes: to inform students what they should achieve, to inform supervisors what student achievements they should support, to provide a basis for assessment, and to reflect the nature of the student's intended profession (Grant, 2006). The Swedish Higher Education Ordinance (*Högskoleförordningen*) states the ILOs of each higher education program (*examensmål*). These ILOs are divided into three distinct outcome categories: knowledge and understanding; skills and abilities; and judgment and approach. These quite general outcomes are subsequently specified in the course syllabi of each course included in a program.

Diverse taxonomies (i.e., classification systems) are used to clarify the complexity of an ILO (Biggs & Tang, 2011; Bloom et al., 1956; Miller, 1990). Common taxonomies in health professions education include Blooms' taxonomy, Biggs's Structure of the Observed Learning Outcome taxonomy, and Miller's pyramid, which is used to assess clinical competence (Bloom et al., 1956; Miller, 1990). A typical learning outcome will begin "By the end of this course, the student will be able to…" and then continues with an action and the outcome. The verbs used in describing the higher levels reflect more complex requirements of knowledge and skills (Kim et al., 2012; Näsström, 2009). For example, verbs at the lower level of Blooms' taxonomy include *remember* and *understand*, while those at the higher levels include *analyze, synthesize*, and *evaluate*, as the latter levels require a more complex level of understanding (Kim et al., 2012; Näsström, 2009). Millers' pyramid resembles Blooms' taxonomy and include the levels; *knows, knows how, shows how*, and *does* (Norcini & Burch, 2007). If students do not master the foundational levels of a taxonomy, where simply understanding is sufficient, it is not likely that they will perform successfully at the higher levels of the taxonomy.

2.2.3 Constructive alignment

Constructive alignment is a principle that guides the design of teaching and learning activities and assessments. Biggs and Tang (2011) note that constructive alignment has two elements. The *constructive* element refers to students constructing their own meaning through relevant learning activities, while the *alignment* element refers to what the teacher must do: create teaching and learning activities that scaffold students' achievement the ILOs and devise assessments that appraise students' abilities to meet the requirements of the ILOs. Hence, defining the ILOs is a prerequisite to achieving constructive alignment, i.e. ensuring that the ILOs, teaching and learning activities and assessments are in line with one another (Biggs & Tang, 2011) (Figure 1). To achieve an ILO, it is important that learning activities be appropriate to the student and aligned with criteria-based assessments that emerge from the ILOs (Biggs & Tang, 2011). Thus, the assessment tasks should be designed so that students can demonstrate mastery of the ILOs (Lasrado & Kaul, 2021).

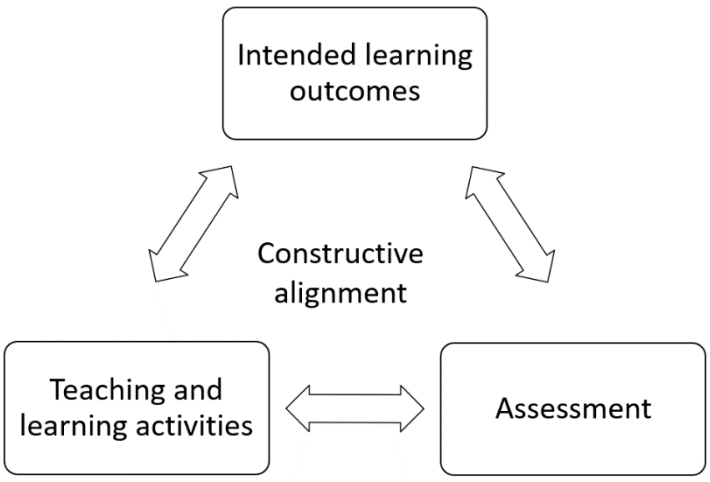

Figure 1. Constructive alignment as described by Biggs and Tang (2011)

2.3 CLINICAL TRAINING AND SUPERVISION

Clinical training under supervision is recognized as a part of effective modern, health care education. This chapter defines the concept and describes the important factors in the supervision of health professions students.

Various terms are used to describe medical education students, as well as the learning activities they pursue under supervision in authentic work situations. In the literature, the word medical and non-medical students are frequently used, non-medical often referring to other than medical and nursing students. Moreover, the terms health professions students and allied health professions students are often used interchangeably. In the current thesis, the term *health profession students* will comprise students from four different (physiotherapy, medical, speech-language pathology and nursing) study programs.

In the clinical education of medical students, a frequently used term, clerkship, comprises all the rotations in clinical settings (General Medical Council, 2022; Wojtczak, 2002). However, the terms clerkship, (clinical) rotation, clinical training and even clinical placements are often used interchangeably. In Europe, clerkships typically take place in the third year and subsequently, which is the case in the medical program at Karolinska Institutet (KI) where much of the research for this thesis took place (Wojtczak, 2002). In nonmedical health professions students' education, the corresponding terms are *clinical training* and *clinical placement* (O'Brien et al., 2019).

2.3.1 Defining clinical supervision

In the literature, there is no consensus on the definition of supervision. The terms *mentor*, *clinical instructor*, *preceptor*, and *supervisor* are used interchangeably, resulting in incompatible interpretations of these supporting roles in health professions education (Gerhart, 2012; Mills et al., 2005). Supervision may be defined as a task-focused, short-term arrangement whereas mentorship is a long-term arrangement focused on the protégé's progress and flourishing (Gallacher, 1997; Kilminster et al., 2007; Yoon et al., 2017). According to Mills et al. (2005) preceptor relationships in the clinical context support early-career health care providers in a formal arrangement for a defined period of time (Mills et al., 2005). Milne (2007) states that supervision differs from these related models by incorporating an evaluative component.

With regard to clinical supervision, Lyth (2000) defines it as a support mechanism for practicing professionals within which they can share clinical, organizational, developmental and emotional experiences with another professional in a secure, confidential environment to enhance their knowledge and skills. Further, Milne's (2007) definition of clinical supervision based on a systematic review of 24 empirical studies concludes that clinical supervision is the formal provision of relationship-based education and training by senior or qualified health practitioners. Although definitions of clinical supervision vary, Cumming (2007) argues that they are quite similar in essence. In this thesis, supervision refers to the provision of monitoring, guidance, and feedback on matters of personal, professional, and educational development in the clinical context to enhance learning and provide safe, appropriate patient care (Kilminster et al., 2007).

2.3.2 Supervision models in health care education

Students' clinical placements may vary in several ways and so do the models of clinical supervision. In a systematic review, Lekkas et al. (2007) studied five allied health disciplines and found that there is no "gold standard" model of supervision for undergraduates and entry-level students. These findings are supported by Pollock et al. (2017). In their review of studies of nursing, midwifery, and other health professions students, the authors report that there is no specific model of clinical supervision that promotes optimal outcomes for health professionals and their students (Pollock et al., 2017). Importantly, within health professions, the student and supervisor often work closely together, with the supervisor overseeing individual students (Barrett et al., 2021; Rindflesch et al., 2013). Some studies indicate that

individual supervision has a superior learning value (Delany & Bragge, 2009; Rindflesch et al., 2013). Barret et al. (2021) showed that the one-to-one (1:1) supervision model is the most common in physiotherapy education, but other models, such as 2:1 and 1:2 were also positively evaluated by students and supervisors. The authors conclude that placement providers are able to determine the most suitable model in their context (Barrett et al., 2021).

2.3.3 Challenges in clinical supervision

The circumstances of clinical training and supervision may be challenging in several ways. One major challenge is allocating time for supervision. In a stressful clinical environment, student education may have lower priority than clinical duties (Irby & O'Sullivan, 2018), and supervision may not even be considered real work (Manninen et al., 2015). Recent research by Elmberger et al. (2019) describes that there are tensions between health care professionals' commitments in clinical settings where educational activities are less valued than research and clinical duties which restrict clinical educators' opportunities for faculty development and progress. O'Brien et al. (2019) who studied final-year health students' experiences of supervision, found that they believed it was obvious that clinicians took on students only because it was a contractual obligation, rather than a choice. However, the authors also note that the supervisors' workloads hampered their ability to supervise students (O'Brien et al., 2019). An increase in workload has reduced clinical supervisors' abilities to oversee student learning and patient care simultaneously (Manninen et al., 2015). Other authors have also mentioned that, due to patient duties and a lack of time, clinical supervisors may be overwhelmed and hindered in supervision (Chuan & Barnett, 2012; Lambert & Glacken, 2005). Other salient challenges are increasing patient numbers, shorter hospital treatment times, and understaffed health care facilities (Dornan et al., 2019; Pitkänen et al., 2018; Weiss et al., 2018).

2.3.4 Preparedness for supervision in the clinical learning environment

In light of the above-mentioned circumstances of clinical training, it is reasonable to reconsider clinical supervisors' opportunities to prepare for students' arrival. The literature in this area is limited. In their investigation of undergraduate nursing students' learning experiences in the CLE, Birks et al. (2017) discovered a lack of planning for student placements. Both students and staff brought attention to organizational problems, such as staff not anticipating students' arrival and students not being told where to go or whom to work with. In a systematic synthesis of undergraduate nursing students' experiences of

learning in clinical placements, Cant et al. (2021) found that preparation for student placement is necessary and should be managed by both the university and the health care organization. In an explorations of undergraduate medical students' experiences of learning from clinical supervision, Thyness et al. (2022) found that a proper introduction consisted of supervisors welcoming the students and promptly on asking what they felt comfortable doing.

One way to investigate supervisor' preparedness is y using the UCEEM, which has a subscale on *Preparedness for student entry*. (No other instrument for assessing the CLE includes a corresponding scale.) The UCEEM however, is relatively new and rarely used among undergraduate students (Strand et al., 2013). Strand et al. (2013) who developed the UCEEM and used it among Swedish medical students in semesters 6–10, found that the *Preparedness for student entry* subscale yielded a quite low score (3.2 on a scale of 1–5). Using the UCEEM to explore senior medical students' perceptions of various CLEs in the UK, Roberts et al. (2018) recorded higher scores in this subscale than Strand et al. (2013), but found differences between students' placements. Together, these studies indicate that further research is needed to shed light on health profession students' perceptions of supervisors' preparedness.

2.3.5 Feedback as a tool in clinical education

The understanding of feedback in education was adopted beginning at the time of the industrial revolution and became synonymous with the transmission of information about a student's performance from a teacher to a student (Boud & Molloy, 2013). In 1983, Ramaprasad (1983) concluded that there was little consensus on the concept and that the diverse definitions of feedback hindered the transferring of knowledge across disciplines. Consequently, he suggested that *feedback* be defined as information about the gap between a student's actual level and the reference level, which is used to alter the gap in some way. Sadler (1989) followed in his footsteps and promoted the learners active engagement in feedback, pointing out that it is essential that the learner understands how to close the gap. The early 2010s saw a shift in the perception of feedback (Figure 2). In 2013 Boud and Molloy (2013) challenged the widespread misconception, that feedback is a one-way performance (Ramaprasad, 1983). They warned against a generic feedback model and stated that a one way performance feedback model does not successfully support learners in improving their work and hence needs to be modified (Boud & Molloy, 2013). In the same vein, Ajjawi and Boud (2017) suggest that feedback is socially constructed and contextually situated and Henderson et al. (2019) describe the contextual factors that enable effective

feedback and show that feedback should be a learner-centered process in which both the teacher and the learner are active (Henderson et al., 2019).

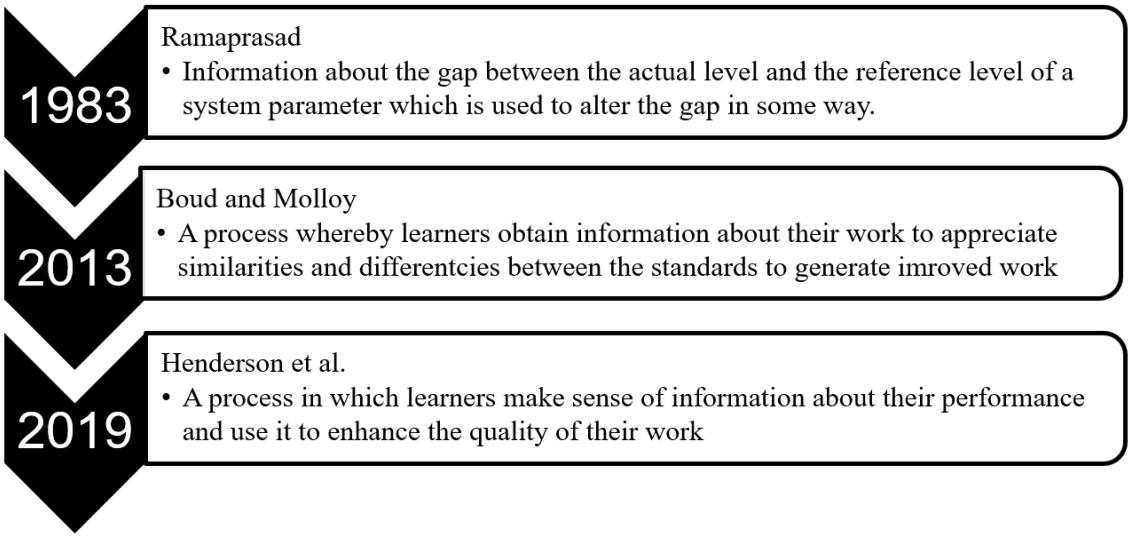

Figure 2. The evolution of definitions of feedback toward a learner-centered approach

Thus, feedback should be considered as a process that strives for constructive dialogue (Dawson et al., 2019) and as a conversation in which the student plays an active role (Molloy et al., 2020). In the current thesis, feedback is seen as a constructive dialogue between a supervisor and a student about the gap between the student's current level and the desired level and about *how* to reduce the gap to achieve the ILOs. This definition is inspired by Ramprasad's definition (1983), but also highlights the striving for a constructive dialogue as suggested by Pintrich and Zusho (2002), thus shifting feedback from a didactic delivery of information toward a conversational model (Molloy, 2009), and a process whereby students enhance the quality of their own work (Henderson et al., 2019).

2.3.6 Feedback in health professions education

Several favorable effects of feedback have been described in the literature. Feedback combined with supervision have been proven to positively affect student development and learning in medical education (Kilminster et al., 2007). It is considered to be a vital driver of students' improvement, especially with the shift toward outcome-based education (Bing-You et al., 2017). The core components in appropriate feedback should include informing students about their learning needs, motivating them to engage in learning activities and providing information about their progress toward the ILOs (Bing-You et al., 2017; Branch &

Paranjape, 2002). Feedback should be an integral part of all clinical education (Bing-You et al., 2017).

Although feedback has been identified as powerfully influencing students' learning (Hattie & Timperley, 2007), it also presents challenges. Its effectiveness depends on its format, timing, and the expertise of the provider (Hattie & Timperley, 2007; Murdoch-Eaton & Sargeant, 2012). Feedback delivered without strategies regarding the areas in which students can improve and how they can improve may engender a sense of helplessness in students (Kluger & Van Dijk, 2010). Furthermore, a process that does not actively involve the student, may end with the student becoming defensive (Molloy & Boud, 2013). Thus, the student and the supervisor need to have a common understanding of the nature of feedback and how it can be used to improve learning (Groves et al., 2015). The supervisor must consider the student's receptiveness to feedback and adapt the feedback accordingly (Murdoch-Eaton & Sargeant, 2012). From the student's perspective, it can also be hard to identify the main message when confronted with a large amount of feedback (Molloy, 2009).

2.4 A SOCIOCULTURAL PERSPECTIVE ON LEARNING

This thesis does not focus on students' or supervisors' perspectives on learning per se, but, because learning in the CLE is a cornerstone of health professions education, we must discuss the theoretical perspectives on learning and understand learning theories. Students' learning in the CLE can be related to several learning theories, each underscoring different aspects of learning and useful for different purposes (Illeris, 2018). *Learning* may be described as the act of absorbing knowledge or as a process that leads to permanent change in capability that is not solely attributable to biological maturation and ageing (Illeris, 2018). The present thesis is based on a sociocultural learning theory that emphasizes the effect of interaction and collaborations with others (Schönrock-Adema et al., 2012). Modern sociocultural learning theories stem from the work of Lew Vygotsky, a Russian psychologist, educator, and philosopher who died in 1934 at the age of 37. After his death, his texts were banned until 1980, when they became available to the world, and his ideas on psychological processes in children have contributed to the understanding of learners of all ages. He observed that upbringing has a social character, so the view of learning as a cultural and social concept can be traced back to his ideas (Vygotsky, 1978).

Vygotsky argued that learning occurs within the zone of proximal development, which offers an additional potential for learning as a result of collaboration with more capable peers

(Vygotsky, 1978). A learner may develop by getting assistance from a more competent other through scaffolding, which facilitates learning and should be adjusted to the needs of the learner but provided only when genuinely needed. When employing scaffolding in the context of clinical supervision, the supervisor can bridge the distance between students' present developmental level and the level that can be achieved with scaffolds. In line with sociocultural theory, learners first acquire knowledge and skills from society and then, in turn, shape their environment (Vygotsky, 1978). This theory is recognized for its value in explaining how learning occurs in dynamic contexts, such as the CLE (Bleakley, 2006). Collaboration with others influences students' learning processes through their acquisition of knowledge and skills from others and their growing familiarity with the norms, cultural beliefs, and attitudes of the communities to which they are being introduced (Schönrock-Adema et al., 2012)

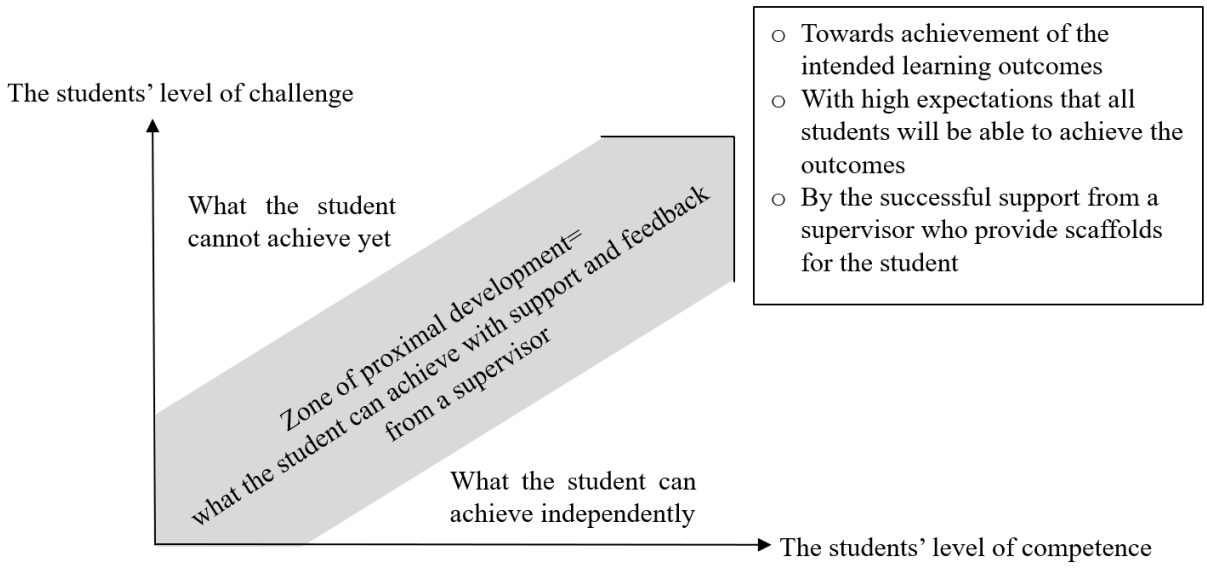

Figure 3. A description of Vygotsky's (1978) zone of proximal development adapted to describe the goal with supervision of health profession students, outcome-based education as described by Spady (1994).

2.4.1 Communities of practices

Etienne Wenger placed learning in the context of lived experiences (Illeris, 2018), and Lave and Wenger argue, in their 1991 book *Situated Learning—Legitimate Peripheral Participation*, that learning should be viewed as socially relational rather than as a solely mental process (Lave & Wenger, 1991). The present thesis likewise views students' learning

in the CLE as participation in a social context where knowledge is a matter of competence and knowing a matter of participation (Lave & Wenger, 1991). Health professions students must grow into the professional community (Taylor & Hamdy, 2013), and a social-constructivist perspective implies that learning is constructed on previous knowledge, perceptions, and experiences. Lave and Wenger (1991) further developed the sociocultural perspective on learning with the concept of a community of practice (CoP), a group of people who share a concern or a passion for a given pursuit and who learn how to do it better in a context of regular interaction (Lave & Wenger, 1991). A CoP rests on three elements: a shared goal (domain), mutual engagement or willingness to share ideas (community), and the specific knowledge that the community develops (practice) (Wenger, 1998). Individuals contribute to the CoP by engagement, and the community in turn refines their practice and fosters a new generation of members (Illeris, 2018). Also the organization gains on COPs, since it is through the interconnected communities that the organization knows what it knows and is effective and valuable as an organization (Illeris, 2018).

2.4.2 Legitimate peripheral participation

Lave and Wenger describe how newcomers became members of a CoP through legitimate peripheral participation (Lave & Wenger, 1991). By participating in peripheral activities, i.e., simple but productive and necessary tasks, participants become acquainted with tasks and learn the vocabulary of the CoP. By gradually evolving toward mastery, they move from the periphery toward the center of the CoP. A supervisor has the potential to confer legitimacy on the newcomer or limit that legitimacy and may control the extent of the newcomer's access to community practices and experiences (Lave & Wenger, 1991). In his later work, Wenger abandoned the concept of legitimate peripheral participation and introduced the idea of a duality: the tension between two opposing forces that together become the driving force for change (Wenger, 1998). The dual forces are described as peripheral and inbound trajectories that may or, contrarily, may never lead to full participation. Training to become a health care professional may be viewed as an inbound trajectory that culminates in full participation in a health professions community while students in a health care setting may be viewed as transient members on a peripheral trajectory (Wenger, 1998). Nevertheless, the concept of legitimate peripheral participation is still frequently used in the medical education literature and will be used here to describe how students may or may not be included in the CoP. In the current thesis, a students' journey, from the first day at a clinical placement to the last day, will be viewed through the conceptual lens of legitimate peripheral participation.

2.5 RATIONALE OF THE THESIS

Clinical training is important in health professions' education, and it is widely accepted that the clinical supervisors have an essential role in supporting health professions students into competent professionals. However, the literature reveals challenging circumstances for clinical supervision.

Exploring students' and supervisors' experiences of the CLE, provides an increased understanding of the reality they face. There is a considerably larger amount of literature examining nursing and medical students' experiences in the CLE, but a comparatively smaller body of literature addressing students from smaller programs, such as the physiotherapy program, and students from different programs at the same university. The results enable insight on how to optimize the CLE and how to prepare for and execute supervision among the studied populations. This is particularly important since clinical training is a comprehensive part of health profession education. In the long turn, this could lead to better learning experiences and an improved education for future students.

Research on the early stages of clinical training and supervisors' preparedness for health professions students' entry in the CLE is limited. Most research on preparedness in medical education literature concerns students, how prepared they are for learning in the CLE or work, or how supervisors perceive students' preparedness for clinical training. Students' perspective on the role of the supervisor, in supervision of health care students', needs to be emphasized in times of constraints and increased productivity. There is also need for a better grasp of how relationships are established and maintained for the purpose of clinical supervision and what is involved as an adjunct to professional practice.

The early stages of clinical training and education needs more attention to better understand the factors affecting students' experiences of the CLE and supervision. There is also a paucity of research on the use of ILOs in the CLE. Knowledge of students' experiences could support the development of educational arrangements to better backing their learning.

3 AIM

The overall aim of this thesis was to provide a deeper understanding of the CLE. More specifically, to explore the CLE from the perspective of students and supervisors.

To achieve the overall aim of the thesis, the specific objectives were:

Study I To describe and compare undergraduate students' perceptions of their CLEs across four different undergraduate programs.

Study II To explore physiotherapy students' experience of supervisors' preparedness and supervision practices during their first clinical placement.

Study III To explore medical students' experiences of the early stages of clinical training.

Study IV To explore clinical physiotherapy supervisors' experience of giving feedback to students during clinical integrated learning.

4 METHODOLOGY

The chosen methodology must relate to the overall research aim and the intended readership of the research. In this chapter, the thesis will be positioned regarding the perspective taken for the research design, and the rationale for choosing the mixed methods approach will be addressed. The specific methods used in the individual studies are presented in Chapter 4.3. A mixed methods approach was determined to be appropriate for the empirical research project. The knowledge generated by this work is intended to be interpreted and employed by individuals adapting it to their own theoretical or practical contexts.

4.1 PHILOSOPHICAL STANCES

Scientific research paradigms, a concept introduced by Kuhn in the 1970s (1970), rest on three fundamental concerns: *ontology* describes how researchers view reality, *epistemology* determines how they know what is real, and *methodology* describes how they come to know what is real (Guba & Lincoln, 1994; Varpio & MacLeod, 2020). The field of health professions education is influenced by diverse academic domains beyond medical science, including the humanities, anthropology, the social sciences, and others, which contribute unique perspectives (Varpio & MacLeod, 2020). These areas employ diverse philosophies of science with various methodologies and specific ways of looking at the world (Varpio & MacLeod, 2020), enabling a multidisciplinary view of health professions education and establishing the need to make research paradigms visible.

The science and medical education literature has traditionally adopted a post-positivist paradigm (Guba & Lincoln, 1994), within which hypothesis are confirmed or falsified and the gold standard of research is the randomized controlled trial. The field is seen as conducting objective, rigorous research (Guba & Lincoln, 1994; Park et al., 2020). Post-positivism, often adopted in health studies, stresses that a scientific truth cannot be proven to represent the correct view of reality (since it may be falsified in the future), that reality cannot be fully understood, and that findings must be considered only probably true (Young & Ryan, 2020).

Medical education research often explores contextually dependent matters, so an interpretative paradigm is useful in reflecting that complexity (Bunniss & Kelly, 2010). Within an interpretative paradigm, a subjective epistemology is adopted, and reality is considered to be relative, implying that the researcher cooperates and cocreates the findings

and knowledge with the study participants (Guba & Lincoln, 1994; Lincoln et al., 2011). Such approaches have been increasingly used in the field of medical education (Lincoln et al., 2011). Within an interpretative paradigm, the researcher does not presume to uncover a new truth but rather to describe aspects of the contextual reality to clarify it (Creswell & Poth, 2016). Most likely, there are other aspects. Within the post-positivistic paradigm, by contrast, the researcher distances herself from the research so as not to influence the findings.

Philosophical stance of the present thesis

This thesis is ontologically grounded on an interpretative paradigm that acknowledges that the world is relative, that multiple truths exist, and that truths are constructed by and between people (Bergman et al., 2012; Lincoln et al., 2011). The chosen epistemological stance takes the perspective that knowledge is situated, socially dependent, and arises from interaction between the researcher and participants. Researchers interpret the meaning of the knowledge constructed with the participants, implying that the researchers' experiences and knowledge underlie their interpretations (Creswell & Poth, 2016). Various methodologies were deemed appropriate to answer the research questions in this thesis, so the research was methodologically guided by the research questions posed in each study (Lingard & Kennedy, 2010).

4.2 RESEARCH DESIGN

The research design adopted in this thesis is anchored in a multiple case study methodological framework using a mixed methods approach, as described by Yin (2009). The mixed methods research design, incorporating both quantitative and qualitative research, has the important benefit of increasing the credibility and validity of findings (Boet et al., 2012). Four studies (Studies I–IV) were comprehensively designed to reflect the overall aim of exploring the CLE from the perspective of students and supervisors. To align with this aim, diverse scientific methods were considered to be the best for understanding the phenomenon of interest. Accordingly, a mono-method approach was chosen for each study.

Mixed methods methodology

In the current thesis, *mixed methods research* describes research that integrates both qualitative and quantitative data, which is a broadly accepted definition (Creswell & Clark, 2017). Debate exists on the differences between mixed and multi-methods research (Halcomb & Hickman, 2015), but there is some consensus that multi-methods research involves data collection using two methods within one paradigm, which is not the case in this

thesis. Research reflecting two paradigms has been used to exploit the strengths of both qualitative and quantitative research within the mixed methods (Scammon et al., 2013) .

Case study methodology

The interpretative stance taken for the three interview studies was guided by the case study methodology outlined by Yin (2014), who describes a case study as an empirical inquiry that investigates a contemporary phenomenon in depth and in its real-world context. Cresswell (2016) described the method slightly different, as an issue explored through one or more cases within a bounded system. Cleland et al. (2021) and Cresswell and Poth (Creswell & Poth, 2016) also note that case study research aims to understand phenomena observed in their natural settings and contexts, which aligns well with the qualitative studies of this thesis. Case study research should be understood as a group of methodologies that guide how research is designed, conducted, and reported (Cleland et al., 2021). The approach is employed in various traditions of qualitative research, seeks a detailed, in-depth understanding of one or a few cases (Creswell & Poth, 2016), and yields insights into complex phenomena (Cleland et al., 2021). The methodology is especially useful when the boundaries between phenomenon and context may not be clear (Yin, 2009). To develop a thorough understanding of a case, Crowe et al. (2011) suggest that multiple sources of evidence be used, which in the current thesis may be interpreted as justifying the use of quantitative as well as qualitative research in its methodology. Although the questionnaire study employed an experimental design, the thesis as a whole constitutes a collective case study, as the overall rationale of the thesis was the need to explore a phenomenon in depth and in its natural context (Crowe et al., 2011).

4.3 METHODS

This section describes the methods and materials used in the studies that form the core of the thesis. The context of the thesis was the clinical education of undergraduate health professions students in Stockholm, Sweden.

4.3.1 Overview of the studies

Table 4 summarizes the study designs and methods employed in the four studies, which are further described in the ensuing sections. Study I describe and compares undergraduate students' perceptions of their CLEs across four different undergraduate programs. Study II explored physiotherapy students' experiences of supervisors' preparedness and supervision practices during their first clinical placement. Study III explored medical students' experiences of the early stages of clinical training. Study IV explored clinical physiotherapy supervisors' experiences of giving feedback to students during clinical integrated learning.

Table 4. Schematic overview of the approach, participants, data collection, and data analysis of the included studies

Study	Approach	Participants	Data collection	Data analysis
I	Quantitative	Physiotherapy, speech-language pathology, medical, and nursing students (n=280)	Questionnaire	Descriptive and inferential statistics
II	Qualitative	Physiotherapy students (n=13)	Semi-structured individual interviews	Inductive content analysis
III	Qualitative	Medical students (n=18)	Semi-structured individual interviews	Inductive content analysis
IV	Qualitative	Physiotherapy supervisors (n=12)	Focus group interviews	Inductive content analysis

4.3.2 Context

This thesis examines the clinical education of undergraduate health professions students at Karolinska Institutet (KI), Stockholm, Sweden. KI is a publicly financed, mono-faculty medical university offering an extensive range of medical education with no tuition fees, and students may apply for government-funded student aid.

Study I

The context of Study I was a medical university, KI. Undergraduate students from four programs were included (Table 5), a part of whose education took place in clinical settings (hospitals and other health care facilities) in the Stockholm region. In their clinical courses, theoretical education was integrated with clinical rotations. The programs were chosen to represent students from longer and shorter programs as well as smaller and larger programs and earlier and later semesters.

Table 5. Overview of the characteristics of the programs included in Study I

Program description	**PT**	**M**	**SLP**	**N**
Students admitted/year	130	330	40	240
Length (years)	3	5.5	4	3
Credits (ECTS)	180	330	240	180
Average length of clinical placements (weeks)	1–8	1–3	1–3	5–6
Clinical placements (% of education)	33	55	20	50

Abbreviations: PT=physiotherapy; M=medical; SLP=speech-language pathology; N=nursing; ECTS=European Credit Transfer System

The physiotherapy program admits 65 students twice annually, the medical program 165 twice annually, the speech-language pathology program admits 40 students annually, and the nursing program 120 students twice annually. The physiotherapy and nursing programs lead to a professional qualification and a bachelor of science degree in physiotherapy or nursing, corresponding to first cycle education in European Higher Education Area (EHEA). The speech-language pathology and medical programs lead to professional degrees at an advanced level, corresponding to second cycle education in EHEA. After graduation, the

students of these programs apply to the National Board of Health and Welfare for certification to practice.

Study II

The setting of Study II was a three-year undergraduate physiotherapy program at KI. Students from the third semester were asked to participate. The Inpatient Care course lasts 10 weeks (15 ECTS), of which six are devoted to clinical education at teaching hospitals affiliated with KI in the Stockholm region. The remaining four weeks are campus based and comprise individual and group assignments on scientific writing and ethics. Clinical supervision is provided at a 1:1 or 1:2 ratio, with a single supervisor overseeing one or two students. Physiotherapists are required to supervise, and, beyond a mandatory course in supervision, they have varying levels of experience. Teacher teams (described in section 4.3.2 Context: *Study 1V*) supported the students and supervisors at the four teaching hospitals.

Study III

Study III's setting was a 5.5-year undergraduate medical program at KI. Students from the fifth semester were asked to participate. The Internal Medicine course comprises 32 weeks (48 ECTS) and runs through semesters 5 (17 weeks, 25.5 ECTS) and 6 (15 weeks, 22.5 ECTS), with a break for the Scientific Methodology in Medicine course (3 weeks; 4.5 ECTS) at the end of semester 5. Internal medicine is integrated with the specialties of infectious diseases, dermatology, clinical pharmacology, geriatrics, and primary care as well as a professional development thread. During the clinical placement, students rotate through various internal medicine departments as well as the emergency department. In addition, they spend one week on a geriatric ward and two weeks in primary care. Semester 5 starts with a three-week theory block featuring lectures and patient-based case seminars as well as clinical skills training. During this period, the students are assigned to a ward, outpatient clinic, or emergency department.

Study IV

The specific context of Study IV was Karolinska University Hospital, Huddinge, Sweden, whose physiotherapy department twice yearly hosts 16 students in their third semester for a six-week clinical placement. Supervising students is mandatory for all its physiotherapists, but not all of them supervise students every semester. The department has a teacher team consisting of three specialized physiotherapists, who are responsible for the practical arrangements of the clinical training at the hospital and who liaise between the medical

university and the university hospital. Two teacher team members allot 20% of their full-time jobs to this educational assignment, and one of them allot 30% and is financed by KI. These positions are called adjunct lecturer, in Swedish *adjungerad klinisk adunkt*). To support the clinical supervisors, the teacher team every semester presents an introductory lecture on clinical supervision and practical concerns about the upcoming course, also providing a manual that includes ILOs, course assessment criteria and schedules, and important links for the supervisors. When the students arrive, the teacher team welcomes them, introduces them to the placement, and subsequently arranges all the teaching sessions during the placement and carries out the practical examinations during the course.

4.3.3 Participants

Study I

All physiotherapy (n=106) and nursing students (n=298) in semesters 3 and 6, speech-language pathology students (n=46) in semesters 4 and 6, and medical students (n=285) in semesters 6 and 10 were invited by e-mail to participate (Figure 3).

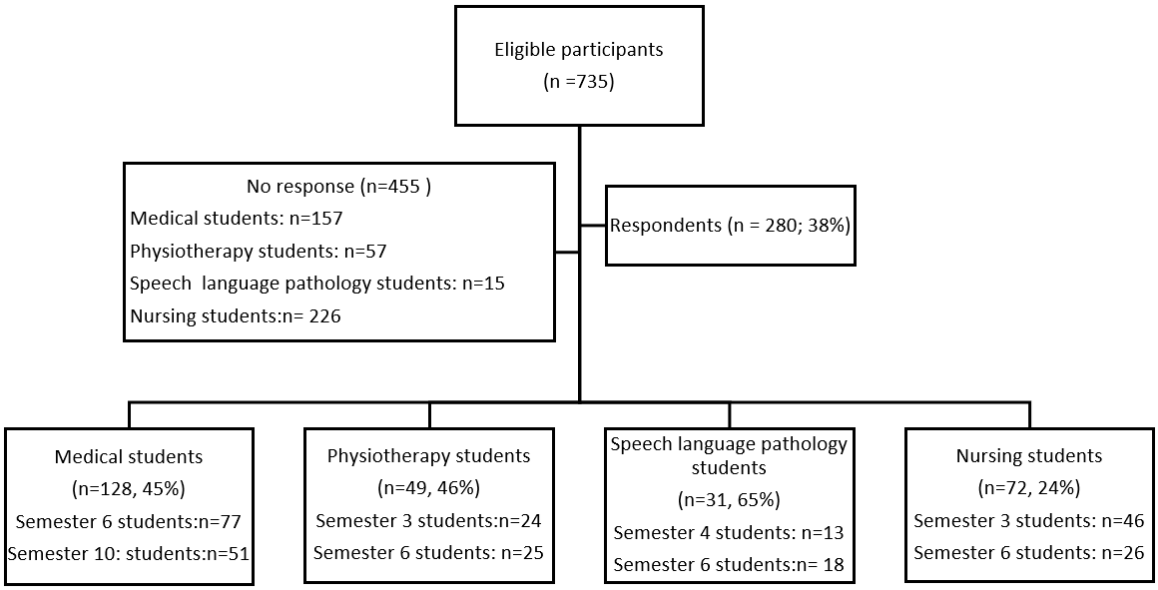

Figure 3. Flow chart showing the number of participants and response rates (n, %) in the study (Reprint from *BMC Medical Education* (2021), 21:258)

Table 6 presents a schematic overview of the participants in Study I. Information was provided verbally to students in all the programs, and an e-mail with a link to the survey and an attached information letter was sent to all participants. The information included the purpose of the study, how the data would be used, and the time required to complete the questionnaire.

Table 6. Schematic overview of the participants in Study I

Participants	**Number of participants**	**Age in years** median (IQR)	**Semester** early/later
Total	280	26 (23–32)	160/120
Physiotherapy	49	25 (23–29)	24/25
Speech-language pathology	31	28 (24–33)	13/18
Nursing	72	29 (24–36)	46/26
Medical	128	26 (24–30)	77/51

Study II

All physiotherapy students (n=68) in their third semester in the autumn of 2020 were invited to participate. Two female students from spring semester 2020, who did their clinical practice in fall 2020 due to the COVID-19 pandemic were asked by one of the authors (AH) to volunteer for a pilot interview. The data from the pilot interviews were regarded as rich and meaningful and therefore included in the final analysis. In all, 13 students (8 females, 4 males, 1 other) with a mean age of 29 years (range 20–46) agreed to participate and were included in the study. On the last day of the Inpatient Care course, they all received a statement outlining the study's aim, methods, and voluntary nature, both verbally and in written format. They were assured that their anonymity would be protected, and informed consent was obtained at the time of the interview.

Study III

All medical students (n=177) in their fifth semester in spring 2021 were eligible to participate. Eighteen students (16 females) with a mean age of 26.6 years (range 21–40) agreed to participate. Information about the study was disseminated verbally and in writing to students during the introduction to the semester's last course, Scientific Methodology. The students received a statement outlining the study's aim, methods, and voluntary nature.

Informed consent was collected at the time of the interview, and the students were assured that their anonymity would be protected.

Study IV

All 13 clinical physiotherapy supervisors in autumn 2016 were invited to participate in the study, of whom 12 (all females) accepted the invitation. Their years of experience in clinical supervision ranged from 0 to 36. Four physiotherapists supervised for the first time, and four had prior experience of supervising five students or fewer. Four had more than 10 years of supervision experience. Five had no theoretical pedagogical education, eight had taken a mandatory, web-based theoretical course in supervision, four had higher education credits in pedagogy, and two had a specialization in physiotherapy. All the informants received (both verbally and in writing) a statement of the study's aim, methods, and voluntary nature. They were assured that their anonymity would be protected, and informed consent was obtained before the time of the interview.

4.3.4 Data collection

The data were collected according to the overall aim of the thesis and the specific objectives of each study. The data for Study I was collected via an online questionnaire, for Studies II and III data were collected through individual interviews, and for Study IV through focus group interviews. The benefits of conducting both quantitative and qualitative research are particularly evident when studying interactions in natural settings (Creswell & Clark, 2017). In both the medical and health care research fields, quantitative methods have historically been dominant, but qualitative methods are increasingly popular. Within health care, qualitative research has been described as a form of social inquiry focused on how people make sense of experiences and the world they live in (Holloway & Galvin, 2016). At the core of qualitative research is an interpretative approach to understanding and describing social phenomena as perceived by individuals, groups, and cultures (Holloway & Galvin, 2016).

Yin (Yin, 2009) recommends avoiding the term *sampling* in case studies, as it may mislead readers into believing that the case comes from a larger population and provides a statistical generalization. By contrast, Lincoln and Guba (1985) state that all sampling is done with some purpose in mind. The present research employed non-probability sampling methods, which are often used in exploratory and qualitative research that aims to develop an understanding of a small or under-researched population (Yin, 2009). The non-random selections were based on convenience, voluntary response, purposive, and snowball

sampling. Convenience samples include subjects who happen to be most accessible to the researcher while voluntary response samples include those who volunteer by, e.g., responding to an online survey. Purposive sampling is an intentional approach in which the researcher uses personal expertise to select the most useful sample to obtain information on the research problem (Creswell & Poth, 2016). A purposive strategy was used here to increase variation in the data and to obtain rich and varied information (Patton, 2014; Schreier, 2018). According to Cresswell and Poth (Creswell & Poth, 2016), snowball sampling typically occurs after a study begins and uses existing participants to recruit other participants.

Interviews in qualitative research

Interviews are a common way of generating data in qualitative studies (Creswell, 2013). Semi-structured interview guides, including a few predetermined, open-ended questions, allow other questions to emerge from the dialogue between interviewer and interviewee and facilitate the exploration of matters brought up by the interviewee (DiCicco-Bloom & Crabtree, 2006; McGrath et al., 2019). Interviews may take from 30 minutes to several hours to complete (DiCicco-Bloom & Crabtree, 2006). Harding (2018) suggests that, while the need to conduct pilot qualitative interviews may not be obvious, they contribute to improving the quality of the interview guide.

While individual interviews encourage participants to express their feelings and thoughts, focus groups enable and promote interaction, aiming to elicit diverse points of views from discussions between the participants (Stalmeijer et al., 2014). In them, people of similar backgrounds and experience are brought together to talk about matters affecting them (Patton, 2014). Focus groups typically comprise from six to nine people who explore attitudes, perceptions, feelings, and ideas about a topic (Denscombe, 2017). The setting allows a relatively homogeneous group to reflect on the questions posed by the interviewer. Focus groups are considered a natural environment in which participants influence and are influenced by others, as in real life, providing a valuable tool for collecting qualitative data (Krueger, 2014). The method can elicit responses about delicate topics and the dynamics of the group that are not generated by other methods (Wellings et al., 2000). When used by trained researchers, the method efficiently yields valid, reliable data (Dilshad & Latif, 2013).

Individual in-depth interviews are used broadly in health care research to co-create meaning with interviewees by reconstructing perceptions of events and experiences related to health and health care delivery (DiCicco-Bloom & Crabtree, 2006). Usually, between 5 and 10

questions are developed (DiCicco-Bloom & Crabtree, 2006), but the interviewer should be prepared to depart from the planned itinerary, as digressions can be very productive by airing the interviewee's interests and knowledge.

The Zoom platform (Zoom Video Communications Inc.) has been identified as a useful, user-friendly, cost-effective, and adequately secure tool for the collection of qualitative data (Archibald et al., 2019). Participants in Zoom interviews have described its strengths, including convenience, time savings, accessibility, ease of use, and an enhanced possibility of discussing personal topics (Gray et al., 2020). Before Zoom interviews, the interviewer must confirm that there are no technological problems and ask the interviewees whether there is a need to clarify the aim or other issues concerning the study (Oliffe et al., 2021).

Study I

Convenience and voluntary response sampling were employed. To ensure broad representation, students with varying lengths of experience in their clinical placements were recruited from shorter and longer programs and earlier and later semesters. An online survey was created in KI survey tool based on sociodemographic data (eight items) and five existing instruments. The survey was tested within the research group before the study began, took approximately 10–15 minutes to complete, and was piloted among 14 students from the included programs before the study. In total, it comprised 62 Likert-scale items. The included questionnaires were the UCEEM, 12-Item Short Form Health Survey, MedNord (subscale for well-being), Brunnsviken Brief Quality of Life Scale, and Interdisciplinary Education Perception Scale. Only the analysis of the UCEEM is included in the present thesis. The data were collected from April through November 2018. The students were asked to complete the questionnaire for their current or latest placement. When participants did not reply, four reminders were sent between 4 and 10 weeks after the first questionnaire administration.

The UCEEM measures undergraduate medical students' perceptions of the conditions at their current placement. The instrument is designed and validated for the Swedish context and has been proven to have strong psychometric properties (Strand et al., 2013). Studies using the UCEEM in other countries confirm it to be a valid, reliable instrument (Abbasi et al., 2016; Fouad et al., 2020). Originally, the UCEEM had 25 items, but the revised version comprises 26 items (personal correspondence with author Pia Strand, 2019-09-18). The number of questions was limited to minimize the risk of rater fatigue (Irby et al., 2021). The items are scored on a five-point Likert scale ranging from fully disagree to fully agree. The instrument

has two overarching dimensions—*Experiential learning* and *Social participation*—and four subscales: *Opportunities to learn in and through work and quality of supervision*, *Preparedness for student entry*, *Workplace interaction patterns and student inclusion*, and *Equal treatment* (Table 7).

Table 7. UCEEM's overarching dimensions, subscales, and items

Overarching dimension: **Experiential learning** (A1+A2)	Overarching dimension: **Social participation** (B1+B2)
Subscale A1: **Opportunities to learn in and through work and quality of supervision**	Subscale B1: **Workplace interaction patterns and student inclusion**
3. My (work) tasks are relevant to the learning objectives. 4. I am sufficiently occupied with meaningful (work) tasks. 5. My tasks are suitably challenging for my level of knowledge and skills. 6. I am encouraged to participate actively in the work here. 13. I receive useful feedback from my supervisors. 14. I feel able to ask my supervisors any question I wish. 15. I get the opportunity to provide a rationale for my actions during supervision sessions. 16. My problem-solving skills are developing well in this placement. 17. I have the opportunity to put my theoretical knowledge into practice in this placement. 18. I have the opportunity to learn together with other students in this placement. 26. I feel I have influence over my learning in this placement.	7. I have adequate access to computers. 8. There is sufficient physical space for the number of students on placement here. 19. As a student, I am received in a positive way by the staff here. 20. I feel included in the team of people who work here. 21. I feel welcome in the staff room/lunchroom here. 22. Communication between those working here is good.
Subscale A2: **Preparedness for student entry**	Subscale B2: **Equal treatment**
1. I received a useful induction to this placement. 2. My supervisors were expecting me when I arrived. 9. I have a supervisor to whom I know I can turn. 10. I have sufficient access to supervision. 11.The supervisors are well prepared for supervising. 12. It is clear that my supervisors are familiar with the learning objectives.	23. Everyone is treated equally here, regardless of cultural background. 24. Everyone is treated equally here, regardless of gender. 25. Everyone is treated with the same respect and dignity, regardless of professional background.

The collected data were examined with descriptive and inferential statistical analyses. Sociodemographic data (gender, age, children in the family, and participants' prior work experience and university studies) were analyzed for each semester, program, and the whole sample. The mean, standard deviation, and range were calculated for descriptive purposes using the statistical program SPSS 3.4.1. The age distribution was skewed and was therefore

presented with median and IQR. The non-parametric Mann-Whitney test was performed to compare differences in the sociodemographic data between semesters within each program.

The UCEEM results were analyzed at four levels (items, subscales, overarching dimensions, and overall) and presented with means and standard deviations. The item response rate (IRR), calculated as the proportion of respondents who completed all the items of the questionnaire, is > 90% at the item level, which is considered satisfactory. To compare the four distinct study programs and semesters, Kruskal-Wallis tests were performed together with Dunn-Šidák post hoc tests. To control for the risk of mass significance and thus reduce the risk of a type-I error, the p-values were adjusted for multiple comparisons using Bonferroni adjustments. Cronbach's alpha was employed to assess the internal consistency of the subscale scores of the UCEEM, and a minimum alpha coefficient of 0.70 was considered to indicate an adequate level of consistency.

Study II

Purposive and snowball sampling strategies were used in this study, which gathered data through individual, semi-structured interviews on an online platform in January 2021. Two students who were in their third semester in spring 2020 (but who did their clinical practice in the fall of that year due to the COVID-19 pandemic) were verbally asked to volunteer for a pilot interview (McGrath et al., 2019). After the pilot interviews were carried out, the first three participants from spring 2021 were informed that additional participants could be included in the study. The interviews were audio- and video-recorded and conducted by the first author of the study (MS), who took notes and discussed them with the other researchers daily. The interviews averaged 45 minutes in length and yielded about 11 pages of text per participant.

Study III

A purposive sampling strategy was employed. Two pilot interviews were conducted with medical students who had finished their fifth semester in the spring term of 2021 to evaluate the relevance and appropriateness of the questions. No modifications were required in the interview process or semi-structured interview guide. The interviews were conducted by the first author of the study (MS) on an online platform in June 2021. The interviewer took notes and held frequent discussions with the other researchers. The interviews were audio- and video-recorded, had a mean length of 50 minutes, and yielded about 10 pages of text per participant.

Study IV

Purposive sampling was employed. The two focus group interviews lasting about 65 minutes each were conducted at the Department for Physiotherapy, Karolinska University Hospital, Huddinge, after the students had completed their clinical practice on the ward in December 2016. The interviewer, a doctoral student in medical education, posed questions about the supervisors' experiences of giving feedback to students, moving from the general to the specific and using a semi-structured interview guide with open-ended questions. The interviews were recorded and yielded 65 pages of transcribed text.

4.3.5 Data analysis

The data analysis is described separately for Study I, and jointly for Studies II, III, and IV, followed by a general discussion of the aspects of trustworthiness and reflexivity.

Studies II, III and IV

Inductive qualitative content analysis was used in Studies II, III, and IV (Graneheim & Lundman, 2004; Krippendorff, 2018). These qualitative studies were intended to yield an in-depth description of the CLE as perceived by the interviewees, which could potentially be of value to other researchers (Preissle, 2006). Qualitative content analysis may focus on either the manifest or latent content of the data (Hsiesh and Shannon 2005; Sandelowski 2000; Graneheim and Lundman 2004; Krippendorff 2004; Elo and Kyngäs 2008), the manifest content being what is said and the latent content representing the underlying meaning of the content. Interpretations of content vary in depth and level of abstraction (Graneheim & Lundman, 2004). The first step of the analysis identified the manifest content, after which the underlying, latent meanings were identified as described by Watzlavick et al. (Watzlawick et al., 2011). Analysis is iterative, going back and forth between transcripts, meaning units, codes, and theme (Graneheim & Lundman, 2004; Krippendorff, 2018). In Study IV, we used the terms *themes* and *subthemes* which are synonymous with *categories* and *subcategories*, respectively, that were used in Studies II and III.

All the interviews were transcribed verbatim and anonymized. All the researchers read the transcripts several times to gain a sense of the whole and ensure accuracy. In Studies II and III, the transcripts were entered into the NVivo software package (Zamawe, 2015). Meaning units related to the aim of the study were identified, condensed, and labeled with descriptive

codes, which were continually discussed until all the researchers agreed on the coding (Graneheim & Lundman, 2004; Krippendorff, 2018; Patton, 2014). Codes with the same or similar meanings were unitized and grouped into subcategories and categories that described the manifest content of the data. The coding and categorization of the data were iteratively discussed by all the researchers, and codes, subcategories, and categories were inductively developed from the text without a predetermined coding scheme. Finally, the researchers went beyond the manifest content and interpreted the latent content of the data (Graneheim et al., 2017). The analysis was iteratively revisited and reconsidered until consensus was established, meeting Patton's dual criteria of internal homogeneity and eternal heterogeneity (Patton, 2014).

4.3.6 Quality criteria

Frambach et al. (2013) suggest that good research in medical education is characterized by evidence that it is trustworthy, applicable to practical settings, consistent, and neutral. Table 8 provides an overview of how the qualitative criteria were assessed in Study I.

Table 8. Overview of how quality was achieved in Study I

Quality criteria	**Steps taken**
Internal validity	Detailed description of context • design • selection • pretesting instrument • statistical tests
Reliability	• Cronbach's alpha
Objectivity	• The researcher remained distant from what was being studied so that the findings would reflect the nature of what was studied rather than the researcher
External validity	Detailed description of • subjects • situation • time • intervention • measures

4.3.7 Trustworthiness and reflexivity

Table 9 shows how the trustworthiness of Studies II, III, and IV was established (Lincoln & Guba, 1985). For these studies, we followed the consolidated criteria for reporting qualitative research (COREQ) (Tong et al., 2007).

Table 9. Overview of the trustworthiness of Studies I, III, and IV

Quality criteria	**Steps taken**
Credibility	• participants described accurately • prolonged engagement in data • persistent observation • triangulation
Dependability	Description of methods for • data collection • analysis • interpretation
Confirmability	• findings reflect the idea of the participants • data speaks for itself and does not reflect the researcher's biases and assumptions
Transferability	• detailed description of the study • other researchers can assess whether the results can be generalized

The literature on quality in qualitative research increasingly acknowledges the importance of *reflexivity* (Finlay, 2002; Lambert et al., 2010; McCabe & Holmes, 2009), which describes researchers' continuous self-reflection to make their subjective role more transparent throughout the research process (Darawsheh, 2014; Smith, 2006). Subjectivity touches the thought processes of all researchers and may affect their research (Finlay, 2002), but reflexivity can limit subjective bias in research by alerting researchers to subjective influences, thus increasing the credibility of the research and generating relevant findings (Finlay & Ballinger, 2006; Lambert et al., 2010). Self-awareness of subjective bias can help researchers avoid coloring participants' accounts with their own interpretations (Lambert et al., 2010).

The COREQ checklist includes a reflexivity domain that confirmed the rigor of the research in Studies II and III (Tong et al., 2007). Furthermore, the thesis's philosophical positioning, interpretivist epistemological stance, and rational for its methodological stance have been

transparency provided. Interpretivism and critical realism highlight the importance of understanding multiple interpretations of the world (Finlay & Ballinger, 2006) .

4.3.8 Ethical considerations

All the participants in the studies in this thesis were informed of the procedures of participation verbally and in writing before they gave consent to participate. The interviewees were encouraged by the researcher to ask questions and learn about the handling of personal information prior to giving consent. The participants were informed that they could withdraw their consent at any time without stating why. The Regional Ethical Review Board in Stockholm approved all the studies (Studies I, II, and III: 2017/38-31/4, Study IV: 2016/1425/31;), which were conducted to according to the principles of the Declaration of Helsinki (Jama, 2013). Ethical considerations were continually discussed during the planning and implementation of the studies.

In three of the studies, data were collected through interviews. Research interviews have drawn criticism, and the power dynamics between the researcher and the informant merit attention as do external pressures on the interviewee's defensive walls (Fog, 2004; Kvale, 2006). As a researcher with scientific competence, the interviewer manages the interview, poses questions, and follows up on answers. In these studies, the interviewer fostered an environment in which the interviewee could talk comfortably and could deflect or not answer questions. Follow-up questions were posed with great care when the informant raised sensitive topics. The interviewer did not attempt to breach the informants' defensive walls but rather talked less, listened more, and asked clarifying questions (McGrath et al., 2019). Qualitative interviews have been described as giving a voice to the many, those who ordinarily do not participate in public debates (Kvale, 2006). In other circumstances, health professions students might not be considered to belong to that group, but, if they are potentially not being treated well, they may require a voice and could provide information of great interest to the public. After each day of interviews, the interviewer discussed the results with the research team, and the interviews were transcribed immediately so that the interviewer could benefit from feedback.

Study I

The major ethical concern in this study involved the low response frequency. When the study was finished, the research group considered the response frequency to be rather low and discussed whether it would be ethically justifiable to (a) not use the collected data and start

the data collection all over again or (b) analyze only the programs with the highest response rates. Discussions with people outside the research group and a further consultation of the literature made it clear that the response rate was adequate and that failing to analyze the results of all the programs would not be ethically justified.

Study II

The main ethical concern of this study was that one of the researchers (AH) had been a clinical teacher to two the interviewees, raising the question of whether the students would dare to speak openly about their experiences. However, the aim was to explore students' experiences of supervision, not their experiences of the teacher team. The risk of not daring to speak freely was considered small. To further protect the students, their data were anonymized before the analysis, and only two researchers (RM and PP) read and provided feedback on the transcripts of the pilots.

Study III

The ethical discussion of this study concerned whether the interviews might become emotional for the students, as the result of the preceding study showed that the CLE had earned low ratings in some cases. However, the risk was considered low, and the study was carried out as planned.

Study IV

The major ethical concern for the study was whether the supervisors would feel free to speak openly, as the data would be analyzed by colleagues (MS and AH) who were members of the teacher team. To create a distance, a researcher conducted the interviews who had never met the supervisors and who was not involved in the analysis but had experience in medical education. The researchers also identified potential risks for the participants, such as focusing on and talking about matters they were not prepared to address. The risks were considered low, however, and the interviews were conducted as planned.

5 FINDINGS

The overall aim of the four studies in the present thesis was to explore the CLE from the perspective of students and supervisors. Study I described and compared students' perceptions of their CLEs across four undergraduate programs. Drawing upon the results of Study I, Study II explored physiotherapy students' experiences of supervisors' preparedness and supervision practices during their first clinical placement while Study III explored medical students' experiences of the early stages of clinical training, and Study IV examined clinical physiotherapy supervisors' experiences of giving feedback to students during clinical integrated learning.

5.1 STUDY I

This study aimed to describe and compare students' perceptions of their CLEs across four undergraduate programs. A total of 280 students participated (72% female; median age: 26 years), corresponding to a response rate of 38%. No differences of age or gender were found between the responders and non-responders.

Total, dimension, and subscale UCEEM scores

The overall score (mean) for all students on the UCEEM was 98.3 (SD 18.4; range 91–130), but it varied between the programs (Table 11). The physiotherapy speech-language pathology students yielded the highest overall scores and medical students the lowest. The scores did not differ significantly between female and male students (98.4/98.3), younger and older students (98.9/98.2), or those with or without children (100.0/98.2). The mean ratings were significantly lower ($p < .01$) for students with previous university studies than for those without them (96.1/101.2).

The subscale of *Preparedness for student entry* yielded the lowest scores whereas the subscale of *Equal treatment* yielded the highest. The medical students yielded significantly lower ratings for the overarching dimension of *Experiential learning* (which is based on the subscales of *Opportunities to learn in and through work and quality of supervision* and *Preparedness for student entry*) than did the physiotherapy students ($p < .001$), SLP students ($p < .001$), and nursing students ($p < .01$). The medical students rated *Equal treatment* (regardless of cultural or professional background) lower ($p < .01$) than did physiotherapy and SLP students. The p-values indicate the results of comparisons between the programs, which were calculated using Kruskal-Wallis tests with Dunn-Šidák post hoc tests.

Table 11. The scores (mean, SD) for the UCEEM total, dimensions, and subscales

	M students Mean (SD)	**PT students** Mean (SD)	**SLP students** Mean (SD)	**N students** Mean (SD)
Total score[1]	90.7 (14.8)	112.3 (12.9)	108.4 (17.7)	97.9 (20.3)
Overarching dimension Experiential learning (A1+A2)	57.0 (10.8)	73.5 (9.8)	70.1 (13.0)	62.7 (14.6)
Subscale A1: Opportunities to learn in and through work and quality of supervision	37.8 (7.2)	47.0 (7.0)	44.9 (8.6)	41.3 (9.2)
Subscale A2: Preparedness for student entry	19.2 (4.4)	26.5 (3.5)	25.1 (4.8)	21.6 (6.1)
Overarching dimension Social participation (B1+B2)	33.6 (5.3)	38.8 (5.3)	38.4 (5.6)	35.3 (7.0)
Subscale B1: Workplace interaction patterns and student inclusion	21.7 (3.8)	25.5 (3.7)	25.1 (4.0)	23.0 (4.7)
Subscale B2: Equal treatment	12.0 (2.3)	13.4 (5.3)	13.3 (2.0)	12.3 (2.8)

Abbreviations: UCEEM=Undergraduate Clinical Education Environment Measure; SD=standard deviation; PT=physiotherapy; SLP=speech-language pathology, M=medical; N=nursing

[1]The UCEEM total score ranges from 26 to 130. Scale A ranges from 17 to 85, subscale A1 ranges from 11 to 55, and subscale A2 ranges from 6 to 30. Scale B ranges from 9 to 45, subscale B1 ranges from 6 to 30, and subscale B2 ranges from 3 to 15.

UCEEM item scores

The physiotherapy students scored all items significantly higher ($p < .001$) than did the medical students. The medical students rated six items significantly lower ($p < .001$) than did other students. Three of the items (nos. 2, 11, and 12) belong to the subscale *Preparedness for student entry* (Table 12); the other three (nos. 6, 13, 15) belong to the subscale *Opportunities to learn in and through work and quality of supervision* (Table 12).

Table 12. The scores (mean, SD) for the UCEEM items for all students (n=280)

UCEEM items	**M students** Mean (SD) n=128	**PT students** Mean (SD) n=49	**SLP students** Mean (SD) n=31	**N students** Mean (SD) n=72
1. I received a useful induction to this placement.	3.5 (0.9)	4.2 (0.8)	4.1 (0.8)	3.6 (1.1)
2. My supervisors were expecting me when I arrived.	3.3 (1.0)	4.7 (0.5)	4.5 (0.8)	3.8 (0.4)
3. My (work) tasks are relevant to the learning objectives.	3.6 (1.0)	4.4 (0.7)	4.2 (0.8)	4.0 (1.1)
4. I am sufficiently occupied with meaningful (work) tasks.	3.2 (0.9)	4.1 (1.0)	4.1 (1.0)	3.5 (1.1)
5. My tasks are suitably challenging for my level of knowledge and skills.	3.5 (1.0)	4.0 (1.0)	4.2 (0.9)	3.7 (1.1)
6. I am encouraged to participate actively in the work here.	3.4 (0.8)	4.6 (0.8)	4.4 (0.7)	3.9 (1.0)
7. I have adequate access to computers.	3.4 (0.8)	4.6 (0.8)	4.4 (0.7)	3.9 (1.0)
8. There is sufficient physical space for the number of students on placement here.	3.6 (1.1)	4.3 (0.8)	4.0 (1.1)	3.7 (1.1)
9. I have a supervisor to whom I know I can turn.	3.6 (1.1)	4.5 (0.9)	4.2 (1.1)	3.9 (1.3)
10. I have sufficient access to supervision.	3.5 (1.0)	4.4 (0.9)	4.1 (1.1)	3.7 (1.3)
11. The supervisors are well prepared for supervising.	3.4 (1.2)	4.3 (1.0)	4.1 (1.2)	3.6 (1.2)
12. It is clear that my supervisors are familiar with the learning objectives.	2.3 (1.0)	4.4 (0.8)	4.1 (0.9)	3.2 (1.4)
13. I receive useful feedback from my supervisors.	3.1 (1.1)	4.5 (0.7)	4.0 (1.2)	3.8 (1.2)
14. I feel able to ask my supervisors any question I wish.	4.1 (0.8)	4.5 (1.1)	4.0 (1.3)	4.1 (1.1)
15. I get the opportunity to provide a rationale for my actions during supervision sessions.	3.3 (1.0)	4.3 (1.0)	4.3 (0.7)	3.9 (1.1)
16. My problem-solving skills are developing well in this placement.	3.4 (1.0)	4.3 (0.8)	4.0 (1.0)	3.8 (1.0)
17. I have the opportunity to put my theoretical knowledge into practice in this placement	3.7 (1.0)	4.3 (0.8)	4.3 (0.8)	3.9 (0.9)
18. I have the opportunity to learn together with other students in this placement.	3.3 (1.1)	4.0 (0.9)	3.4 (1.4)	3.1 (1.3)
19. As a student, I am received in a positive way by the staff here.	3.9 (0.7)	4.4 (0.8)	4.5 (0.6)	4.0 (0.9)
20. I feel included in the team of people who work here.	3.5 (1.0)	4.2 (0.9)	4.2 (0.9)	3.8 (1.1)
21. I feel welcome in the staff room/lunchroom here.	3.7 (0.9)	4.2 (0.9)	4.4 (1.0)	4.0 (1.0)
22.Communication between those working here is good.	3.6 (0.7)	4.3 (1.1)	4.3 (0.8)	3.7 (1.1)
23. Everyone is treated equally here, regardless of cultural background.	4.2 (0.9)	4.6 (0.7)	4.7 (0.6)	4.1 (1.1)
24. Everyone is treated equally here, regardless of gender.	4.1 (0.9)	4.6 (0.7)	4.4 (0.8)	4.3 (0.9)
25. Everyone is treated with the same respect and dignity, regardless of professional background.	4.1 (0.9)	4.6 (0.7)	4.4 (0.8)	4.3 (0.9)
26. I feel I have influence over my learning in this placement.	3.2 (1.0)	4.0 (1.0)	4.0 (1.0)	3.6 (1.2)

5.2 STUDY II

This study explored physiotherapy students' experiences of supervisors' preparedness and supervision practices during their first clinical placement. The qualitative content analysis resulted in one overarching theme: *a coherent whole throughout the placement.* The theme was based on three categories (Table 13).

Table 13. Overview of the identified subcategories, categories, and theme

Subcategories	Categories	Theme
A well-organized initial encounter	Establishing a relationship	A coherent whole throughout the placement
Creating a sense of trust		
Proximity of the supervisor	Fostering active participation	
Promoting student autonomy		
Encouraging cooperation in the community		
Intended learning outcomes used recurrently	Cultivating outcome-based learning	
Facilitating self-assessment		

The theme indicates that the supervisors introduced the ILOs on the first day and that they aligned the learning activities chronologically, from introduction to assessment, to the ILOs. Both the appointed supervisors and their colleagues and other staff supported the students' learning by being open to questions and inviting the students to participate in various clinical activities. The students conveyed that the organization showed a genuine interest in supporting their learning, as they were considered to be future colleagues.

Establishing a relationship

The students described the beginning of the clinical practice as entering a new world. Anxiety about possibly arriving late was alleviated by the supervisors' prearranging clear, easily found meeting places, such as a reception area or café at the hospital. The students noted that a well-organized initial meeting laid a foundation for their relationship with the supervisor. Most supervisors booked fewer patients on the first day and prioritized a scheduled personal

meeting with their student. Furthermore, they gave students information about the ward, routines, and types of patients on the ward, which better prepared the students for their practice. The supervisors also presented the ILOs and other information provided by the university and, with the students, discussed the latter's expectations, prior experiences of health care, and potential worries. The students reflected on the relationship with their supervisors in terms of a sense of trust. In the beginning, they were nervous about asking questions, but, after the supervisors clarified that they had time to listen and talk, the students felt less worried and could better focus on their learning activities, as a sense of trust had been created.

Fostering active participation

The students acknowledged the proximity of the supervisor, indicating that their supervisors were available when needed. The supervisors evolved their supervision to support the development of students' autonomy by gradually increasing the complexity of the tasks. Initially, the students were given simple tasks, but, as they developed, they were gradually allowed to handle more complex patient situations and to collaborate with others. According to the students, the supervisors introduced them to the whole staff on the ward and encouraged cooperation in the community. Consequently, not only the appointed supervisors but also the whole staff took responsibility for the students' learning and invited them to participate in various clinical activities. This enabled the students to learn and benefit from the experiences of professionals other than the appointed supervisor.

Cultivating outcome–based learning

The students noted that the ILOs were used recurrently and were integrated and aligned with day-to-day activities from the first day to the end of the placement. The supervisors' familiarity with the ILOs supported and empowered the students to achieve their outcomes. The students said that the supervisors encouraged them to reflect on their learning and that they continually involved students in taking responsibility for their learning through self-assessment. Recurrent dialog about the ILOs helped the students visualize their learning needs and their achievements in relation to them. The students were also invited to participate in planning learning activities that would enable them to achieve the ILOs.

5.3 STUDY III

The focus of Study III was medical students' experiences of the early stages of their clinical training. The findings resulted in the overall theme of *balancing acting and adapting*, which emerged from three categories (Table 14).

Table 14. Overview of the identified subcategories, categories, and theme.

Subcategories	Categories	Theme
Transition in the role of the learner	The clinical learning environment—a big leap from the campus	Balancing acting and adapting
Intended learning outcomes were hidden and vague		
Ambivalence toward peers	Personal relationships influenced learning	
Supervisors as role models: two sides of a coin		
Becoming an acknowledged member of the team		
Avoiding criticism		
Ad hoc solutions when supervisors were absent	Suboptimal organization of clinical placements	
Educational responsibilities were downgraded		

The theme indicates that the students were encouraged to push themselves forward in the CLE, which did not suit all the students, as the timid ones risked becoming passive observers. Neither students nor supervisors regularly used the ILOs in the CLE; instead, the supervisors asked what the students had previously learned, or the students focused on what they believed was important to learn in the placement. When combined with short placements, supervision without a focus on the ILOs made it difficult for the students to understand their roles in the CLE, which affected their feelings of being prepared for future work. The students did not want to burden their supervisors, whom they perceived as having a difficult, stressful working situation, suggesting that the students instead tried to adapt to the environment.

The clinical learning environment—a big leap from the campus

The students described an abrupt transition from their roles as learners in the campus-based learning environment to learning in a stressful CLE. The conditions were described as tough and favoring those who pushed themselves forward. Shy students, those who lacked the ability to push themselves forward, and those who chose not to do so risked completing the clinical course as mere passive spectators. The need to take the initiative from day one resulted in psychological stress, and those who viewed themselves as people oriented believed that they risked losing confidence. The students varied in how prepared they felt to take the initiative and in how quickly they adapted to the new circumstances. They said it would have been easier had they been given a couple of days to familiarize themselves with the context before taking initiative on their own. They described the ILOs as hidden and vague. In the placements that the students considered superior, the supervisors initiated a dialogue about the ILOs, the students' previous experience, and their learning needs. When the ILOs were clear and coherent, students could more easily focus on learning activities. Conversely, when the supervisors did not discuss the ILOs, the students instead focused on learning what they believed was most important to know in the placement.

Personal relationships influenced learning

The students expressed ambivalence toward peers at the same placement. Together, they dared to take initiative, which created opportunities to join a learning activity initiated by another student's supervisor but could also result in supervisors paying less attention to each student. Furthermore, the students did not want to be associated with a peer who did not perform well or behave as expected. The supervisors became role models for the students, whether as professionals they admired or, by contrast, as individuals from whom they distanced themselves and who prompted them to question their choice of profession. When the students were assigned authentic clinical tasks, they found it easier to participate in discussions with the staff and felt more like members of a team. Without a proper introduction to the placement, they did not feel included in the team. Large staff rotations also made it difficult to become a team member. The students were cautious in their criticism of negative experiences, as they viewed their supervisors as potential employers, and being critical could reduce their likelihood of returning for an internship at the same hospital.

Suboptimal organization of clinical placements

The students were not always met by a supervisor who was expecting their arrival but had to start the placement by seeking their supervisors or looking for someone to supervise them.

This resulted in ad hoc solutions, with the staff discussing in front of the students who should act as supervisor. Some of the circumstances were unpredictable, e.g., sick leaves, but, according to the students, no backup plan seemed to be available on those occasions. The medical students experienced that the supervisors neglected their educational responsibilities to prioritize their clinical duties with patients over supervision. The students said that some supervisors were aware that they neglect them and their supervisory obligations due to stress. The students believed that the supervisors made the right choice by prioritizing the patients, and, to ease their supervisors' burden, they put aside their own learning needs and refrained from active participation.

5.4 STUDY IV

Two focus group interviews explored clinical physiotherapy supervisors' experience of giving feedback to students during a clinical course. The analysis yielded the overarching theme of *continuous development and support within the social network at the workplace facilitate the work of giving feedback to students*, which emerged from three subthemes (Table 10).

Table 10. Overview of the identified subthemes, themes, and overarching theme.

Subthemes	**Themes**	**Overarching theme**
Promoting factors	Constructive dialogue	Continuous development and support within the social network at the workplace facilitate the work of the clinical supervisors
Aggravating factors		
Reaction to feedback		
Credibility	Professionalism	
Emotional impact		
Approach		
Educational tools	Enabling strategies	
Competence development		
Support		

Overarching theme

The supervisors collaborated within their community at work, which comprised mainly colleagues, other supervisors, and the teaching team. The collaborations facilitated the supervisors' provision of feedback and resulted in the students' getting feedback and experience from others than the assigned supervisor. By collaborating, the supervisors got inspiration and new ideas from one another on how to further develop the feedback process. Both experienced and first-time supervisors participated in and benefitted from the voluntary collaboration. The existence of the teacher team increased the status of the supervisors, and collaboration resulted in a positive experience that was important for both new and experienced colleagues in difficult feedback situations. The teacher team was seen as providing increased credibility for the supervisors, showing the students that the supervisorial assignment was important in the field. Importantly, the supervisors did feel that they were left alone with the responsibility of supervision.

Constructive dialogue

The supervisors expressed those students who were willing to engage in constructive dialogue eased the work of feedback. To encourage for students to participate in dialogue, the supervisors fostered a safe, confidential environment by setting aside time for reflection after feedback was given.

Professionalism

Although the supervisors experienced emotional impacts during difficult feedback situations, they aimed to take a professional approach when giving feedback and considered it important to take full responsibility for their obligations. This was facilitated by acting respectfully, establishing a structure, and a taking a professional approach to the student, which implied that the supervisors were well prepared.

Enabling strategies

This subtheme embraces the strategies and tools the supervisors used in the feedback process, one of which was reflecting with a colleague. Educational tools and a theoretical course in pedagogy at the university were considered beneficial. Finally, the supervisors consulted the teacher team when they needed to create an individualized, structured plan for a student's future studies.

6 GENERAL DISCUSSION

This thesis set out to explore different aspects of the CLE, including both students' and supervisors' perspectives. To achieve a deeper understanding, the four included studies contribute complementary perspectives on the CLE, including a comparison of students' perceptions of their CLE across four different undergraduate programs (Study I), physiotherapy and medical students' experiences of their early clinical placements (Studies II and III), and supervisors' experiences of giving feedback to physiotherapy students (Study IV).

6.1 Summary of main findings

Together, the findings presented in the current thesis suggest a complex picture of the CLE. Even though the students generally indicated positive perceptions of their CLEs, students from different study programs at the same university rated their CLEs quite differently. First, in several aspects the medical students rated their CLE significantly lower than the students from other programs did. Second, physiotherapy students considered it important that their supervisors took the initiative to establish a relationship, that they fostered active participation by being available, and that they promoted student autonomy and encouraged cooperation in the community. The continual use of ILOs indicate that the physiotherapy students were supported to identify their learning needs and achieve the outcomes. Third, the medical students reported that the transition from learning on campus to learning in the CLE was sometimes abrupt, and they had to switch to a more active learning role. They also reported that ad hoc solutions in supervision occurred, which contributed to their perception that educational responsibilities were downgraded, and that the quality of clinical training was variable. Rather than trying to change the circumstances, the students opted to adapt to the busy clinical learning environment. Finally, the findings indicate that the physiotherapy supervisors experienced giving feedback as an emotionally charged situation and that their development and learning in relation to giving students feedback was facilitated by the professional network in the workplace. In the following chapter, the findings are presented and elaborated on in relation to previous literature; this is followed by methodological considerations and ethical reflections.

6.2 Students' overall perceptions of the clinical learning environment

Cook-Sather and Shultz (2001) claim that students have a unique perspective on what happens in their learning environments. An important finding in Study I was that the total UCEEM score was relatively high indicating that overall, the students' perceptions of their CLE were positive. This result is in line with previous studies carried out by Strand et al. (2013) and Roberts et al. (2018), who also used the UCEEM to study students perceptions of the CLE at another university in Sweden and in the UK, respectively. Similar results have been obtained by other authors who have used another relatively popular instrument, the Clinical Learning Environment Supervision and Nurse Teacher Evaluation scale (Pitkänen et al. 2016; Khan et al. 2020) to study the CLE. Jointly, these results are encouraging as training in the CLE is an essential part of health profession students' education.

An unanticipated finding, however, was that the medical students in our study rated their CLE significantly lower than the students from the other programs did. Few studies have compared the perceptions of the CLE among students from different health profession programs. Khan et al. used (2020) the Clinical Learning Environment Supervision and Nurse Teacher Evaluation scale and found similarly high ratings for the CLE, but also found that male students and students of other various health disciplines were less satisfied than nursing students. Our findings, on the contrary, did not reveal any differences between genders, but the students from the physiotherapy and speech language pathology programs rated their CLE significantly higher than the medical and nursing students rated theirs. The differences between the student groups are not easy to interpret without larger-scale studies and a deeper explorations of the identified groups. However, it could be speculated that the differences may depend on how the students were received in the clinic, what kind of supervision the students were provided, or perhaps the length of the placements, which may impact the students' perceptions about belonging and being part of a team in health care. Some of these topics will be discussed in detail in the following chapters.

6.3 Supervisors preparedness for student entry

The UCEEM subscale that yielded the highest differences among the programs was *preparedness for student entry*. The medical students scored lower on this subscale than the other students. Studies by Strand et al. (2013) and Roberts et al. (2018), who also used the UCEEM, yielded similar result, even though Roberts et al.'s study showed slightly a bit higher ratings for preparedness. A majority of the literature on preparedness has focused on

how prepared students are to learn in the clinic (Banneheke et al., 2017; Joolaee et al., 2015), but otherwise scientific literature has found that clinical supervisors' lack of adequate preparation is a constant problem in health sciences (Anderson & Hearing, 1988; McGartland & Joffe, 1996). Hunt and Kennedy-Jones (2010) interviewed novice occupational therapists and showed that preparedness for supervision was influenced by a sense that supervisors were still learning themselves. They concluded that active support and supervision from the workplace and the university are necessary. Furthermore, Holt et al. (2002), who used an online survey to explore preparedness for supervision among veterinary nursing student supervisors, found that almost 50% of the participants did not feel well prepared for supervision and that 75% lacked formal training in supervision. Other than these studies concerning supervisors' preparedness is rare, implying that this is an area that needs attention.

Study II in this thesis focused on students' perceptions of supervisors' preparedness. The physiotherapy students indicated that the supervisors' preparedness became apparent in terms of prearrangement of meeting places, that were easy to find, that the supervisors had booked fewer patients for the first day, and that they provided the students with information about the placement during their first meeting. The students' anxiety about possibly arriving late diminished, and they appreciated the opportunity to discuss their expectations and worries during the first meeting. The medical students in Study III added insight to the results of Study I by indicating that they experienced ad hoc solutions when supervisors were needed. At certain clinical placements, no supervisor apparently expected them. These circumstances seem to indicate supervisors' lack of preparation, which strengthens the result of the comparisons between programs in Study I. Based on these findings, it appears that supervisors' preparedness varies between placements and programs, which affects students' perceptions of their learning environment and their learning experience. As the scientific evidence of supervisors' preparedness is limited, we must be cautious about drawing conclusions. Embarking on clinical education is like entering a new world, and therefore it seems necessary to focus more on supervisors' opportunities to prepare for students' arrival and conduct further studies on how that arrival could be optimized.

6.4 Intended learning outcomes in clinical education

An important element of outcome-based education is the statement of ILOs, that is, the students' expected competencies at the time of course completion or graduation (Harden, 1999). One item included in the UCEEM related to supervisors' preparedness for student entry is whether the supervisors were familiar with the learning outcomes. In Study I, this

item yielded the lowest scores and the highest differences between the programs. The physiotherapy and speech-language pathology students' scores for this item were high, while the scores of the nursing and medical students were low. The medical students yielded the lowest scores. This finding was further studied in Studies II and III. During the interviews, the physiotherapy students indicated that the supervisors discussed the ILOs on the first day of the placement and subsequently integrated and aligned ILOs with day-to-day activities throughout the placement. This supported and empowered the students to achieve the outcomes, enabled a continuous dialogue, and provided a sense of coherence for the students. On the other hand, the medical students reported that their supervisors were not always familiar with the ILOs. Rather, they asked the students what semester they were in and what subjects they had studied recently and, at best, adapted their teaching accordingly. This difference needs attention, considering the central role that learning outcomes play in modern education. It may be questioned how we can know whether students' have attained the necessary knowledge and skills when the learning outcomes have a vague role during clinical training.

Studies addressing students perceptions of supervisors' familiarity with ILOs are rare, making comparison with previous results challenging. Existing studies on ILOs focus more on, for example, the dialogue about ILOs (Pitkänen et al., 2018). Delany and Bragge (2009) studied physiotherapy students and supervisors and found that their perceptions of the ILOs may enhance the outcomes of clinical education. Phuma-Ngaiyaye et al. (2017) reported, perhaps not surprisingly, that collaboration between students and supervisors supported students in achieving learning outcomes. Thus, our knowledge about supervisors' familiarity with learning outcomes remains narrow.

The literature points to the importance of having a bridge between the academy (i.e., universities) and health care organizations (Delany & Bragge, 2009; Phuma-Ngaiyaye et al., 2017). Universities are responsible for education and learning outcomes, but supervisors must be informed about and receive support in realizing these outcomes. However, the supervisors also have the responsibility to ask for that information. For the physiotherapy students and supervisors in Studies II and IV, the teacher team provided this bridge and played a supportive role. Regardless of who has the role of a bridge or support, it may be theorized that having this bridge could improve the experience of CLEs. Another suggestion is that these supportive teams or persons should be geographically close to the students and supervisors for easy access. A recent study among pharmacy students (Hindi et al. 2022)

studied a “successful” clinical placement and considered it as a placement in which the learning outcomes were attained. In agreement with these authors, more effort should be placed in the future to ensure “successful” clinical placements and the start for that is the specify and clarify the intended learning outcomes for all involved.

6.5 Supervision in clinical learning environments

Clinical supervision has been described as an essential part of health profession education. There is no other way to offer students authentic work experiences, train them in clinical skills, and simultaneously maintain patient safety (Nordquist et al., 2019). However, supervision has also been described as an added burden in times of resource constraints, increased patient complexity, and staff shortages (Courtney-Pratt et al., 2012; Rodger et al., 2008). The results of Study III with medical students confirm these insights. The medical students indicated that the educational duties of their supervisors were downgraded and sometimes no back-up plan seemed to be available. Some supervisors seemed aware that they ignored their supervisory obligations due to stress.

Searching the literature for enablers and barriers to effective clinical supervision across health care professionals, Rothwell et al. (2021) found that the main barrier was lack of time and a heavy workload. Similar results were obtained by Greenway and Entwistle (2013) 10 years earlier. They found that a lack of adequate resources could cause the members of an overstretched workforce to be unable to support each other effectively, resulting in a decline in clinical supervision. Along with the lack of resources, organizational culture and attitude toward supervision have been described as important (Kenny & Allenby, 2013; Koivu et al., 2011). In situations where supervisors lack management who do not recognize the importance of supervision, organizations and managers can act as barriers to providing the time and resources needed for effective supervision (Rothwell et al., 2021). Based on the literature and the findings in this thesis, it seems necessary to improve the ongoing support for clinical supervisors, and through them also for students, and engage the leadership of the organizations, both university and health care, to ensure effective and meaningful supervision and education

6.6 The supervisor–student relationship

The literature notes that the relationship between a supervisor and a student is essential for student learning in the CLE, and that the quality of the relationship affects the effectiveness of supervision (Boor et al., 2008; Fenton, 2005; Kilminster et al., 2007; Kilminster & Jolly, 2000; Pitkänen et al., 2018; Saarikoski et al., 2002). Our findings provide insight into how important it is for supervisors to establish a positive tone at the beginning of clinical placements to ensure a good relationship with students. The physiotherapy students in Study II noted that a well-organized initial meeting laid the foundation for a positive relationship with their supervisors. Supervisors who made efforts to establish a relationship eased students' introduction to the clinical environment. The students were initially nervous, but after the supervisors had clarified that they had time to listen and get to know them, the students' nervousness decreased, and they were able to focus on learning.

In their thematic literature review, Pront et al. (2016) stress the importance of developing a common view of the purpose and process of supervision. Vågstøl and Skøien (2011) who alike us carried out a study among physiotherapy students, found that students preferred a supervisor who had a genuine interest in them, and established a relationship in which the students could talk freely and ask questions. Further, Delany and Bragge (2009) explored how physiotherapy students and supervisors perceived their respective roles and found that the students were conscious of how the relationship affected their confidence and willingness to actively engage in the learning process. Similar findings were obtained by Rindflesch et al. (2013), who identified that an open and trusting relationship was vital for students' learning. A study conducted by O'Brien et al. (2019), who explored undergraduate health profession students across a range of disciplines, found that the students greatly valued supervisors who were willing to invest in the student and set aside dedicated time for supervision. I would argue that students' experience of the CLE could be enhanced if they were invited into a relationship in the beginning and continued to receive support during their clinical placement. Continuous changes of personnel among the supervisors make it difficult to attain this goal.

6.7 Experiences with providing feedback

The impact of feedback in education is undoubted (Nicol & Macfarlane-Dick, 2006). The current thesis includes supervisors' experiences of providing feedback. The results of Study IV showed that the supervisors found it challenging to provide feedback and asked for

continuous development. In these challenging feedback situations, the supervisors found support within their workplace network. The members of the teacher team, which comprised three physiotherapists, were in geographic proximity and set aside dedicated time to support supervisors, providing them with educational tools to develop their feedback skills. Furthermore, when in need of more support, the teacher team helped the supervisors, for example, with an individualized plan for a student who risked being failed. The collaborative network among the supervisors described in Study IV was not organized in a formal way but was rather voluntary and spontaneous. Thus, the supervisors had a supportive community, in which they discussed their practices and found solution to the problem they experienced, which corresponds to Lave and Wenger's' description of a CoP (1991).

McCarty and Higgins (2003) conducted a literature review on support mechanisms during clinical placements and found that clinical supervisors need ongoing feedback and support from clinical coordinators and faculty members, including regular meetings and support in the evaluation process. Further, Hoffman and Daniels (2020) found that nursing supervisors benefited from structured instruction concerning their supervision duties, provided by a teacher team or other group/individual. An interesting finding of their study is that, similar to our findings, the supervisors appreciated the fact that they did not have to solve problems alone and were able to find support from fellow colleagues in emotionally challenging situations (Hoffman & Daniels, 2020). The findings of these studies and our findings together indicate that carrying out clinical education can be demanding and challenging, and we should encourage supervisors to seek support from collegial networks or support the establishment of these networks if they are missing in the workplace.

6.8 Theoretical considerations

Lave and Wenger's theory of CoP inspired the theoretical framing of this thesis. This theory is widely used in medical education research (McGrath et al., 2020). However, theory is used in different ways (Kumasi et al., 2013). In the current thesis, theory is mainly used to broaden the findings, whose transferability to other contexts the reader is encouraged to judge. Lave and Wenger were anthropologists who observed apprenticeships among tailors; their findings are surprisingly similar to some of the findings in the current thesis. They observed that most learning did not take place with the master but rather among the apprentices (Lave & Wenger, 1991), suggesting that learning is a social and collective process, rather than an individual process. This coheres with the physiotherapy supervisors' description of their situation. Despite the possibility of getting help from the teacher team and having instruments to

enhance the feedback process, it was their collegial network that provided the most support and allowed them to continuously develop. The supervisors were not merely colleagues, but rather had an identity as members of a shared domain of interest, in which they had a collective competence, shared information, and helped and learned from each other. The interactions concerning the supervisors' educational duties were essential in the creation of the community. They shared a repertoire of resources, and consequently, the ways of addressing problems formed the practice. According to Lave and Wenger (Lave & Wenger, 1991), the combination of the shared domain, the community, and the practice forms the basis of a CoP. Viewing physiotherapy supervisors as a CoP may support the interpretation, description, and generalization of the study.

The students in a CLE engage in the practice of a profession; that is, they learn the profession by carrying out the activities in which the group is engaged. This implies that it is important for students to become accepted as novice members of the community. The physiotherapy students in Study I indicated that the whole community accepted them. They described their supervisors as door-openers for the students into the professional network in the workplace. The supervisors introduced the students to the entire staff on the ward, and the students felt that the entire community was willing to support their learning. On the other hand, the findings from the medical students' interviews indicate that they had to open doors themselves into the community and adapt themselves as best they could to the circumstances. In a CoP, identity is shared, which entails acceptance of the norms and the organizational structure of the community (Wenger, 1998). Cruess et al. (2014) propose that the development of a professional identity in each medical student should be the primary objective of medical education. However, given the expectation that medical students will act assertively in the CLE, the medical students experienced that they were not always welcomed as legitimate practitioners in the medical CoP. In addition, the medical students considered that educational activities were downgraded in the clinic. Those who received an introduction to the placement, had longer placements, and were provided with authentic tasks felt that they were enabled to move from outside the CoP to the inside.

6.9 Methodological considerations

Methodological considerations in quantitative survey research

A questionnaire is a commonly used data collection method that has advantages and disadvantages (Kelley et al., 2003). One advantage is that it provides an easy way to collect data from a targeted population. As studies of complex CLEs are increasing, educators may

struggle to decide which instrument to use (Irby et al., 2021). To support this choice Irby et al. (2021) suggest a series of guiding questions, including how the instrument was theoretically framed, which aspects of the CLE they wish to capture, whose perspective they want to study, and how much time they expect students to devote to completing the survey.

The UCEEM was found to be a clinically oriented instrument, designed for general-purpose use in medical education, and grounded within a sociocultural learning theory. In addition, it has been reported to have good psychometric properties and is relatively short, which reduces rater fatigue (Irby et al., 2021; Strand et al., 2013). Thus, the UCEEM was considered a reasonable choice to obtain data about the perspectives on the CLE of students in different health education programs. However, the UCEEM was originally designed for medical students, so in the current thesis, the assumption was that CLEs are essentially similar for all undergraduate health education students. Including students from four different programs was advantageous in increasing understanding of the CLE, and Studies II and IV further strengthened opportunities to understand the circumstances that students encounter in the clinic. The students were chosen specifically to represent shorter and longer study programs and earlier and later semesters, which was also advantageous in increasing understanding of the CLEs. The results revealed clear differences between some of the programs but not between the semesters, indicating that the chosen instrument was adequate for the purpose of comparing different programs. The internal consistency calculated for the subscale scores showed acceptable Cronbach α values surpassing the .70 threshold (Tavakol & Dennick, 2011).

Studies that have used the UCEEM are rare, which limits the possibility of comparing the results of study I in this thesis with the findings of other studies. Furthermore, there are no published guidelines on how to interpret the results. Therefore, the recommendations by Swift et al. (2013) concerning the interpretation of the Dundee Ready Education Environment Measure were followed (Roff et al., 1997). Accordingly, individual items with a mean score of ≥3.5 were considered particularly strong areas, items with a mean score of ≤2.0 were considered to be in need of particular attention, and items with mean scores between 2 and 3 were considered areas that could be improved. Carifio and Perla (2008) argue that single items measurement should not be analyzed alone, since the items are part of a "structured and reasonable whole." However, in Study I, individual items were analyzed individually, offering the possibility of identifying problems in a specific area but the results should be interpreted with caution as they reflect only one area of the CLE.

An important factor in a quantitative survey study is to provide information about the non-responders (Werner et al., 2007). Information about the non-responders in Study I was limited, which restricted the possibility to draw conclusions about them. However, the age and gender distribution of the study participants corresponded with the age and gender distribution of all the students registered in the four programs at KI, implying that the responders and non-responders from that perspective were similar. It is also important to include the response rate in quantitative survey research. In Study I, the item response rate was >90%, which is considered satisfactory.

Methodological considerations in qualitative research

The methodological considerations for Studies II, III and IV, concern the effort to achieve trustworthiness, which has been referred to as the rigor of a study. Trustworthiness concerns the degree of confidence in the data, the interpretation, and the methods used to guarantee the quality of the study (Polit & Beck, 2020). The widely accepted criteria introduced by Lincoln and Guba (1985) credibility, dependability, confirmability, and transferability—were chosen to demonstrate the trustworthiness of the qualitative studies.

To establish *credibility* the research groups decided to use a well-known research method. Furthermore, the research group held frequent meetings during the process to discuss interpretations during the analysis process. In Studies II and III the interviewer (MS) wrote reflective commentaries, which were discussed after each day of interviews. Descriptions of the researchers' backgrounds, qualifications, and experience were provided. Furthermore, investigator triangulation was used, involving multiple researchers in the analysis of the data to enhance credibility (Patton, 1999). Making use of investigators with different backgrounds contributed to confirming the findings, as the researchers' different perspectives added breadth to the phenomenon of interest, hence adding to the probability that the findings were credible. A possible limitation regarding the *credibility* of the findings were that two of the researchers was familiar with the informants in Study IV. To create distance, an outside person conducted the interviews; the interviews were considered to be rich, as the informants felt free to make both positive and negative assessments, which may indicate that they felt comfortable speaking freely. Similarly, one of the researchers in Study II held a position with the teacher team for the two pilot students, and in Study III, one of the researchers was the director of the course from which the students were recruited. These researchers were not responsible for organizing, conducting, or anonymizing the interviews and had access only to anonymized data.

According to Lincoln and Guba (1985), *credibility* also concerns prolonged engagement with data and persistent observation. Prior to the interviews in Studies II and III, the researcher invested time in building trust with the students by stating that the information they shared would not be used against them and that anonymity would be provided. The relatively small amount of data obtained in Studies II, III, and IV may be considered as limiting the *credibility* of the studies; however, the amount of data in an interpretative tradition may not correlate with methodological quality. Lincoln (2011) suggests that priority should be given to the extent to which the findings advance the understanding of a phenomenon. Regarding persistent observation, there was a possible threat that the demands placed on a doctoral student could potentially lead the researcher to come to a closure too soon (premature closure) (Lincoln & Guba, 1990). However, during the analysis of the data there were no time constraints, and the doctoral student was assured that she had enough time to identify the depth of the findings and reveal the findings that were of importance. Lincoln and Guba (1985) stated that persistent observation offers *depth* in comparison with prolonged engagement which offers *scope*.

Concerning *confirmability*, triangulation was considered a strength and was used repeatedly in reflections within the research groups to ensure that the findings were the true experiences of the informants and not the researchers' preferences. The *transferability* of the findings was assured through careful descriptions of the context, programs, and informants. Regarding *dependability*, the possibility for someone outside the research to follow and audit the steps taken during the analysis was carefully described. In a later work by Lincoln and Guba (1989), the concept of *authenticity* was further suggested to enhance trustworthiness by taking the influence of context into consideration. Guba (2004) considers fairness to be the most important criterion for authenticity, implying that the researcher must avoid suppressing some findings while enhancing others. To acknowledge this, thick descriptions of the steps taken in the analysis process were provided, and frequent discussions were held within the research groups until consensus was reached.

Member checking

It has been suggested that member checking enhances the trustworthiness of qualitative research (Lincoln & Guba, 1985). This is a method of debriefing the analytical results of a study with the participants to obtain their agreement (Lincoln & Guba, 1985). The procedure may improve the accuracy, credibility, and validity of the findings (Creswell & Miller, 2000).

However, due to the potential drawbacks, such as conflicting views on interpretation, Varpio et al. (2017) suggest that member checking should be used with caution (Varpio et al., 2017), especially because reality may be perceived differently without a fixed truth (McGrath et al., 2019; Morse, 2015). It may be difficult for individual informants to comprehend the theorization of data gathered from multiple participants, suggesting that member checking should be employed carefully (Hallett, 2012). Therefore, member checking was not used in the studies.

Reflexivity

Reflexivity can be used to establish all the criteria for trustworthiness. The researcher needs to be reflexive about herself and her persona as a researcher (Holloway & Galvin, 2016). This improves the quality of the research report by allowing readers to assess the applicability of the research findings to their local settings. Studies II and III adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Tong et al., 2007). The COREQ was used to promote complete and transparent reporting of the research to further improve the rigor, comprehensiveness and credibility of the individual studies (Tong et al., 2007). The COREC suggests that reflexivity starts by identifying any preconceptions that the researcher holds, and this was discussed accordingly within the research groups (Tong et al., 2007).

Since Studies II and III originated from Study I, the researchers' preconceptions were that, overall, the physiotherapy students had positive experiences in their CLE. The interviewer (MS) in Studies II and III was unknown to the participants and presented as a doctoral student in medical pedagogy. The interviewer aimed to maintain her position as a researcher rather than as a physiotherapist or clinical teacher during the interviews. This may be regarded as locating the researcher within the research project and as thoughtful and conscious self-awareness (Finlay, 2002), which is a demanding and constant process in qualitative research (Bott, 2010).

In the interviews with the physiotherapy students, the context described by the informants was familiar to the researcher, and the researcher's previous professional and personal experiences were of help; for example, the medical terms the students used were familiar to the researcher (MS). In the interviews with the medical students, the researcher took field notes at the beginning that contained clarifying jottings that were followed up with the research group after each interview. A recurring reflection was on the differences in experiences among the students from the different programs, who sometimes had placements

in the same ward. With a desire to act as a professional and neutral researcher following an interview guide, reflexivity demanded that the physiotherapist researcher remain silent when, in other circumstances, she would have commented.

Zoom as a data collection method

An online platform was used for the individual interviews because face-to-face interviews were not possible during the COVID-19 pandemic. Zoom is considered cost-effective since no room needs to be booked, and no time or expense for travel is involved (Oliffe et al., 2021). The individual interviews took place in 2021, which meant that both the interviewer and the interviewees were already familiar with the technology since theoretical education worldwide had mainly taken place via Zoom since the beginning of the pandemic in 2019 (Oliffe et al., 2021). The students chose the environment where they wanted to conduct the interview; some students were outdoors, some were at home and had a relative in proximity, and some students changed their location during the interviews when they shared sensitive information. It has been suggested that a researcher should acknowledge how remarkable it is that interviews normally proceed in well-ordered ways, and the interviewer and interviewees know how to play their roles satisfactorily (Brinkmann, 2016). How the self-chosen environment affected the students is difficult to know, but the impression was that it was a strength that they got to decide for themselves, and the interviewer got a positive response when allowing that it was okay for the interviewee to go for a walk as the interview took place.

7 CONCLUSIONS

The findings of the current thesis can be summarized as follows:

- Health profession students from four different programs generally indicated positive perceptions of their CLEs, suggesting that the programs meet the educational needs of the students. However, statistically significant differences were found between the programs, with higher scores obtained by the students in the smaller physiotherapy and speech-language pathology programs.

- The physiotherapy students highly regarded supervisors who established a relationship with them and encouraged their cooperation in the community. The continual use of learning outcomes helped students identify their learning needs and achieve the outcomes.

- The medical students found that the transition from learning on campus to learning in the clinic was abrupt. Course leaders and senior students encouraged them to act assertively and push themselves forward in the clinic, which did not suit everyone. In the clinic, ad hoc solutions in supervision occurred, and students found that their supervisors' educational responsibilities were downgraded, resulting in a variable quality of clinical training.

- Providing feedback to students is a task involving continuous development for the supervisors, who aimed to be professional while handling their own emotions in their interactions with students. Regardless of their experience and level of education and despite available instruments, the supervisors learned and found support from each other within the workplace network.

7.1 Implications for practice

Although undertaken in the context of a limited number of health professions, this thesis aims to provide more evidence to guide education in CLEs in the future. The following suggestions may be considered in the education of health profession students:

- Embarkning clinical education is like entering a new world for undergraduate health profession students; therefore, it is necessary to focus on supervisors' preparation for the students' arrival. A well-organized initial meeting is recommended to establish a safe and positive relationship between the student and supervisor. Time should be set aside on the first day for the supervisor and student to get to know each other. The supervisor is responsible for arranging this meeting. This is not only a matter for individual supervisors but also for the organization, which must provide the supervisor with time to prepare.

- The medical students reported that their supervisors were not always familiar with the learning outcomes. This needs attention, considering the central role that learning outcomes play in modern education. The outcomes should guide supervisors and students throughout the clinical placement to support the student and identify the students' learning needs and achievements in relation to the outcomes. To achieve this, it is crucial that supervisors are familiar with the learning outcomes, implying that it is necessary to improve the ongoing support for clinical supervisors and, through them, the support for students. The leadership of both universities and healthcare organizations must ensure effective and meaningful supervision and education.

- The findings indicate that providing successful clinical education can be demanding and challenging. The leadership of organizations should facilitate the work of CLE supervisors by supporting their collegial networking or facilitating the development of collegial networks where they are missing. Regardless of experience or level of education and despite available instruments, physiotherapy supervisors learned from and supported each other within their workplace network.

7.2 Future research

Several ideas for future research emerged during work on this thesis. A more detailed description of the conditions of students' clinical training and the models of supervision in different programs would be valuable. To obtain a deeper understanding of medical students' CLE, future studies should use additional data sources, for example, clinical supervisors and medical students from later semesters. It would also be useful to use other data collection methods, such as questionnaires focusing on students' knowledge of the ILOs for other courses. The results of the four studies in this thesis raise questions about the impact of group size variations on clinical placements in different study programs. Future research could also aim to specify in more detail what students identify as central to good preparation for student entry. Finally, a detailed description of how different programs strive to make supervisors and students attentive to the ILOs that are central to clinical training would be of importance.

To explore students' experience of supervisors' preparedness and supervision practices during their clinical placements could be repeated among students in later courses in the physiotherapy program as well as among students from other programs to identify possible differences in their early needs. The need to establish a relationship with the supervisor may change from year to year.

A medical student in Study III stated that, "From my perspective, the focus has not been on the learning outcomes for the course; the focus has been on the patients." This quote highlights the patients' needs in CLEs, which have not received any emphasis in the studies in this thesis but could be foregrounded in future studies. Given that the overall focus of health care is to improve patient outcomes, development in the supervision of healthcare students is meaningful only if the process is associated with improved patient outcomes. Few studies have addressed how supervision practices within healthcare CLEs impact patient outcomes. The most reported barriers to clinical supervision include a lack of resources in terms of time, organizational support, and knowledge. This is worrying since these barriers most likely will affect patients. If research on clinical supervision can address these barriers, clinicians may be provided with support that will benefit all parties involved in CLEs.

Further research should also be undertaken to explore the working conditions of clinical supervisors. The CLE programs for health profession students have varying organizational and supervisory structures, which could be explored and compared in future studies. Future

studies on learning in the CLE need to encompass clinical placements that take place in a variety of organizational contexts. Such studies could provide a more detailed view of potentially important sociocultural and organizational factors that influence students' experiences and the outcomes of the CLE. The groups being researched should be more heterogeneous to better mimic the dynamic CLEs.

7.3 Epilogue

Being a doctoral student in medical pedagogy involves learning a new language and learning about concepts within the field. This is reasonable for someone who is pursuing a doctoral degree. The impression, however, is that many barriers need to be overcome before clinicians can embrace the field. Disagreement on basic concepts contributes to confusion. As researchers within medical pedagogy, it is our mission to offer clinicians easy access to evidence-based advice and recommendations. It is not plausible to suppose that clinicians, in a time of constraints, will have opportunities to familiarize themselves with the field of medical pedagogy to the extent that they themselves can draw conclusions from the research literature regarding best practices in education. Within my clinical field (physiotherapy), Europe-wide consensus and clinical practice guidelines are used in everyday practice. I look forward to a future where the field of medical pedagogy can offer clinicians consensus reports and gold standards in clinical education in order to support their growth and development.

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