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2010

INTERPROFESSIONAL EDUCATION

Aspects on learning together on
an interprofessional training ward



Uffe Hylin



**Karolinska
Institutet**

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Cover photo: Uffe Hylin. Students at the IPTW at Södersjukhuset.

To Gustav and Siri and Oskar and Isabel,
who have not yet started their higher educations.
Which path they will choose? I'm not the one to tell,
it depends on their interests and qualifications.
In different professions they may be trained,
like medicine or nursing, well I am not sure.
But interprofessionalism has explained
the possible team: "Hylin Family Four"

ABSTRACT

In this thesis, students from four different educational programmes, i.e. medicine, nursing, occupational therapy and physiotherapy, participated in the studies. The students had two-week placements on an interprofessional training ward (IPTW), where they worked together in teams. The goals were in short to learn about and understand the other professions, to develop one's own professional role and to provide the patients with good care.

This thesis is based on four studies. Study I is a descriptive study in which students from the four professions were asked for their opinions about the course in relation to the goals of the course, e.g. how they perceived their professional role and what knowledge they had about the other professions. Study II is a follow-up study in which the students who had completed their course at the IPTW two years earlier were asked for their impressions of the course in relation to their experience of working as professionals, e.g. if they encouraged collaboration in their present occupation. In Study III the students' approaches to learning were explored and related to their opinions about the course. Study IV is a prospective controlled intervention study investigating the impact on teamwork and learning of a one-day team building training preceding the course at the IPTW. Data was collected by questionnaires and observations.

The results from Study I showed that most students perceived their professional roles more clearly, that their knowledge about other professions had increased, and that they rated the educational concept at the IPTW high. In Study II the students described independence and responsibility as concepts unique to the IPTW. The collaborative learning methods made their self-confidence grow, but the supervision could be improved. Study III showed that the students in general preferred a collaborative-constructivist approach to learning, but one cluster called "Low collaborative" could be identified, and the students in this cluster were less positive towards the IPTW concept than the other students. In Study IV the students in the intervention group had a more positive approach to teamwork and communicated better during the course. It was easier for the facilitators to work with the intervention teams.

Clinical practice on an IPTW provides students with a good opportunity to develop their own professional roles and learn about the other professions. Students value the interprofessional training in clinical practice high. Former students use the experience they have acquired from the course in their present work. Students with a low collaborative profile in their approach to learning may find interprofessional training less important than other students. Team-building training improves teamwork and collaboration. Students prefer clinical training on an IPTW compared to traditional clinical practice.

Keywords: Interprofessional relations; Students, health occupations; Professional competence; Patient care team.

SAMMANFATTNING PÅ SVENSKA

BAKGRUND

Vid de flesta medicinska universitet utbildas studenter från olika program var för sig utan gemensamma aktiviteter. Men sjukvården är ett arbetsfält där kunskaper från olika yrkesområden krävs och där personer med olika yrkeskunskaper förväntas samarbeta för att ge patienterna god vård. Interprofessionell utbildning som bedrivs på en klinisk utbildningsavdelning (KUA) syftar till att studenterna ska öka sina kunskaper om varandras yrken och att lära sig att arbeta i team, samtidigt som de ges möjlighet att träna sin egen yrkesroll i en trygg, studentaktiverande miljö.

Interprofessionell utbildning definieras som *tillfällen då två eller flera yrken lär med, från och om varandra för att förbättra samarbetet och kvaliteten i vården*. Metoden syftar alltså på lång sikt till att förbättra vården genom ett bättre samarbete och en ökad förståelse mellan de personer som arbetar i de olika vårdyrkena.

Under KUA-placeringen får studenterna arbeta självständigt under handledning. De får på ett naturligt sätt aktivt delta och formulera mål för varje patients vård, samt aktivt delta i arbetet att nå dessa mål. Motsättningar och förutfattade meningar mellan olika yrken i vården förväntas minska samtidigt som vårdkvaliteten förväntas öka.

Avhandlingen belyser ur olika aspekter hur interprofessionell utbildning påverkar lärande under klinisk utbildning och kan på så sätt bidra till en bättre förståelse av interprofessionell pedagogik och utbildning på kliniska utbildningsavdelningar.

SAMMANFATTNING AV INGÅENDE DELARBETEN

Studie I: Interprofessional training in the context of clinical practice: Goals and students' perceptions on clinical education wards

Det första delarbetet (Ponzer et al, 2004) beskriver verksamheten på KIs kliniska utbildningsavdelningar, hur utbildningen är upplagd och hur studenterna uppfattade konceptet att lära tillsammans med interprofessionell pedagogik. Studiematerialet bestod av enkätsvar från 962 KUA-studenter. Analysen visade att interprofessionell träning på KUA ger möjlighet för studenterna att utveckla sina professionella roller, att lära sig hur de fungerar som teammedlemmar samt att handledningen är av avgörande betydelse för lärandet. Dessutom visade studien att läkarstudenternas situation på en KUA behöver belysas och utvecklas.

Studie II: Interprofessional training in Clinical Practice on a Training Ward for Health Care Students – A follow up Study

Det andra delarbetet (Hylén et al, 2007) är en uppföljning av KUA-studenter två år efter genomförd KUA-placering. Syftet var att undersöka vilka bestående intryck de tidigare studenterna hade av utbildningen på KUA, samt om och hur de använde sina interprofessionella kunskaper och färdigheter i sitt dagliga arbete.

I studien inkluderades 348 tidigare KUA-studenter som besvarade en enkät 2 år efter sina KUA-placeringar. I fritextsvaren betonade dessa tidigare KUA-studenter betydelsen av ökad förståelse för varandras yrkeskompetens och möjlighet till teamträning under KUA. Negativa intryck handlade oftast om att KUA-placeringen var för kort och att det saknades hjälp till basal patientvård. Kursen på KUA bedömdes ha högt värde för det framtida arbetet och mer än 90 % av studenterna ville behålla KUA-placeringen.

Studien visade att den interprofessionella utbildningen medförde ett mer interprofessionellt förhållningssätt i de tidigare studenternas dagliga arbete.

Studie III: Students' approaches to learning in interprofessional training in clinical practice

Det tredje delarbetet är en prospektiv studie som undersökte interprofessionell utbildning i relation till olika lärtilar. Hypotesen var att när studenterna är "tvingade" till samarbete skulle studenter med en mer samarbetsmässig lärtil uppskatta kursen bättre.

Under tre terminer skattade 368 KUA-studenter på Södersjukhuset sina lärtilar enligt Conceptions of Learning and Knowledge Questionnaire innan KUA-placeringen inleddes. Efter KUA-placeringen fick studenterna fylla i en enkät där de skattade sina åsikter om KUA och besvarade öppna frågor avseende positiva och negativa erfarenheter. Med klusteranalys identifierades tre grupper av studenter med likartad lärtil och dessa grupper jämfördes med varandra.

Resultaten visade att studenterna generellt hade en samarbetande/konstruktivistisk lärtil. En av klustergrupperna karaktäriserades av låga värden beträffande samarbete och denna grupp hade också de lägsta värdena i utvärderingen av KUA. Nästan alla studenter värderade dock KUA-utbildningen högt oavsett lärtil.

Studie IV: Does team building training enhance interprofessional collaboration at a training ward? A prospective intervention study

Det fjärde delarbete är en prospektiv interventionsstudie som undersökte effekten av teamträning inför KUA-placeringen och om den kunde påverka det interprofessionella samarbetet och lärandet. Hypotesen var att teamträningen skulle förbättra samarbete och lärande.

De 256 studenter som genomförde sin kliniska utbildning på KUA SÖS under 1 år randomiserades till två alternativa metoder att starta sin KUA placering med, nämligen:

1. Traditionellt (kontrollgrupp): Studenterna träffades och fick information om KUA-placeringen av KUA-handledarna veckan innan KUA-veckorna började (ca 2 timmar).
2. Teamträning (interventionsgrupp): Under den första dagen av KUA-placeringen fick studenterna lära sig hur man effektivt arbetar i team, både genom teori om grupperns utveckling och genom praktiska övningar med efterföljande processanalys, samt hur man ger konstruktiv feedback. De fick även presentera sig själva och sitt yrke för varandra för att redan under denna första dag lära sig vilka kompetenser de olika yrkesgrupperna som samarbetar på KUA har. Denna första dag genomfördes med hjälp av specialutbildade handledare engagerade i projektet.

Studenterna besvarade en enkät innehållande frågor avseende attityder till interprofessionell utbildning på KUA, lärstilar och kunskaper före och efter KUA-placeringen. Enkäten innehöll även frågor med fritextsvar avseende positiva och negativa erfarenheter av KUA-placeringen. Handledarna utgjorde observatörer under studiens gång och besvarade sedan enkäter om hur de uppfattade studenternas teamarbete.

De kvantitativa resultaten påvisade inte några skillnader i de båda studentgruppernas genomgående positiva uppfattning om KUA-placeringen, men den kvalitativa analysen av fritextsvaren visade att teamarbetet förbättrades i de team som ingick i interventionsgruppen. Studenterna i interventionsgruppen hade ett bättre samarbete i sina team och kom till beslut snabbare än kontrollgruppen. Interventionsgruppens studenter var också mer intresserade av varandra, litade mer på varandra och hade ett öppnare diskussionsklimat.

SLUTSATSER

De flesta studenter är positivt inställda till interprofessionell utbildning på KUA. De utvecklar förståelsen för olika yrkesroller och de lär sig om olika yrken.

När studenter som aldrig har träffats tidigare sätts tillsammans i team, är det fördelaktigt att först låta dem lära känna varandra och utveckla sitt samarbete, till exempel genom en organiserad teamträning.

Interprofessionell utbildning, med relevant innehåll och relevanta mål, bör introduceras tidigt under de olika utbildningsprogrammen. Interprofessionella kurser bör vara obligatoriska och ge separata högskolepoäng.

Handledningen är mycket viktig. Utbildning och stöd till handledarna är av avgörande betydelse för genomförandet av interprofessionell utbildning.

LIST OF PUBLICATIONS

- I. Ponzer S, *Hylín U*, Kusoffsky A, Lonka K, Mattiasson A-C, Nordström G: Interprofessional training in the Context of Clinical Practice: the goals and the students' perceptions on Clinical Education Wards. *Medical Education* 2004; 38: 727-736.
- II. *Hylín U*, Nyholm H, Mattiasson A-C, Ponzer S: Interprofessional training in Clinical Practice on a Training Ward for Health Care Students – A follow up Study. *Journal of Interprofessional Care* 2007; 21: 277-288.
- III. *Hylín U*, Lonka K, Ponzer S: Students' approaches to learning in clinical interprofessional context. Submitted.
- IV. *Hylín U*, Kalén S, Longueville A, Hjälml M, Ponzer S: Does team building training enhance interprofessional collaboration at a training ward? A prospective intervention study. Submitted.

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LIST OF ABBREVIATIONS

AMEE	Association of Medical Education in Europe
CLKQ	Conceptions of Learning and Knowledge Questionnaire
FHS	Faculty of Health Sciences at Linköping University
IPE	Interprofessional education
IPTW	Interprofessional training ward
KI	Karolinska Institutet
OT	Occupational Therapy
PBL	Problem Based Learning
PT	Physiotherapy
WFME	World Federation of Medical Education
WHO	World Health Organization

INTRODUCTION

Under the motto “Learning together to be able to work together”, Karolinska Institutet (KI) started a project in 1998 for integration between the different educational programmes. One part of the project was to implement interprofessional training wards (IPTW) where students from different educational programmes should learn and practise together.

One of the IPTWs was a ward at my department and I was one of the orthopaedic surgeons assigned as medical facilitators for the students at the IPTW. I found this new form of education and the pedagogy affiliated highly interesting, but among several of my colleagues the opinion was rather that this is a waste of time. In order to evaluate this new activity, a group consisting of lecturers from the different educational programmes was formed. The group proposed the structure and principles for the initial evaluation, agreed on the first version of the questionnaire and found me, willing to do the actual work. When the first evaluation (Study I) was completed the group was disbanded and I was asked to proceed the work with evaluations.

HEALTH CARE EDUCATION

Brief Historical Aspects

By tradition, professions in health care have been responsible for the education of students of their own profession. In this thesis, students from four different health care educations participated in the studies. A brief introduction of the history of the professional educations included in this thesis adds to the understanding and is given here.

Physicians

A systematic education of doctors is often assumed to have started in ancient Greece by Hippocrates about 400 BCE, but before medical universities were founded young doctors were instructed by their experienced older colleagues in an apprentice system. The first medical university in the world is considered to be the medical centre in Gundishapur, Iran, founded about 350. In Europe the first university was founded in 1088 in Bologna, but medical science developed at the University of Padua, which was founded in 1222. For the first time in history bedside education of medical students was introduced in Padua in 1543. In Sweden, Uppsala University was founded in 1477, thus being the oldest university in the Nordic countries, and the first professor at the Medical Faculty in Uppsala was appointed in 1613. Medical

education was introduced at Uppsala and Lund Universities during the 17th century and in Stockholm Karolinska Institutet was founded in 1810, primarily to provide training for army surgeons.

Nurses

In 1860 Florence Nightingale started the Nightingale Training School for Nurses, the very first school for nurses, at St Thomas' Hospital in London, where young women received a one-year education by trained nurses. In Sweden, nursing education was started at Red Cross School of Nursing in 1867 by Emmy Rappe, who was educated at St Thomas' Hospital by Florence Nightingale. Several schools for education of nurses were started during the following years, for example Sophiahemmet school of nursing in 1884. Nursing education was considered a university education in 1977 and it was introduced at Karolinska Institutet in 1998 when Stockholm College of Health Sciences was incorporated into KI.

Physiotherapists

Physiotherapy was recognized as a branch of nursing in 1894 but "hydrotherapy" – a physiotherapy technique – was practised in ancient Greece and the first academic thesis regarding physical training was actually published in 1723 by Nicolas Andry, professor of medicine in Paris (Andry, 1743). In Sweden, Per Henrik Ling started a school for teachers in gymnastics in 1813 and he defined four types of gymnastics: pedagogical, military, esthetical and medical. The medical gymnastics were the precursor to physiotherapy, but it was not until 1934 that physiotherapy as a treatment was separated from gymnastics. At Karolinska Institutet education of physiotherapists was introduced in 1959 and in 1977 it was considered a university education.

Occupational therapists

Occupational Therapy is probably the youngest of these four professions. "Moral Treatment", a treatment based on purposeful daily activities, was used to treat mentally ill patients during the 19th century, and is considered the embryo of occupational therapy. During World War I and II occupational therapists were called on to develop programmes and treat injured soldiers and this let the OTs out from the institutions for the mentally ill. The first major textbook in occupational therapy was published in 1947 (Willard and Spackman, 1947). In 1955 the education for occupational therapists in Sweden was one year, in 1964 it became three years, but it was not until 1989 that it was considered a university education. At Karolinska Institutet education of occupational therapists was introduced in 1998.

INTERPROFESSIONAL EDUCATION

Introduction

The purpose of all health care education is to ensure high quality in health care by educating professionals in the different health care professions. Traditionally, the different professions in health care are responsible for the education of their own students, thus the specific educational programmes are designed by the professions themselves. Lecturers, teachers and other professionals from the specific profession educate and instruct the students to develop profession-specific knowledge, skills and attitudes, but also transfer to the students their opinions about other professions, adding to the students' already preconceived notions. Although health care professions share common core values, traditionally their educations are separated: students in one programme never meet students in another programme.

Nevertheless, professionals in health care are expected to work together in teams, and the need for collaboration is obvious. However, difficulties in teamwork are encountered as the different professionals have neither enough knowledge of each others' professional roles, nor competence in teamwork (McNair, 2005).

Furthermore, health professionals working in teams often do not understand or respect each other's roles or knowledge (Kvarnström, 2008). The early vision of interprofessional education (IPE) was that different professions would understand each other and work more efficiently together and thereby improve the quality of care (Barr, 2002).

There has been some confusion about the term interprofessional, as the terms multiprofessional and interdisciplinary are sometimes used as interchangeable words (e.g. Hall and Weaver, 2001). Also, several different proposals for definitions have been made. Parsell and Bligh (1998) looked at the number of professions involved and defined interprofessional as involving two professional groups and multiprofessional as involving three or more professional groups. Harden (1998) based the definition on the professions' perspective and defined it as multiprofessional when each profession looked at the subject from the perspective of its own profession and as interprofessional when each profession looked at the subject from the perspective of its own and other professions.

The Centre for Advancement in Interprofessional Education (CAIPE) made the step to define interprofessional education, and today the commonly accepted definition is as follows:

Interprofessional education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care (CAIPE).

Here the word interprofessional refers to interaction between professionals. There is also emphasis on the objectives of the interprofessional education, i.e. to improve both collaboration and the quality of care.

The commonly accepted definition of multiprofessional education is when professions learn side by side for whatever reason (Barr, 2000), while the word multiprofessional just means that there is more than one profession present (Delany and Molloy, 2009, p 72).

In this thesis I will use the word *profession* in the meaning of a career, vocation or occupation that requires education and knowledge in some specific field of education or science, such as physician or nurse. I will use the word *discipline* in the meaning of a branch or a subset of a profession, thus e.g. orthopaedic surgery and psychiatry are different disciplines within the medical profession.

Improving the quality of care

In learning with, from and about each other, collaborative skills among the students will improve, enabling effective collaborative practice, which will strengthen health systems and improve health outcomes (WHO 2010).

In a review of medical education by the World Health Organization (WHO) in 1973, they saw interprofessional and traditional programmes as complementary. IPE outcomes were described as better understanding of roles and more satisfying roles for all team members, better use of the physician's time, and more effectively achieved improvements in health care (WHO, 1973).

In the Declaration of Alma-Ata, the WHO presented the vision "Health for all by the year 2000" and set several goals to be achieved to reach an acceptable level of health for all the people of the world by the year 2000. In the declaration, health workers are requested to be suitably trained socially and technically to work as health care teams (WHO, 1978).

In the Edinburgh Declaration 1988, the World Federation of Medical Education (WFME) defined 12 areas of improvement which could be achieved within the medical schools. One proposition was that the opportunities for joint learning and service with other health and health related professions, as part of the training for team-work, should increase (WFME, 1988). Later, the WFME described the task of

doctors to promote health and treat disease, but also to be effective health team managers and good communicators, who work effectively as members of health care teams. It was recommended in the Global Collaborative Programme that teamwork and multiprofessional education is implemented (WFME, 1994). Multiprofessional education was described as a priority, and the expected outcomes of multiprofessional education were described as more cost-effective doctors, better prepared to work in health care teams for the benefit of both patients and communities (Walton, 1995).

The report “Health professions education: A bridge to quality” from the Institute of Medicine in 2003 defined five core competences that all clinicians should possess, regardless of discipline, to meet the needs of the 21st century health system.

The core competences defined were: to provide patient centred care, to employ evidence-based practice, to utilize informatics, to apply quality improvement and to work in interdisciplinary teams. The interdisciplinary teams are urged to “cooperate, collaborate, communicate and integrate care in teams to ensure that care is continuous and reliable” (Institute of Medicine, 2003).

In 2009, the WHO presented the *WHO Patient Safety Curriculum Guide for Medical Schools* (WHO, 2009), a complete programme for implementation of patient safety education in medical schools. In the guide, traditional curricula for medical students were described as being too focused on pure clinical skills like diagnosis and treatment, while skills fundamental to patient safety like team working and risk management were considered as being overlooked. The Curriculum guide aimed to reduce harm caused by health care by encouraging medical schools to include patient safety in their courses.

In the curriculum guide 11 areas were identified as relevant to improving safety in health care. Three of these are clearly related to interprofessional education:

Understanding systems and the impact of complexity: Patients depend on a system of care, consisting of many people from different professions doing the right thing at the right time. Individual health care workers are not able to provide a safe and quality service by themselves, they need to collaborate and communicate between different professions.

Being an effective team player: The WHO defines an effective team as a team in which the members communicate and combine their observations, expertise and responsibilities to optimize patient care. Students need to learn how to work in effective health-care teams to improve quality of care and to reduce errors.

Engaging with patients and carers: The health care team should include the patients and their carers. They can contribute to a safe care by helping with the

diagnosis, deciding about treatments, choosing an experienced and safe provider, ensuring that treatments are appropriately administered, and identifying adverse events.

When the WHO presented the “Framework for Action on Interprofessional Education & Collaborative Practice” in 2010, it established that there is sufficient evidence that effective IPE enables effective collaborative practice, and that collaborative practice strengthens health systems and improves health outcomes (WHO 2010).

In the Framework for Action (p. 14-15), the WHO describes the need for interprofessional collaboration in several areas in the worldwide system of health care, for example:

Family and community health: Every day 1500 women die from complications in pregnancy or childbirth. Health workers who are able to jointly identify the key strengths of each member of the health care team will play a key role in reducing these complications.

HIV/AIDS, tuberculosis and malaria: Interprofessional teams that have the expertise and resources to tailor their response to the local environment will be critical to the success of disease management programmes, education and awareness.

Health action in crisis: Interprofessional education provides health workers with the kind of skills needed to coordinate the delivery of care when emergency situations arise.

Health systems and services: Interprofessional education and collaborative practice maximize the strengths and skills of health workers, enabling them to function at the highest capacity.

In the Framework, an international scan of IPE practices from 42 countries is presented. Educational benefits from IPE are described as real world experience and insight for students in health care, and as students learning about the work of other practitioners. It is also considered beneficial that staff from a range of professions participate in programme development.

Also experienced health policy benefits are described: IPE improves workplace practices and productivity and also raises staff morale. Patients have better access to health care, and there are reported improvements in patient safety and patient outcomes.

Collaborative practice

Health care is delivered by teams, and a functioning teamwork is essential to deliver health care of high quality (Institute of Medicine, 2001). Teamwork in health care has been defined by Xyrichis and Ream (2008) as:

A dynamic process involving two or more health professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning, or evaluating patient care. This is accomplished through interdependent collaboration, open communication and shared decision-making.

In looking at this definition, I found at least four important goals that will hardly be reached without interprofessional education: sharing common health goals, interdependent collaboration, open communication and shared decision-making. To accomplish a functioning teamwork we must learn to cooperate by achieving knowledge and skills needed for collaboration: collaborative competences.

Collaborative competences were described by Barr (1998) and included knowledge about one's own profession and other professions, skills in working with other professions and attitudes regarding relationships and understanding:

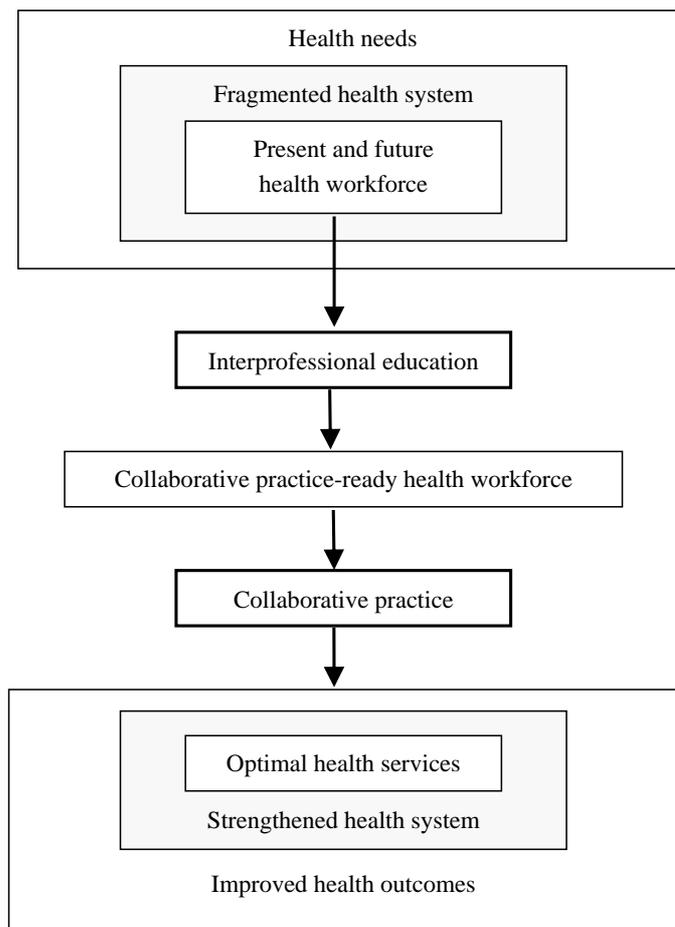
- Recognise, describe and respect roles, responsibilities and competence of both one's own profession and other professions in relation to each other.
- Work in teams to assess, plan, provide and review care, but also review services, improve standards, solve problems and resolve conflicts.
- Enter into interdependent relationships and learn from other professions, accept differences, and also tolerate misunderstandings or other shortcomings.

In achieving collaborative competences, the different professionals in health care will be prepared to deliver care of high quality in different health care systems.

Collaborative practice occurs when multiple health workers from different professions use their collaborative competences and put their interprofessional knowledge into action to provide comprehensive services to patients, carers and communities (WHO 2010). See Figure 1.

According to the WHO (2010), there is evidence showing that collaborative practice among other things can improve patient care and safety, decrease patient complications, clinical errors and mortality rates, and also reduce the cost of care.

Figure 1. Interprofessional education will prepare a collaborative practice-ready health workforce, delivering optimal health services through collaborative practice in a strengthened health system, thus improving health outcomes (Derived from WHO, 2010).



INTERPROFESSIONAL TRAINING WARDS

An Interprofessional training ward is a clinical ward at a hospital, at a rehabilitation centre, at a nursing home or at some other care institution, where real patients are being treated and the care is delivered primarily by students from different professions. The students work in teams and they are supervised by facilitators, who are professionals from the same professions.

In this thesis I will use the expression *Interprofessional training ward*, which I believe was introduced by Fallsberg and Wijma (1999), and Freeth and Reeves (1999). Other authors have used comparable expressions describing the similar concept. We used the expression “clinical education ward” (Ponzer et al, 2004), which was introduced earlier by Mogensen et al (2002), who also defined a “clinical training ward” as a ward without patients where students can learn and practise manual skills and communication. In the first report from the first IPTW in Linköping, it was called “student ward” (Wahlström et al, 1996), later the same authors introduced the term “multiprofessional training ward”, but both “educational ward” and “teaching ward” were also used (Wahlström et al, 1997). Freeth et al (2001) also used the expression “student ward” and Wood (2004) called it “clinical experience ward”. In the *Framework for Action on Interprofessional Education & Collaborative Practice* the term “interprofessional student training ward” is used (WHO, 2010). In Denmark, an 8-bed part of an ordinary 30-bed ward was used as IPTW, and this was described as an “interprofessional training unit” (Jacobsen et al, 2009). A setting with interprofessional students on an ordinary ward in UK was called an “educational teaching ward” (Wakefield et al, 2006).

The Interprofessional Training Ward in Linköping

Background

When the Medical Faculty at Linköping College of Higher Learning started in 1970, it was organized as a sub-unit to the Medical Faculty at Uppsala University. The medical students spent the first two years in Uppsala, mainly with theoretical studies. During the educational reforms in Sweden in the 1970s, the College of Higher Learning in Linköping became Linköping University and had the opportunity to start their own health care educations. There was a need for the Medical Faculty at Linköping University to develop a new curriculum when the connection to Uppsala University was lost.

With impressions from other innovative medical universities, especially McMaster medical school in Canada, and from the Association for Medical Education in Europe

(AMEE), the Faculty of Health Sciences (FHS) at Linköping University was founded in 1986, collecting six health care educations, i.e. medicine, medical laboratory technology, nursing, occupational therapy, physiotherapy and social welfare. In the new curricula the teaching and learning principles were based on problem based learning (PBL) and IPE (Areskog, 2009).

Implementing the Interprofessional Training Ward

In order for the students to exchange knowledge about each other's competence, professional roles and work tasks, a course element called "teamwork – professional role" was implemented in the curricula at the FHS and tested for two years. During this course element, students from various educational programmes worked together during their clinical rotations. The positive experiences from this test period led to the idea of starting a specially designated ward where the students could work together as professionals, but with competent supervision. The planning and implementation of the training ward was made as a collaborative project between the FHS and the University Hospital of Linköping (Wahlström et al, 1996).

Students from medical laboratory technology, medicine, nursing, occupational therapy, physiotherapy and social welfare were included in the project. An orthopaedic ward was chosen and patients with hip fractures and other forms of illnesses in need of rehabilitation were admitted. These patients often suffer from other diseases, such as heart failure, chronic obstructive lung disease, diabetes or dementia, and they require a complete care team to receive adequate rehabilitation. The student team represented all professions needed to cover medical, rehabilitational and social aspects of the care (Wahlström et al, 1997). These multiproblem patients often presented a complex pathology, but the students dealt with both the medical problems and the rehabilitation in an excellent way (Wahlström and Sandén, 1998).

It was considered important that the permanent staff members at the ward were good supervisors, since the students should take the primary responsibility for the care. Staff members who were interested in teaching and supervising were selected for facilitators. A senior lecturer at the Faculty of Health Sciences was responsible for pedagogical supervision and was a resource person for the facilitators (Wahlström et al, 1997).

The evaluation after the first year focused on the students' attitudes towards the goals of the two-week IPE course at the IPTW. A three-part questionnaire was used and the students answered the questionnaires before, halfway through and after the training at the ward. In the pre-test, the students' expectations were high, and the post-test showed that their expectations were satisfied, the nursing students showed the most

positive attitudes towards the goals. The rating of the understanding of the skills of other professions showed a significant increase after the course. A possible goal conflict between teamwork and practising one's own professional role was identified, especially among medical laboratory technology students but also among medical students and students from community care supervision (Fallsberg and Wijma, 1999).

The Interprofessional Training Wards in Stockholm

Background

A collaborative project between Stockholm County Council and Karolinska Institutet, including the four university hospitals affiliated with KI, was started in 1998 under the motto "Learning together to be able to work together". At each hospital, centres of clinical education were started. At each hospital a clinical skills centre was set up, and at three of the hospitals interprofessional training wards were opened (Mogensen et al, 2002). At the fourth hospital, a "Students' Emergency Department" was set up, where the student teams met orthopaedic emergency cases.

Implementing the interprofessional training wards

At Karolinska Institutet interprofessional training wards were set up at three university hospitals with the training ward in Linköping as a model. The hospitals were Danderyds sjukhus, Huddinge sjukhus and Södersjukhuset. Small orthopaedic wards with 6 or 8 beds were chosen. The course was designed for medical, nursing, occupational therapy and physiotherapy students. For the medical students the training at the ward was scheduled during their eighth term, when they also had the course in orthopaedics. For all the other students the training at the ward was scheduled during their sixth and last term.

The total time for the educational programmes could not be increased. The educational departments involved had to reschedule their particular courses to make place for the two-week IPE course at the training ward. For medical students, the 8-week rotation in general surgery and the 4-week rotation in orthopaedics were reduced by one week each. For nursing and occupational therapy students, a longer clinical rotation period was split into two parts. The physiotherapy students had several weeks reserved time for project work and the training ward course was scheduled during this time.

The optimal composition of a student team was thought to be 3 nursing students and 1 medical, physiotherapy and occupational therapy student each. Due to numbers of students available the teams came to consist of 3 nursing students, 1 or 2 medical students, 1 physiotherapy student and 1 or none occupational therapy student.

The students in the teams met for the first time during a 2-hour introduction they received a few days before the course started. The teams practised at the ward by a three-day rotation schedule: afternoon shift the first day followed by a day shift the second day and the third day free, during both weekdays and weekends, as well as public holidays.

The patients admitted to the training wards at two of the hospitals suffered from both acute and elective orthopaedic conditions, for example ankle fractures or hip replacements. At the third hospital the ward was specialized in elective surgery of degenerative joint disease. Patients with a failing cognitive function or patients with serious medical conditions were not admitted since all patients were to be treated on an informed consent basis and no medical risks were to be taken.

Facilitators and pedagogical strategy

The facilitators at the ward were 5 or 6 nurses, 1 orthopaedic surgeon, 1 occupational therapist and 1 physiotherapist. The nurses worked full-time at the ward, with the same schedule as the students. The orthopaedic surgeon worked during office hours but also had to attend to surgery and out-patients mainly during afternoons. The occupational therapist and the physiotherapist worked half-time at the training ward and held half-time positions at other wards. All facilitators were present during the morning rounds but during the afternoon the nurse facilitator supervised all students. The night shifts were manned by qualified staff.

It was considered important that the facilitators did not see themselves as teachers in the meaning of transferring knowledge to the students, but rather make the students learn by facilitating the process (Oandasan and Reeves, 2005).

It was also considered important that the facilitators adopted a common pedagogical method and that the methodology was continuously discussed and revised in order to develop a sustainable structure for facilitation accepted by both facilitators and students. Senior lecturers at the hospitals and lecturers from the educational departments involved gave regular pedagogical support to the facilitators, both during weekly meetings and during seminars before the beginning of each term. In the evaluation we found strong support that the quality of supervision was very important for student satisfaction (Study I: Ponzer et al, 2004). Later systematic evaluations of

IPE have also shown that development in facilitation is essential (Hammick et al, 2007).

The pedagogical strategy had a collaborative student-activating approach. As described by Barr (2002), it was considered important to follow the principles of adult learning (Knowles, 1980), who described adult learners as autonomous and self directed, assuming responsibility for their own learning. Adult learners already possess experience and knowledge and need to connect and relate the new experience or knowledge to what they already know. They are goal-oriented, relevancy-oriented and practical.

The students had to plan the day's work together, they were actually forced to discuss and agree on what to be done, when to do it and who was responsible to complete the tasks. They had to solve questions and problems that arose by reflections, discussions and analysis in the teams, using each other's life experience, knowledge and skills, before they asked a facilitator. The students' independent problem-solving skills were supported by the facilitators as the latter did not provide answers but rather questions to define the problem and help the students find the solution themselves. Of course critical issues, e.g. patients with acute severe conditions, were dealt with promptly.

During the first days of the course, the teams received more support from the facilitators but after a few days the teams managed the planning and patient care almost by themselves.

As a part of the pedagogical strategy, there was a 30-minute tutored reflective session at the end of each day-shift. During this reflection the students discussed and evaluated both the teamwork and the care, specific situations or critical events could be debriefed and the students gave feedback to each other about the day's work.

Other interprofessional training wards in Sweden

In Linköping there are now two interprofessional training wards, the orthopaedic ward which has been running since 1996 and an IPTW in geriatric care was opened in 2006. In close connection with the Faculty of Health Sciences at Linköping University, an IPTW in orthopaedic care was also opened in Norrköping in 2001 (Linköping University, 2009).

At Karolinska Institutet in Stockholm there are the three IPTWs in orthopaedic care, which opened in 1998 and are described in this thesis.

An IPTW in geriatric care and rehabilitation opened in 2001 at Sahlgrenska University Hospital in Göteborg. At the ward there are students from the dietician,

medical, nursing OT and PT programmes (Sahlgrenska Universitetssjukhuset, 2003, 2010).

In 2002 an IPTW was opened at the University Hospital in Lund. The ward is an orthopaedic ward and the students are from the medical, nursing, OT and PT programmes (Ortopediska Kliniken Lund, 2002).

An IPTW in a nursing home was opened in 2003 in Örebro and here social worker students, nursing students and OT students were practising together. Later, the social worker students have been replaced by student audiologists (Örebro University, 2010).

In Östersund an IPTW in orthopaedic rehabilitation for medical, nursing, OT, PT and nursing assistant students was opened in 2003, affiliated to Mid Sweden University and Umeå University (Olsson et al, 2006).

In Malmö, an IPTW in short-time care in internal medicine was opened in 2005. The students are from the medical, nursing, OT and PT programmes (Thomé, 2006).

At the hospitals in Karlskrona and Karlshamn there are several wards with IPTW-profile; 3 in internal medicine, 2 in surgery, 1 orthopaedic, 1 in gynaecology and 1 rehabilitation wards. The hospitals are affiliated to Linnæus University Kalmar Växjö, school of health sciences at Blekinge Institute of Technology and Kristianstad University College. At least six students from nursing, nursing assistant and biomedical science programmes have clinical placements on one ward at a time (Landstinget Blekinge, 2010).

In 2009 an IPTW was opened at the hospital in Enköping, also an orthopaedic ward with nine beds. The students are from the medical, nursing, OT and PT programmes (Lasarettet i Enköping, 2010).

OBJECTIVES FOR THE IPE COURSE AT THE IPTW

General Goals

During the project “Learning together to be able to work together” a multidisciplinary team consisting of teachers from the four educational programmes involved discussed and agreed on the general goals for all students attending the IPE courses at the IPTWs at the three hospitals. The general goals were as follows:

- Provide the patient independently, but under supervision, with good medical care, nursing care and rehabilitation.
- Develop one's own professional role.
- Enhance the level of understanding of the other professions.
- Stress the importance of good communication for teamwork and for patient care.
- Enhance understanding of the role of the patient ("patient as a partner").
- Become more aware of ethical aspects of health care.

Profession-specific goals

The profession-specific goals were specified by lecturers from each profession.

Profession-specific goals for medical students

- Practise and deepen one's own professional role under supervision by a consultant.
- Independently take a history, examine the patient, make a diagnosis and suggest investigations and treatments. Practise routine work regarding admissions, discharges, prescriptions, clinical chemistry and x-ray results, rounds, documentation, referrals etc.
- Together with the patient and his or her carers discuss medical treatment, i.e. develop the doctor – patient relation.
- Lead the medical treatment in cooperation with the health care team.
- Acquire deeper knowledge about the patient's needs for nursing care, physiotherapy and occupational therapy and understand areas of knowledge in the other professions.
- From the perspective of one's own professional role contribute to ethical considerations and with respect and consideration for the others in the health care team collaborate, identify and perform measures regarding the patient's need for medical treatment.
- If the time allows, follow the patients outside the IPTW and participate in operations or visit the outpatients' clinic.

Profession-specific goals for nursing students

- Plan, carry out, evaluate and document nursing care together with the patient.
- Lead health care teams and independently prioritize and distribute care tasks and also give medication and provide other treatments.
- Together with the patient and his or her carers plan, carry out and evaluate the instruction required to satisfy the patient's need of knowledge, information and health care guidance.
- From the perspective of one's own professional role contribute to ethical considerations and with respect and consideration for the others in the health care team collaborate, identify and perform measures regarding the patient's need for nursing care.
- Acquire deeper knowledge about the patient's needs for medical care, physiotherapy and occupational therapy and understand areas of knowledge in the other professions.

Profession-specific goals for occupational therapy students

- Independently investigate and assess the need for occupational therapy regarding personal care, living environment, work time and recreation time.
- Together with the patient and his or her carers find goals and treatments, evaluate and document the result.
- Practise and deepen one's own professional role in collaboration with the health care team in order to develop an understanding for the other professions' importance for the situation of the patient.
- From the perspective of one's own professional role contribute to ethical considerations and with respect and consideration for the others in the health care team collaborate, identify and perform measures regarding the patient's need for occupational therapy.

Profession-specific goals for physiotherapy students

- Acquire deeper knowledge about the patient's needs for medical care, physiotherapy and occupational therapy and understand areas of knowledge in the other professions.
- Independently assess the need for physiotherapy and together with the patient find goals and treatments, evaluate and document the result of the physiotherapy process.
- To review and reflect upon the professional competence of the physiotherapist, consisting of theoretical knowledge, skills and attitudes.
- From the perspective of one's own professional role contribute to ethical considerations and with respect and consideration for the others in the health care team collaborate, identify and perform measures regarding the patient's need for physiotherapy.

METHODOLOGICAL CONSIDERATIONS

In this thesis, four methodological approaches were used; Study I is a post-intervention survey and Study II is a long-term follow up study, both of them are retrospective studies. Study III has a before-and-after approach, thus being prospective, and Study IV is a prospective, randomized and controlled intervention study.

Questionnaires

For data collection questionnaires were used in all four studies, together with observations in Study IV. The questionnaire developed for Study I was used in all studies, with minor changes. The questionnaires are presented in Appendix 1.

In the questionnaires used in the four studies, the students were asked to rate their opinions on 9-point rating scales with opposite words at either end. Such scales are by definition *Semantic Differential* scales (Osgood et al, 1957), but commonly referred to as *Likert scales*, named after Rensis Likert, who presented a technique to measure attitudes by using 5-point scales in 1932 (Likert, 1932). I have chosen to call the

scales in the questionnaires Likert scales, since this term is commonly accepted also for the semantic differential scale.

In the first study, the questionnaire was distributed after the course at the IPTW, collecting the students' opinions after the course. Some questions asked retrospectively for opinions before the course. Retrospective accounts of perceptions could at least partially depend on inferences and reconstructions and it has been shown that people sometimes undermine their past capabilities in order to make them fit in with their own ideas about their possible personal change (Richardson, 2000; Ross 1989).

During one term the questionnaire was revised into a two-part questionnaire and the students at one of the hospitals received the two questionnaires, one before the course and the other one after the course. The students at the other hospitals served as control group, receiving the original questionnaire. As a matter of fact, there was a very low response rate at one of the control group hospitals, making this evaluation actually a comparison between two hospitals. When comparing the retrospective reports to the prospective pre/post-test condition the significant differences were that the students who completed the questions prospectively were more positive towards the IPTW and that their increase in attitude towards the IPTW concept was lower than the others.

This indicates that the students rating their attitudes retrospectively tended to give a lower rating. On the other hand, their mean rating after the course was also lower and this could be due to differences between the hospitals involved. We could not determine if these differences depended on the method or if there actually was a difference between the two hospitals. The conclusion was that the typical bias reported in the literature concerning retrospective memory was not a severe problem in the study.

One of the questions in the questionnaire asked for knowledge about the other professions. The students were asked to rate their knowledge on a nine-point Likert scale ranging from 1 (None) to 9 (Very much). In Study I, there was noted an increase in rating, but to further explore this, the questionnaire for the first term during Study III was altered and a different question constructed. During this term the students were given descriptions of 20 tasks and they should connect each task with one of the four professions present at the IPTW. They received this question both before and after the two-week course and the result showed an increase in the number of correct connections. When comparing this to the result of the other two terms during Study III, when the students rated their knowledge on the Likert scale, we could see that the knowledge about occupational therapy was better when the task-connecting method was used, but there was no difference regarding the other professions, and no

difference for any profession regarding the increase in knowledge. Our conclusion was that it is possible to use the Likert scale rating for this type of question.

Statistical considerations

Likert ratings should be considered as ordinal data, since there is an order in the ratings, i.e. a rating of 7 is better than a rating of 6. Numbers are used because it is convenient, but the numbers can be replaced by letters or figures. In a rating with letters, e.g. A-B-C-D-E, or figures it is obvious that a sum or a mean value can not be calculated, nor standard deviation or variance, hence a presentation of the median value and quartiles is the best way to describe a central tendency (Svensson, 2001). A widespread test for comparison of groups, Student's t-test, is not adequate to use. But, as a matter of fact, Student's t-test and other statistical methods only applicable to interval data are frequently used with Likert scale data and this is commonly accepted by peer-reviewed journals.

There has been (and still is) a debate about how to analyse Likert-type data. Jamieson (2004) strongly argues for non-parametric tests, while Pell (2005) replies that it is acceptable to use parametric tests if the data is of appropriate size and shape. Carifio and Perla (2008) refers to several studies showing that Likert *scales*, i.e. a collection of Likert *items*, produce interval data and that it is appropriate to use parametric tests.

In Study I, we used parametric tests with the motivation that the number of students was high and there were 9-point scales, which makes the data more interval-like than the commonly used 4-point or 5-point scales (Knapp, 1990). Data was presented as mean values and standard deviation. Later, the data was also re-analysed using non-parametric tests and there were no differences in the result.

In Study II, non-parametric tests were used for the Likert items. Data was presented as median value and interquartile range.

Also in Study III and Study IV, non-parametric tests were used. The CLKQ and RIPLS Likert scales (sums of Likert items) were treated as ordinal data. After a discussion among the authors, data was presented as mean values, since mean values are more common and probably easier to understand for the reader.

Content analysis

In Study II and Study IV answers to open-ended questions were analysed by content analysis, a method for identifying core consistencies and meanings in a text (Patton,

2002). A detailed method for content analysis in seven steps was described by Dahlgren and Fallsberg (1991), and this method was used in the studies. In short the method includes *familiarization* with the text by reading carefully to get acquainted with the text in detail. By *condensation* significant and informative text fragments are selected to represent longer texts or paragraphs. The next step is to *compare* the text fragments to find sources of variation or agreement and answers which appear to be similar are grouped together in the *grouping* process. Each group contains text with similarities and by *articulation* the essence of similarity within the groups is described. The grouping and articulation processes may need to be revised several times. When the grouping and articulation is assessed as satisfactory the groups or categories are *labelled* with suitable words to characterize the content of the groups and also to separate them. Finally, by *contrasting* the obtained categories are compared with regard to similarities and differences. Also labelling and contrasting may need to be revised before the content analysis is completed.

In the studies, the open-ended responses were blinded, meaning that the information about educational programme or study group was not known to the analysts. The text was read repeatedly to develop a feeling for, and overall picture of the content, and to identify recurring themes in the text. A few minor registration errors were also identified and corrected during this phase. The data was then read repeatedly, sentence by sentence, to separate text units which were coded by content and divided into theme groups based on this coding. The text units were then compared, grouped together and articulated by a suitable expression, followed by a categorization of the groups of similar expressions, comprehensively labelled. Often the most significant responses in each category were chosen as labels to represent that category. The categories were sorted and the groups of responses checked for correct labelling. Some were then re-labelled, divided or moved to another category and thus the final categories were found. During the grouping and categorization process, all groups were continuously compared and contrasted to find both similarities and differences in order to make the final categories as representative as possible.

Observations

In Study IV, the 8 facilitators at the ward observed the teams during their teamwork. They were asked to observe the communication and the decision-making process in the teams. After the study period a questionnaire with open-ended questions regarding quality in team-collaboration was completed by all facilitators. The information about the groups (i.e. which group was a control group or an intervention group) was not possible to keep secret, thus this part of the study was not blinded.

Approaches to learning

The Conceptions of Learning and Knowledge Questionnaire (CLKQ) is a questionnaire developed to assess students' approaches to learning (Lonka et al, 2001, 2004, 2008). The questionnaire consists of 19 questions and for each item the students rate themselves on a 6-point Likert scale ranging from "I fully disagree" (1) to "I fully agree" (6). The results are presented as mean values of the three sub-scales which are characterized as follows:

- "Certain knowledge" (CK): Students with an externally regulated conception to learning. The main conception of these students is to learn definite knowledge from textbooks or taught by a teacher. This component indicates that the students emphasize the teacher's role in, and control of, the learning process. Students who ask which pieces of knowledge are to be mastered and need an unambiguous and exact view of the items being studied reach high scores. They agree with "the teacher has to explain in detail what is essential to know" and "the teacher's task is to teach and my task is to learn".
- "Collaborative-Constructivist" (CC): Students with a collaborative conception to learning, based on shared construction of explanations. The main conception of these students is to build knowledge together with others, teachers as well as other students. Students with high points on this component want to cooperate with other students and they find teamwork useful. They agree with statements such as "other student's comments are useful for my own learning" or "it is essential to discuss issues being studied together with teacher and students", and they disagree with "group work is waste of time".
- "Practical value" (PV): Students with an application-directed conception to learning. These students have a pragmatic orientation; they emphasize importance of directly applicable knowledge, immediately useful in practical and concrete situations. Examples of statements they agree with are "it is important that issues being studied are practically useful" and "it is essential that my studies provide information that I can apply in my future profession".

Readiness for interprofessional learning

The Readiness for Interprofessional Learning Scale (RIPLS) was developed to assess the readiness of health care students for interprofessional learning (Parsell and Bligh, 1999). The questionnaire is composed of 19 items, each answered on a 5-point Likert scale, and the result is presented as mean values of three sub-scales:

- “Team-working and collaboration” (TC): Students who share a strong belief that shared learning is beneficial in many ways. They believe in effective team working and the need to share knowledge and skills with other students.
- “Professional identity” (PI): Students with a strong conviction that a profession should be learned together with students and professionals representing the same profession, and thereby strengthen the professional identity and the power of professional cultures.
- “Roles and responsibilities” (RR): Students who believe that different professions should keep to their own tasks and responsibilities, including that one profession should be subservient to another.

AIMS AND OBJECTIVES

STUDY I

The aim of Study I was to describe the context of interprofessional training on interprofessional training wards and to report students' perceptions of this type of interprofessional and professional training.

STUDY II

The aim of Study II was to examine former students' impressions of the interprofessional course they had passed as undergraduate students and its relationship to their current healthcare experiences including their use of the interprofessional skills they had subsequently learned in practice.

STUDY III

The aims of Study III were firstly to categorize the students' learning approaches and secondly, to relate these to their professions, gender, attitudes towards the course and the course goals, understanding of their own professional role, knowledge of the other professions and their satisfaction with the supervision.

The hypothesis was that since during a mandatory interprofessional clinical course the students are "forced" to cooperate within teams and take responsibility for patient care as well as for their own learning, students with a less cooperative approach might be less satisfied with the course, and students who prefer a more collaborative learning approach will be more satisfied.

STUDY IV

The aim Study IV was to investigate if a one day team-building training preceding the 2-week course at the IPTW improves the outcome of the course in terms of team-collaboration and reaching the goals of the course.

The hypothesis was that the team-building training will improve the students' collaboration and learning.

OVERVIEW OF THE THESIS

ETHICAL CONSIDERATIONS

The studies were considered as evaluations of education and did not affect patients, thus no ethical problems regarding patients were identified. The IPTW already existed and ethical considerations regarding patients on a student ward were already made during the implementation of the IPTW.

For all studies, ethical considerations regarding students were made. We discussed if the questionnaires we wanted the students to complete were too extensive, or if we would violate the students' integrity by classifying their approaches to learning or asking for their opinions.

For Study IV, the ethical considerations were if it was acceptable that not all students received the team building training since the control group would not get this additional education. The students in the intervention group had a one day shorter course at the IPTW since the team building training was performed during the first day of the course. Some moments during the team building training, e.g. the personal presentation or the practical problem solving task, may be seen as troublesome or embarrassing by some students.

However, we regarded the questions as fairly non-violating and since completion was voluntary and anonymous the intrusion in the students' private life was not bigger than during any other course evaluation. Over 1000 medical students who had earlier participated in courses in professional development and leadership, also with personal presentation and other similar tasks, had not complained. We did not consider the team building training more difficult in any respect. Students have always spent time getting to know each other, and by doing so in a structured manner would probably let them work more efficiently on the ward and in practice not lose any time.

All studies were reviewed and approved by the Local Ethical Committee at Karolinska University Hospital, Huddinge.

SUMMARY

This thesis is built on four studies, evaluating students who have participated in IPE on interprofessional training wards in Stockholm, Sweden. In Table 1 a summary of the framework for each study is presented.

Table 1. Summary of the studies. Outcome level of IPE from Hammick et al (2007), see Figure 5, page 54.

	Study I	Study II	Study III	Study IV
No of students eligible	1233	633	369	256
No of students included	962 ^a	348	283 ^a	253
Response rate	78 %	55 %	77 %	99 %
Type of study	Descriptive Retrospective	Descriptive Retrospective	Descriptive Prospective	Interventional Randomized Controlled Prospective
Type of data	Quantitative	Qualitative Quantitative	Quantitative	Qualitative Quantitative
Data collection	Questionnaire: after	Questionnaire: 2 years after	Questionnaire: before and after	Questionnaire: before and after, Observations
Data analysis	Anova, t-test, Wilcoxon signed rank test, Spearman's correlation	Content analysis, Kruskal-Wallis, Mann-Whitney U	Cluster analysis, Cronbach's alpha, Kruskal-Wallis, Mann-Whitney U, Sign test	Content analysis, Kruskal-Wallis, Mann-Whitney U
Outcome level	2b	3	3	2b

a) Study I and III was overlapping in time. 117 students are included in both studies.

STUDY I

Participants

In this study, all 1233 students attending the IPE courses at the IPTWs during the years 2000 and 2001 at three university hospitals in Stockholm were asked to complete a questionnaire evaluating the courses. Completion was voluntary and anonymous. A total of 962 students returned the questionnaire, thus a response rate of 78 %. Distributions between the different educations are presented in Table 2.

Table 2. Distribution of students included in Study I.

	Number of students included
Medical students	210
Nursing students	470
OT students	98
PT students	184

Methods

Questionnaire

The questionnaire was developed by the senior lecturers from the 4 educational departments involved and by an educator with substantial experience in evaluating educational programmes. The first versions of the questionnaire were discussed with other teachers and minor changes were made. The questionnaire consisted of 3 sections focusing firstly on the students' perceptions regarding the specific goals for the clinical training at the IPTW, secondly, on the students' attitudes towards interprofessional training at the IPTW, and thirdly, on their satisfaction with the course. Each question was answered using a nine-point Likert scale, where 1 indicated the most negative and 9 indicated the most positive alternatives. The questionnaire also included some open-ended questions that were not used in the study.

The students completed the questionnaires during their last day on the IPTW. The first section of the questionnaire focusing on the IPTW goals asked each student to rate the extent to which his or her team, acting independently, had provided the patients with good medical care, nursing and rehabilitation. In some of the questions the students were asked for their ratings both before and after the course. These questions were how they had experienced their professional role, how they rated their knowledge of the other professions and their understanding of the importance of good communication for teamwork and patient care. Also, they were asked to rate their understanding of the role of the patient, as well as their understanding of the ethical issues pertaining to their professional life, before and after the course.

The second section asked for their attitudes towards the IPTW concept (“What was your attitude towards the IPTW before and after the course?”). In the third section the students were also asked to rate how satisfied they were with the overall team supervision and with their profession-specific supervision.

Statistical analyses

In Study I, the Likert scale data was treated as interval data. Thus, the data is presented as means, standard deviations and 95% confidence intervals. Student’s t-test and ANOVA were used for independent groups. For comparison of differences between “before” and “after”, the paired sample t-test and Wilcoxon signed ranks test were used. Spearman’s correlation coefficient was used to test correlations. All tests were 2-sided. The results were considered significant at $p < 0.05$.

There was a discussion about using parametric or non-parametric tests. Arguments for using parametric tests were that the number of included students was high and that the scales were nine-point scales. Also, the expert in evaluation who was connected to the project proposed the use of parametric tests.

Later, all analyses have been recalculated using non-parametric tests and there were no differences in the results.

Results

Most students perceived their professional roles more clearly. The mean rating before the course was 6.5 and after the course it was 7.8. As a matter of fact, 281 students did not differ and 37 students actually rated their perception of their professional roles lower after the course than before. In IPE, the students are intended to both share and

learn knowledge and competences within the team. In this study, there were 13 (6.3 %) medical students, 10 (2.2 %) nursing students, 3 (3.2 %) OT students and 11 (6.1 %) PT students rating their perception of their professional roles as less clear after the course. Among the 281 students with no difference, 91 rated their perception of their professional role 9 and 98 rated it 8 already before the course.

The understanding of importance of good communication for teamwork and for patient care, and the understanding of the patient as a resource in health care and of ethical aspects were all rated high (6.9 – 7.3) before the course and the ratings after the course had increased (7.6 – 8.4). There were some differences between the students from different educational programmes, almost always involving the medical students, who scored lowest. The largest significant differences regarded “understanding of the patient as a resource in health care” after the course, where the medical students rated 6.7 compared to the nursing students 7.8, the OT students 8.1 and the PT students 7.7.

The attitudes towards the IPTW concept were rated 5.1 – 6.3 before and 7.2 – 7.9 after the course. The PT students’ ratings were the lowest before the course (5.1) and together with the medical students also the lowest after the course (7.2). The nursing students rated this item highest before the course (6.3) and after the course the OT students’ ratings were the highest (7.9) closely followed by the nursing students (7.8).

When analyzing attitudes in relation to gender there were significant differences found only in the OT student group. The male OT students scored significantly lower (5.0, n=6) than the female OT students (6.4, n = 89) regarding perception of professional role before the course and regarding attitudes towards the IPTW concept after the course (males: 6.2, n=6; females: 8.1, n=89).

After the course the students rated the team supervision and the profession-specific supervision. The team supervision was rated 7.3 and there were no significant differences between the educational programmes. The profession-specific supervision was rated 6.9 by the medical students, 7.2 by the PT students, 7.6 by the nursing students and 8.0 by the OT students. There were significant differences between medical students and nursing students and between medical students and OT students, and also between PT students and OT students.

The students also rated their knowledge about the other professions both before and after the course. The knowledge about other professions before the course were rated 4.6 – 6.7, knowledge regarding occupational therapy scoring the lowest and knowledge regarding medical care and nursing care scoring the highest. After the course these ratings had increased to 6.4 – 7.9, knowledge about occupational therapy scoring the lowest and knowledge about nursing care scoring the highest.

Table 3. Students' ratings of professional roles, patient care and attitudes towards IPE before (retrospectively) and after the IPTW course. All differences between "before" and "after" are significant ($p < 0.001$).

Variable	n	Retrospective rating "before" the course (mean value)	Rating after the course (mean value)
Perception of professional role (1: unclear – 9: clear)	935	6.5	7.8
Understanding of importance of good communication for teamwork (1: very little – 9: very much)	825	7.0	8.4
Understanding of importance of good communication for patient care (1: very little – 9: very much)	825	7.4	8.4
Understanding of the patient as a resource in health care (1: very little – 9: very much)	779	6.9	7.6
Understanding of ethical aspects in health care (1: very little – 9: very much)	814	7.3	7.8
Attitudes towards the IPTW concept (1: negative – 9: positive)	935	6.0	7.6
- medical students	205	5.9	7.2
- nursing students	456	6.3	7.8
- OT students	93	6.1	7.9
- PT students	181	5.1	7.2

STUDY II

Participants

All 633 students who participated in the IPE course at the three IPTWs in Stockholm during the academic year 1998-1999 were invited in 2001 to participate in the study and received a questionnaire by mail. Completion was voluntary and anonymous. Totally 348 completed questionnaires were returned, thus a response rate of 55 %. Distributions between the different educations are presented in Table 4. The median duration of working time after graduation was 18 months for all students. Since the medical students' education is longer, their median duration of working time after graduation was 4 months, while it was 21 months for the other student categories. Of the 348 former students, 24 (7 %) had not been working in health care by the time they answered the questionnaire.

Table 4. Distribution of students included in Study II.

	Number of students included
Medical students	99
Nursing students	148
OT students	28
PT students	73

Methods

Questionnaire

The questionnaire consisted of two sections. The first section focused on the respondents' impressions of the interprofessional course they passed about two years ago and its relation to their current healthcare experiences. They were also asked about their satisfaction with the course, i.e. "What is your overall opinion of the course?" These questions were answered using a nine-point Likert scale where 1 indicated "no/disagree" and 9 "yes/agree".

The second section included questions regarding their lasting impressions. The first question “Do you have any lasting impressions of the interprofessional course on the training ward” was answered by choosing one of three alternatives: “yes, many”, “yes, some” or “no, almost none”. In addition to this question they were asked to describe both positive and negative impressions by their own words.

In the second question they were asked for their opinion on whether the course should become a regular part of the educational programme at Karolinska Institutet: “Would you recommend that the course on the training ward remains unchanged, remains but should be changed or should be closed down?”, and in addition to this question they were asked for suggestions for changes.

Finally, in the third question, they were asked if they encouraged collaboration in their present occupation and the answering alternatives were “not at all”, “not much”, “to some extent” and “yes, definitively”.

Statistical analysis

The Likert scale data in Study II were considered as ordinal data, hence the results are presented as median values with interquartile ranges. For comparison of results between groups, the Kruskal-Wallis test and the Mann-Whitney U test were used. The results were considered significant at $p < 0.05$.

Results

The question “Do you have any lasting impressions of the interprofessional course on the training ward?” was answered by 344 (99 %) former students of whom 157 (46 %) had many and 162 (47 %) had some lasting impressions, whilst 25 (7 %) responded that they had no lasting impressions of the course.

As positive impressions the former students mentioned independence and responsibility as concepts unique to the IPTW. Also that their self-confidence grew thanks to the collaborative learning methods and the good facilitation. On the other hand, negative lasting impressions were bad supervision, especially noted among physicians, OTs and PTs, the professions that did not have profession-specific supervisor all the time, and that there was too much nurse assistant’s work (Figure 2).

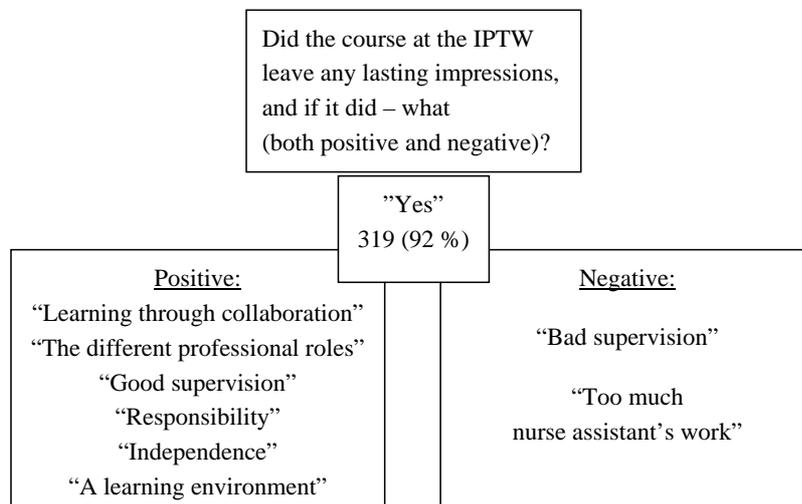


Figure 2. Positive and negative impressions from the IPTW.

The question "Do you now encourage collaboration in your present occupation?" was answered by 346 (99 %) persons and 92 % of them did encourage collaboration in their present work whilst 9 (3 %) responded that they did not and another 18 (5 %) responded "no, not much". The main reasons for not encouraging collaboration were lack of time, which was mentioned by 6 respondents, organizational issues or unbreakable patterns in their current workplaces. Out of the 27 former students answering "no" or "no, not much" 10 were not working in health care (Figure 3).

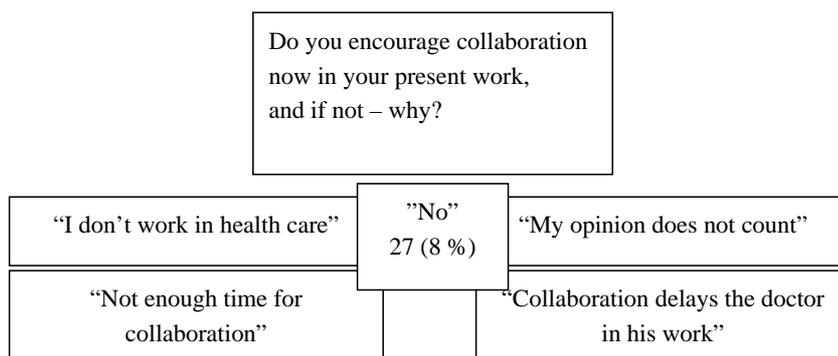


Figure 3. Reasons for not encouraging collaboration.

The results from the two-year follow up study were also used when the decision to make the interprofessional training wards permanent were taken. In the study there was a specific question regarding the former students' opinion about keeping the IPTWs. Recommendation that the course at the IPTW should remain was made by 314 (90 %) of the respondents. Of these 129 (41 %) thought that the course should be kept unchanged and 185 (59 %) that it should be changed in some way. Twenty-one students (6 %) said that the course should be closed down. There were 17 physicians, two nurses and two physiotherapists who suggested the course should cease (Figure 4).

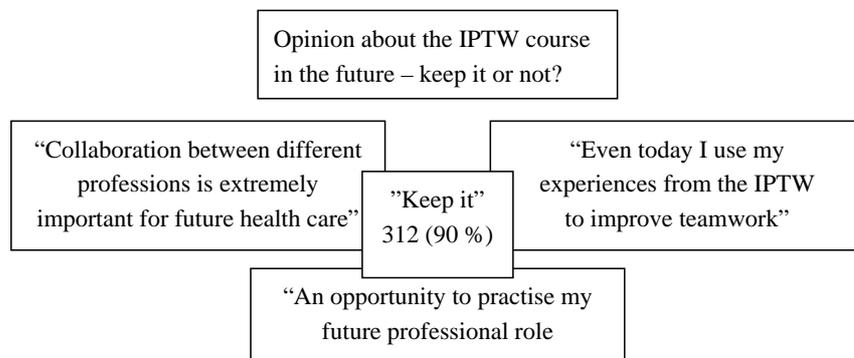


Figure 4. Major reasons for keeping the course at the IPTW.

The qualitative analysis of the open-ended questions regarding the former students' lasting impressions of the interprofessional course at the training ward and their opinion how the course should be developed resulted in five categories describing their perceptions: Professional role development, Working in teams, Tutoring, Patient care, and Future aspects of the course and real world practice.

The positive aspects of *Professional role development* suggested that both one's own professional role and the understanding of others' professional roles were strengthened and that the course on the IPTW contributed to development of independence and self-responsibility. On the other hand, difficulties in developing the professional role and professional identity, together with too few profession-specific tasks, as expressed particularly by the medical students, were considered negative. Learning about the other professions' vocational training, competence and duties was described as positive but realizing students' lack of knowledge about the other professions was disheartening. Exchange of experience was made possible on the training ward and this was described as being useful later in understanding the other's work and enhancing teamwork.

In the category *Working in teams* an increase in the understanding of the other different professions as well as one's own profession was believed to be due to teamwork. The atmosphere and the exchange of experience during the course were considered a breeding ground for future collaboration. Teamwork was described as the key to future development of healthcare work, and this was presented as a reason for making the course a regular part of the educational programme. However, sometimes the collaboration failed. Not all professions were present at all the course sessions, and the number of occupational therapy and physiotherapy students was not enough to admit OT and PT students in all teams. Some occupational therapists and nurses stated that the medical students were not interested in teamwork. Physiotherapists and physicians thought the course on the IPTW was more relevant to the needs of nursing students' than their own, that nursing students had the most natural tasks on the ward and that nurses were dominating the course. The medical students did not feel they could make use of their knowledge and competence, they were sometimes absent, and they had to attend other lectures too often. The atmosphere on the ward was good and the exchange of experience and knowledge was considered a breeding ground for future teamwork.

The *Tutoring*, both profession-specific and general, was described as positive. Yet some physicians, occupational therapists and physiotherapists were dissatisfied with the profession-specific tutoring. All four professions stated that facilitators could cooperate more between themselves and they could also provide more profession-specific tutoring and feedback for students.

Regarding *Patient care*, the close contact with the patients during basic nursing care was positive, as was the fact that all professions took an active part in the nursing care. Nurses and some of the physicians pointed out that it was valuable for everyone to perform basic tasks. However, some physicians and physiotherapists in particular, thought this work took up too much time on the course. They thought their professional role was diminished by basic nursing care.

Future aspects of the course and the real world practice included opinions about course development. Most respondents wanted the course to remain because it was so instructive. There was a general view that the course should be extended. Some physicians said that the course was placed too early in their educational programme whilst many of the others said it was placed too late.

The student scheduling was criticized by physicians, occupational therapists and physiotherapists who pointed out that working hours in real work do not correspond to the shift work during the course. The medical students sometimes had other mandatory learning commitments such as lectures, and this interfered with their attendance on the training ward.

Many of the physicians expressed a need for more profession-specific training and tutoring during the course and also suggestions of supplementary training, e.g. case discussions, group seminars or lectures on ethics and communication. Suggestions were also made that other professions, e.g. nursing assistants or welfare officers, should be included to complete the healthcare teams.

The ones that said that the IPTW should be closed down said that the course did not give them anything for their future profession, that they felt they were being used as unpaid labour, that the course goals were obvious, and that students did not take the course seriously.

STUDY III

Participants

In this study, all 369 students attending the IPTW course at Södersjukhuset, during the academic year 2001-2002 and the first half of the academic year 2002-2003, a total of three terms, participated. The participation was anonymous and voluntary, and all students agreed to participate. The data was collected by two questionnaires, distributed and completed before and after the course, respectively. There were some difficulties in pairing the questionnaires, why the final number of included students was 283, thus a response rate of 77 %. Student distribution is presented in Table 5.

Table 5. Distribution of students in Study III.

	Number of eligible students	Number of students included
Medical students	85	60
Nursing students	192	151
OT students	40	33
PT students	52	39

Methods

Questionnaires

During a formal introduction to the IPE course 3 days before the course started, the students were asked to fill in a questionnaire and on nine-point Likert scales rate their attitudes towards the IPE course and if they considered the goals for the IPE course realistic in relation to the length of the course, their understanding of their own professional role and their knowledge of the other professions. This part of the questionnaire was the same as was used in Study I. They were also asked to complete the Conceptions of Learning and Knowledge Questionnaire (CLKQ) that categorizes the student's approaches to learning as collaborative-constructivist approach ("Collaborative-Constructivist"), externally regulated dualistic approach ("Certain Knowledge") or practical application-directed approach ("Practical Value").

At the end of the course, the same questionnaire as before the course was used except that questions regarding the students' opinion about the supervision and their opinion about the care and rehabilitation they provided for the patients during the course were added (nine-point Likert scales). Thus, every student received questionnaires both before and after the course, and they were asked to put the same anonymous code on both questionnaires.

Out of the 738 questionnaires handed out, 652 were returned (88%) and 283 pairs of questionnaires could be identified (77%). For the additional 86 questionnaires (55 "before" and 31 "after") the corresponding questionnaire was missing or could not be identified.

Statistical analyses

The nine-point Likert scale data in Study III was considered as ordinal data. In the statistical analyses, non-parametric tests were used. For comparison of differences between groups the Kruskal-Wallis and Mann-Whitney tests were used, and for comparison between "before" and "after" the Sign test was used. All tests were two-sided. The central tendency was presented as mean value. After a discussion among the authors, we assumed that a mean value probably is easier to comprehend than a median value and interquartile range. The results were considered significant at $p < 0.05$. Bonferroni correction was used for multiple analyses.

The reliability of the CLKQ scales, measured as internal consistency (Cronbach's Alpha) was 0.63 for the Collaborative-Constructivist scale, 0.77 for the Certain Knowledge scale and 0.57 for the Practical Value scale.

The statistical software used was PASW Statistics 17.0 for Windows. For the cluster analysis, several clusters were constructed by using different parameters and clustering methods, and the method resulting in clusters with most diverse final cluster centres were chosen.

Results

The results of the CLKQ showed that the students in general preferred a collaborative-constructivist approach to learning. The occupational therapy students scored the highest on the Collaborative-Constructivist sub-scale, followed by the nursing students.

Female students had significantly higher ratings on the Collaborative-Constructivist approach, and for female medical students this difference was even more pronounced when compared to male medical students. Instead, the male medical students rated significantly higher on the Practical Value and Certain Knowledge sub-scales.

Through a cluster analysis three student clusters with different preferences regarding approaches to learning were identified and they were characterised as “Low Collaborative” group, “Collaborative Constructivist” group, and “Cookbook” group.

One of the goals for the IPE course at the training ward was that the students’ understanding of their own professional role should increase. All students in all three clusters rated their understanding of their own professional role to mean value 6.4 – 6.8 before they started the course. After the course the rating was 7.9 for all groups indicating a significant increase over time for all cluster groups, but no difference between the groups.

Since the IPE course aimed at increasing the students’ knowledge about the other professions, the students were asked to rate their knowledge regarding all other professions except their own before and after the course. The students’ knowledge about each others’ professions were rated 6.0 – 6.2 before the course and 7.2 – 7.3 after the course. For all ratings regarding knowledge about each others’ professions no significant differences between the cluster groups could be seen, but all changes over time were significant.

The students were asked, both before and after the course, if they thought that the goals of the IPE course were realistic in relation to the course length. The students in the clusters “Collaborative Constructivist” and “Cookbook” considered the goals more realistic after the course while there was no change in the opinion of the “Low Collaborative” cluster. The students were also asked if they thought that the goals

represented today's healthcare, if the goals should be applied to future healthcare and if the goals should pervade healthcare training to a greater extent. The "Cookbook" group had a higher score on the question regarding today's healthcare. The "Low Collaborative" group had generally lower scores and the "Collaborative Constructivist" group had generally higher scores on the questions regarding future healthcare and future healthcare training.

The students were also asked about their satisfaction with the IPE course and the results showed that the "Collaborative Constructivist" cluster was significantly more positive towards the concept already before the course compared to the "Low collaborative" cluster. Further, the "Low collaborative" cluster did not change their opinion during the course while both "Collaborative Constructivist" and "Cookbook" clusters had a significantly more positive attitude at the end of the course.

STUDY IV

Participants

All 256 students attending the IPTW course at Södersjukhuset during the academic year 2003-2004 were asked to participate in the study and 253 of them (99 %) agreed. The 3 students who declined participation did not complete the questionnaires but they agreed to participate in the observation part of the study. Participation in the study was voluntary and the information in the questionnaires was anonymous. In the observations the students were not anonymous, but when the data from this part of the study was collected, it contained only information based on groups.

Table 6. Distribution of students in Study IV.

	Number of eligible students	Number of students included
Medical students	64	44
Nursing students	138	123
OT students	20	17
PT students	34	33
Unknown	0	36

The student distribution among the different professions is presented in Table 6. For 36 students the information about educational programme was not known, either because the student did not answer that question or because the first part of the questionnaire was missing.

Methods

Intervention and control groups

The students were divided into 48 teams, each team collecting 1 or 2 medical students, 2 or 3 nursing students, and 1 OT or PT student, except in 4 teams in which both OT and PT students were represented. The students were randomly divided into the teams, also making the selection to control or intervention group randomized. For practical reasons, the intervention was carried out during 4 consecutive months, covering both terms during the academic year. The first 12 teams were considered control teams, the following 24 teams received the intervention and the last 12 teams were also control teams.

The control teams received the regular 2-hour information about the course at the IPTW; the intervention teams received a one-day team building training.

The intervention

The intervention was a one-day course including theoretical information and practical training aiming to let the team members get to know each other and start the team-building process. The team training was based on the Fundamental Interpersonal Relations Orientation (FIRO) theory (Schutz 1958), which describes the three phases: inclusion, control and affection that people in relations with others go through in this order. It was considered important to provide the teams with time, tools and theories for the team-building process, to develop teamwork and group skills, to learn how to function more effectively, and to learn to reflect on the group process (D'Eon 2004).

After a brief introduction and a presentation of the students and the two tutors, by just letting everyone say their name and something about themselves that was not known to the others, the three teams had to solve a theoretical problem which required team working: the Zin obelisk (Francis and Young 1992). After the process analysis, the FIRO theory was introduced. The next task was a 30-minute preparation followed by a 5-minute personal presentation by each team member, in their teams, i.e. in three

parallel sessions. After this presentation, the theory of the Johari window (Luft and Ingham 1955) was introduced and discussed.

For the next task, the group was split into four uni-professional parts and each small group of students made, after a 30-minute preparation, a presentation of their profession, including history, fundamental principles and ethics, basic contributions to health care, and classical conflicts with other health care professions.

The following task was a practical problem that also required teamwork to be solved: the teams should imagine that they took care of a severely injured patient at the emergency room and they had to turn the patient in order to inspect injuries on the back side. The “patient” was a figure on a big notepad paper (approx. 100 × 85 cm) and to emphasize the teamwork the team had to stand on the paper while they turned the paper upside down without touching the floor outside the paper. One of the team members was appointed observer and received a short instruction on observing the team communication and to conduct the following process analysis. During the following discussion, based on the results of the preceding task, i.e. more or less broken papers, mistakes and accidents in health care and how they can be prevented was debated, and during this session the Swiss cheese model of system accidents (Reason 2000) was introduced.

The last session of the day dealt with feedback, including exercises in giving and receiving constructive feedback.

Questionnaire

Data was collected using two questionnaires which the students completed during their first day (baseline data) and last day (follow-up data), respectively, of the course at the IPTW. The baseline questionnaire included questions about the students’ background including their opinion on how they had experienced their own professional role and also their opinion on the IPTW-concept. The answers were ratings on 9-point Likert scales, where 1 indicated bad/low and 9 indicated good/high. To guarantee the educational homogeneity between the groups the students also rated their approaches to learning according to The Conceptions of Learning and Knowledge Questionnaire, CLKQ (Lonka et al, 2001, 2004, 2008) and their readiness for interprofessional learning according to The Readiness for Interprofessional Learning Scale, RIPLS (Parsell and Bligh 1999, Lauffs et al, 2008).

The follow-up questionnaire was completed on protected time during the last days of the course and included the ratings about professional role and the IPTW-concept. The students were also asked to rate their own development in professional

competence, understanding of teamwork, understanding of other professions, understanding of ethical aspects in health care, and understanding of communication. Also, the students were asked to rate the quality of the medical care, nursing care and rehabilitation they provided the patients with. Furthermore, they rated to what extent they had had the opportunity to practise their own professional skills and to practise in interprofessional constellations. Finally they rated the level of orthopaedics that they had learned, and how satisfied they were with clinical and profession-specific supervision.

The students were also asked to mark to what extent they preferred interprofessional training on a training ward to traditional uni-professional practice.

The post-test also included three open-ended questions in which the students were asked to share their opinions about the IPTW:

- 1. Mention the three most positive experiences from your practice at the interprofessional training ward.*
- 2. Mention the three most negative experiences from your practice at the interprofessional training ward.*
- 3. Please suggest improvements for the education at the interprofessional training ward.*

Observations

During the study period, the 8 facilitators at the IPTW were asked to observe the students' teamwork. After the study period they were asked to complete a survey to share their observations about quality in team-collaboration. Information about if the student teams belonged to the control group or the intervention group was open to the facilitators.

Statistical and content analyses

A triangulation design (Creswell et al, 2003) including a qualitative and a quantitative approach together with observation was chosen. The qualitative data was based on the three open-ended questions in the follow-up questionnaire. Content analysis (Dahlgren and Fallsberg 1991, Patton 2002) was used in order to find patterns and themes in the texts. The open-ended handwritten answers were typed and the information about study groups and educations was coded prior to the analysis,

making the data blinded for the analysts. The texts were then read and the statements were labelled by each of the five authors separately, the content of the texts was discussed and the information was sorted in such a way that the nuances in the data were captured. Statements with the same label were grouped together and discussed to find some statements which needed to be re-labelled.

This procedure resulted in 66 groups, each consisting of between 1 and 106 separate statements. After this, the process was repeated, now categorizing the groups in the same way, resulting in four main categories describing the students' opinions. Only when this analysis was finished, was the blinded information decoded to admit comparison between the groups. The analysis focused on positive and negative aspects of the interprofessional course and the different aspects described by the students were compared for differences and similarities in meaning.

The statistical software used was PASW Statistics 17.0 for Windows. The Likert scale answers, including the CLKQ and RIPLS, were considered as ordinal data. For comparison of results between groups, the Kruskal-Wallis test and the Mann-Whitney U test were used. The results were considered significant at $p < 0.05$.

Results

Pre-test and quantitative data

In the pre-test there were no significant differences between the intervention and the control groups in any of the items, in the CLKQ or the RIPLS. The follow-up data showed that both groups were very satisfied with the practice at the IPTW. The quantitative part, i.e. the questionnaires, did not show any significant differences between the groups.

The question whether the students preferred traditional practice or practice at an interprofessional training ward was answered by ticking one of nine boxes in a line, where the leftmost box indicated "traditional" and the rightmost box indicated "interprofessional training ward". In both groups the median mark was in the second box from the right. This question was answered by 203 students; the missing 50 students were equally distributed between the study groups. There was no significant difference between the groups. Table 7 shows the distribution of the students. Out of the 203 students answering the question 128 put their mark in the two rightmost boxes, indicating that they clearly preferred practice on an IPTW before traditional clinical placement. A total of 16 students put their marks on the "traditional" part of the scale, 167 put it on the "IPTW" part of the scale, and 20 put their mark in the box

in the middle. It was only 4 medical and OT students who clearly preferred traditional clinical placement.

Table 7. Students' preferences regarding clinical practice. For 30 students the information about educational programme was unknown.

Programme	Result (n)									
	Traditional					IPTW				
	<input type="checkbox"/>									
Total (203)	2	2	5	7	20	10	29	35	93	
Medical students (37)	1	2	1	1	1	5	8	10	8	
Nursing students (94)	0	0	3	2	8	1	11	13	56	
OT students (16)	1	0	0	1	1	1	1	4	7	
PT students (26)	0	0	1	1	3	2	8	5	6	
Unknown (30)	0	0	0	2	7	1	1	3	16	

Qualitative data

Content analysis was performed of the three open-ended questions in the post test. The content analysis resulted in four main categories describing the students' experiences and suggestions: Communication, Organization, Education, and Professional development.

The positive aspects of communication included mainly opinions about the teamwork. There was a difference between the control group and the intervention group, as the students in the control group more often described the teamwork as team members doing their task, while students in the intervention group were more likely to describe teamwork as working together.

The negative aspects of *communication* focused on failing teamwork. The control group students often explained that they were missing one profession in the teams, while the intervention group students emphasized the difficulties in being both part of a team and acting as an independent professional.

Suggestions for improvement were made about introduction to administrative routines and information about how the ward is organized. Intervention group students also suggested that in the future all students should receive the team-building training.

Regarding *organization*, as positive statements the students mainly expressed that they had enough time for each patient and that the practice at the ward as such was a positive experience.

The student schedule, a three-day rotation with an evening shift followed by a day shift and a free day, was considered negative as some students did not like the evening shifts or the weekend shifts, or that the weekend shifts were unjustly divided among the teams. There was less profession-specific supervision during evenings and weekends, and this was also considered negative. That the two-week course was too short was a negative experience, mainly reported by the students in the control group.

The suggestions for improvement dealt with the schedule. Students from both groups proposed fewer evening and weekend shifts, and – especially in the control group – suggestions were made for making the course longer.

In the category *education* many students from both groups considered the supervision at the IPTW to be a very positive experience. Students in the intervention group were more likely to describe the supervision in terms of freedom and team-supervision, while students in the control group described the supervision as questions and answers.

Negative opinions about the supervision were that there was less profession-specific supervision during evenings and weekends, and in the intervention group the students also considered the facilitator to be too active, not letting the student team work as independently as they wanted.

Both groups suggested better supervision as a possible improvement. Students in the control group wanted the facilitators to be more present and closer to the students. They also wanted the supervision to be more structured. On the other hand, students in the intervention group wanted the facilitators to keep a lower profile.

Positive aspects in the category *professional development* were that the students could practise as professionals in an authentic setting and thereby gain understanding about their professional roles. Concerning others' professional roles, learning about the other professions' work was described as positive, but students in the intervention group also described this in terms of comprehension.

Some students in both groups mentioned as negative aspects that they did not have enough time to practise their professional roles, or that the roles were mixed up.

Responsibility and independence were positive experiences, and the students described that they actually found themselves in charge of the care at the ward, independently taking responsibility for the patients. This was emphasized in both groups. Only one student, a medical student in the control group, felt that too much responsibility was forced on her and this made her feel incompetent.

Both groups described as positive professional development their experiences in working out and motivating a medical decision, in gaining self-confidence in the profession, in completing tasks they had not done before, and in realizing that they would be successful in their future work. Some students proposed more training in orthopaedics before the course.

Observations

All eight facilitators stated that the team-collaboration was improved in the intervention teams compared to the control teams. Two of them indicated that there was no difference in working with the different teams, but the other six facilitators said that it was easier to work with the intervention teams.

The facilitators' answers to the open-ended questions were analysed by content analysis.

Several improvements from the intervention were described. Students in the intervention teams were more interested in each other and in each other's work, that the teams seemed more united, that the team members communicated better and that they shared the patient-related work, and also that they more often tried to solve problems in the teams before asking the facilitator. The intervention team students seemed to feel safe in the teams, the atmosphere was calm, it was easier to talk about sensitive issues and the students also gave each other more constructive feedback. The intervention teams had a working team-collaboration much faster than the control teams. It was easier for the facilitators to work with the intervention teams. The students in the intervention teams had a more positive attitude towards the IPTW, and they focused more on learning.

There was also some deterioration mentioned. For one of the three teams during each two-week period, the course became one half-day shorter since they started on Tuesday morning instead of Monday afternoon. Thus, these teams were given less time for introduction and were being "thrown into the fight" without preparation at the ward.

META-ANALYSIS

Some questions were used in more than one study, making it possible to combine them and analyse data from 1729 students. The ratings are presented as mean values and the Mann-Whitney test is used to analyse significant differences.

Regarding perception of professional roles, the mean rating was 6.5 before the course and 7.8 after the course. The PT students rated their perception of their professional role highest both before (7.0) and after (7.9) the course. The OT students rated it lowest (6.2) before the course and medical students rated it lowest after the course (7.5). There were no significant differences between genders (Table 8).

Table 8. Comparison of ratings before and after the course regarding perception of professional roles. Ratings on 9-point Likert scales.

Variable	n	Rating before the course (mean value)	n	Rating after the course (mean value)
Perception of professional role (1: unclear – 9: clear) - total	1394	6.5	1309	7.8
Perception of professional role - female students	1144	6.5	1061	7.9
Perception of professional role - male students	234	6.6	216	7.7
Perception of professional role - medical students	301	6.6	284	7.5
Perception of professional role - nursing students	713	6.4	657	7.9
Perception of professional role - OT students	138	6.2	134	7.8
Perception of professional role - PT students	242	7.0	234	7.9

Significant ($p < 0.005$) differences before the course between OT and medical students, between OT and PT students, and between PT and nursing students.

Significant ($p < 0.005$) differences after the course between medical and nursing students and between medical and PT students.

Regarding attitudes towards the IPTW concept, the mean rating was 6.2 before the course and 7.4 after the course. The nursing and the OT students rated their attitudes towards the IPTW concept highest both before (6.6 and 6.4, *NS*) and after (7.8 and 7.9, *NS*) the course. The PT students rated it lowest (5.3) before the course and the medical students rated it lowest (6.5) after the course. The female students rated their attitudes towards the IPTW concept significantly higher than the male students, both before and after the course (Table 9).

Table 9. Comparison of ratings before and after the course regarding attitudes towards the IPTW concept.

Variable	n	Rating before the course (mean value)	n	Rating after the course (mean value)
Attitudes towards the IPTW concept (1: negative – 9: positive) - total	1388	6.2	1681	7.4
Attitudes towards the IPTW concept - female students	1137	6.3	1361	7.5
Attitudes towards the IPTW concept - male students	234	5.8	287	6.9
Attitudes towards the IPTW concept - medical students	300	6.1	397	6.5
Attitudes towards the IPTW concept - nursing students	710	6.6	809	7.8
Attitudes towards the IPTW concept - OT students	137	6.4	162	7.9
Attitudes towards the IPTW concept - PT students	241	5.3	313	7.1

Significant differences ($p < 0.005$) between male and female students both before and after the course.

Significant differences ($p < 0.005$) before the course between PT students and all others, and between medical students and nursing students.

Significant differences ($p < 0.005$) after the course between medical students and all others, and between PT students and all others.

CONCLUSIONS

STUDY I

This study showed that interprofessional clinical practice on an IPTW provides students with a good opportunity to develop their own professional roles and learn about the other professions. Most students were satisfied with the course on the IPTW. Quality of supervision and support for the students as a team are important factors and should be focused on when developing interprofessional training in a clinical setting.

STUDY II

This follow-up study showed interprofessional education on an IPTW to be considered as valuable by former students, who used the experience they had acquired from the course in their present work. Also, the students' opinion was that interprofessional education should be introduced early during healthcare education to promote collaboration and understanding, and to counteract preconceived notions between healthcare professionals.

A very important factor during interprofessional education is the supervision. The facilitators must be familiar with the pedagogical methods used, must be available for students and must give students constructive feedback.

STUDY III

There are two main conclusions from this study. Firstly, students with a low collaborative profile in their approach to learning were less satisfied with the goals for the interprofessional clinical training on the IPTW, implying that they found interprofessional training less important than the other students, and also less satisfied in their overall opinion of the course. Secondly, almost all students – regardless of their approach to learning – highly valued the interprofessional training in clinical practice.

STUDY IV

There are two main conclusions from this study. Firstly, team-building training improves teamwork and collaboration in the student teams at an IPTW. It is worth devoting time to the team-building training, since the training results in better functioning teamwork in shorter time. Secondly, health care students – independent of team building training – prefer clinical training on an IPTW compared to traditional clinical practice.

DISCUSSION

AIMS AND OBJECTIVES OF IPE

Interprofessional education occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care.

My interpretation of the definition of IPE is that *two or more professions* means that there is an opportunity for interprofessional education when at least two students from different professions are educated at the same place at the same time. It also means that two is good enough. We do not have to set the goal too high, trying to include students from all educations all the time, at least not in the beginning. In reality we often have to use what we have got, and it is better to start on a small scale with the students from the two different professions that are already present than trying to change the curricula and clinical rotation schedule for all educational programmes at the university.

Learning *with* each other means in my understanding that students participate under the same conditions. This includes that the students have protected time for their IPE activity, that the IPE activity is compulsory for all students, and that the student groups have common goals for their learning.

In order to learn *from* each other, students must have an open mind, accept that other students may have other knowledge and that everybody can contribute with information, skills or attitudes, making understanding and learning better. There must be an open atmosphere, allowing questions and discussions, and the facilitators must encourage activities leading to collaborative problem-solving, discussions and clinical practice.

An interest in what the other professions can contribute with to reach the goal for the health or social care, or for the IPE session, results in learning *about* each other. The starting point must be the patients' needs and the students must drop their preconceptions about other professions and their ideas about hierarchy to be able to comprehend and put the other professions in relation to one's own.

A Goal Conflict?

At the IPTWs at KI the students had both general and profession-specific goals. Since the goals were rather extensive there were sometimes conflicts regarding the importance of the different goals and which goals the team or the individual student

should focus on at different times. This goal conflict was most notable among medical students, who sometimes found that they missed practising professional skills.

In another study focusing on medical students at one of the IPTWs at KI, the share of time spent on doctor-related issues was 57-71 % and the share of time devoted directly to orthopaedic issues was between 7 and 44 % (Lindblom et al, 2007). The ratings were made by the students but there were no definitions of “doctor-related issues” or “orthopaedic issues”. The authors pointed out that there is too little orthopaedic education in medical schools compared to the amount of patients with orthopaedic conditions. At this specific IPTW the setting was altered as the medical students were placed at the emergency ward during their evening shifts, thus not taking part in the interprofessional teamwork at the IPTW. This resulted in tension between the medical students and the other students in the teams. In my opinion, this was a way to restrain the students’ opportunities to learn *with* each other.

Also Tucker et al (2003) reported conflicts between two student groups and they found that the conflict depended on disparity in access to the course. The authors emphasized the importance of ensuring equity among the students in IPE.

In the post-intervention questionnaire in Study IV there was a question regarding if the students had learnt some orthopaedics during the course at the IPTW. The answer was a rating on a 9-point Likert scale ranging from 1/“no, nothing” to 9/“yes, very much”. The medical students’ mean rating was 5.9, and for the other student categories the mean ratings were 7.0 for PT students, 7.4 for nursing students and 8.1 for OT students. Almost all medical students had fully completed or at least had two thirds of their orthopaedic clinical course preceding the course at the IPTW. The other students had almost no experience of orthopaedic surgery before the course at the IPTW and the results in the survey probably illustrates this difference in previous experience.

I agree that from a comprehensive point of view, there is too little orthopaedics in the medical curriculum at KI. However, it was not an objective for the medical students to learn orthopaedics during the course at the IPTW. Furthermore, orthopaedics is a *topic* while IPE is a *method*, thus this conflict between orthopaedics and IPE seems very artificial.

Interprofessional competence is not opposed to professional competence; it is rather a part of the professional competence, built up by knowledge about possibilities and contributions in relation to other professions. It aims at giving an understanding of the limitations in one’s own profession and creating respect for responsibilities and competence in other professions (Pelling, 2007). Furthermore, as found in Study II (Hylin et al, 2007), if something is considered specific for one profession, it must be

contextualized in relation to other professions in order to understand why and how it is specific. IPE can also help both students and professionals to find functions that are considered belonging to several professions or matters that no profession accepts responsibility for (Illingworth and Chelvanayagam, 2007).

At another of the IPTWs at Karolinska Institutet, where the original team-setting was not altered, a separate study concluded that the active patient based learning by working together increased both collaborative and professional competence among the students (Hallin et al, 2009). In this study professional competence included perception of the professional role, communication and teamwork, and also providing medical treatment. This result is in line with the studies in this thesis.

An IPTW in a nursing home was opened in 2003 in Örebro where social worker students, nursing students and OT students were practising together. Evaluations of the IPTW in Örebro showed that there is a need to deepen students' understanding of both differences and similarities between the professions, and that IPTWs are important in providing opportunities for students to build experiences of collaboration and to gain knowledge about each other (Lidskog et al, 2007). After the course at the IPTW the students reported increased understanding of each others' professions and they also reported a higher motivation to consult each other. However, the social worker students reported low possibility to develop their own professional role, as they found the concrete health care different from their social care work (Lidskog et al, 2008a). This highlights the need for clinical training to be relevant in relation to future practices (e.g. Knowles, 1980; Oandasan and Reeves, 2005). Also, all persons involved in the training at the IPTW, both students and facilitators, need to know and accept the learning goals and what to expect from the training. Furthermore, when planning and implementing an IPTW the choice of setting is important to secure both relevant professional training and training in collaborative practice (Lidskog et al, 2009). To find a balance between recognition of professional identity and participating in the health care team, students from different educational programmes need to interact and reflect with each other. During the training on IPTWs such interaction and reflection are made possible (Lidskog et al, 2008b). After these evaluations (Lidskog et al, 2007, 2008a, 2008b, 2009) were carried out, the social worker students have been replaced by student audiologists (Örebro University, 2010).

These results put focus on the importance of both the goals and the setting for the IPE activity. The goals and the setting need to be relevant and understandable for the students. Lidskog (2008a) reported that social worker students had too few relevant tasks on the ward and that they did not see the relevance of the IPTW experience to their professional development. Social workers do not normally work on a hospital

ward and by placing the students on the ward they found themselves put in a context not relevant to their future work.

One way to find relevant goals for the students in IPE is to look at the curricula of different educational programmes and when similarities are found, these are put together in a separate curriculum for interprofessional activities. In this way, the profession-specific goals, derived from the different curricula, will serve as means to reach the IPE goals in interprofessional knowledge, skills and attitudes. There must be a balance between IPE goals and profession-specific goals, but the optimal division is yet to be verified.

Once the goals are defined, relevant settings must be found. The setting can be in the patient's home, at the outpatient clinic, in a classroom, at the emergency ward, on an ordinary ward, in the operating theatre or wherever it is relevant for the participating students.

When we have the goals and the setting, we can relate the goals to the different educational programmes to find the best time for the specific IPE activities, thus making the decision whether it should be early or late in the programmes dependent on the goals. This is comparable to Oandasan and Reeves (2005) who suggest us firstly to define the goals, secondly to decide when to introduce the course to meet the goals and, thirdly, to choose the learning strategy to use.

Quality of care

The ultimate objective of IPE is to improve collaboration and the quality of care. Probably improved collaboration is both easier to achieve and to quantify than improved quality of care. Barr et al (2000) described six levels of outcome of IPE, reclassified from Kirkpatrick's (1967) classification of educational outcomes, ranging from learners' reactions to benefits to patients (see Figure 5), also used by Hammick et al (2007). In Hammick's et al systematic review of more than 10,000 abstracts published from 1964 to 2003 in four major databases, they found just over 400 studies evaluating IPE, but only 21 of them met the inclusion criteria for high qualitative studies. Out of these 21 studies, seven reported changes in service delivery or patient care (level 4a or 4b). Five of these studies described IPE initiatives among qualified health care practitioners and the remaining two described IPE among undergraduate health care students.

Level 1: Reaction	Learners' views on the learning experience and its interprofessional nature.
Level 2a: Modification of perceptions and attitudes	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitude towards the value and/or use of team approaches to caring for a specific client group.
Level 2b: Acquisition of knowledge and skills	Including knowledge and skills linked to interprofessional collaboration.
Level 3: Behavioural change	Identifies individuals' transfer of interprofessional learning to their practice setting and their changed professional practice.
Level 4a: Change in organisational practice	Wider changes in the organization and delivery of care.
Level 4b: Benefits to patients/clients	Improvements in health or well-being of patients/clients.

Figure 5. Classification of IPE outcome (modified Kirkpatrick's model, from: Hammick et al, 2007).

The result from the systematic review clearly points out two difficulties in measuring benefits to patients. Firstly, to design a high quality study is difficult. A randomized, controlled, double-blind study is normally accepted as high quality in methodology, then sample size, response rate, inclusion and exclusion criteria, and the statistical analyses add to the overall quality of the study. In education, especially in clinical practice, it can be very difficult to run two different settings alongside, and as a consequence difficult to randomize and to define a control group. Secondly, benefits to patients or clients may not be immediately apparent. Benefits to patients, measured as, for example, lower mortality, fewer medication errors, less infection rate or fewer re-admissions to hospitals, will be very difficult to evaluate as the number of patients must be very high, the follow-up time must be long and there are numerous confounders to handle.

In Östersund the IPTW in orthopaedic rehabilitation for medical, nursing, OT, PT and nursing assistant students was evaluated after three years. In total 72 students participated in the evaluation and the conclusions were that the students developed their professional role and identity and that the nursing assistant students were important participants in the interprofessional teamwork. The one-day introduction was also considered important. Regarding the patients at the ward, the 50 patients included in the evaluation experienced excellent nursing care and rehabilitation (Olsson et al, 2006), an outcome at level 4b describing benefits to patients.

The IPTW in short-time care in Malmö with students from the medical, nursing, OT and PT programmes was evaluated after the first year and in general the students' opinions were that professional development, teamwork and supervision were highly appreciated. 230 students were included in the evaluation and a majority of them considered the placement at the IPTW a very important part of their education. Some of the medical students questioned the schedule, i.e. the evening shifts, and they also desired better facilitation from the medical facilitator. The patients at the ward reported that they received better service, more nursing care and more contact with the physicians (Thomé, 2006), also a level 4b outcome.

Although these two evaluations from Östersund and Malmö were not designed as scientific studies with control groups, and are not published in peer-reviewed journals, they imply that there are benefits to patients, at least in the short perspective during their stay at the hospital.

Results from an IPTW in London showed that the patients treated on the IPTW were highly satisfied with the care, and in comparison to the patients who received ordinary care on other wards they were more satisfied (Freeth et al, 2001). The patients at the IPTW stated that they were listened to, that their questions were answered and that they received sufficient information (Freeth and Reeves, 2002; Reeves et al, 2002).

Pollard et al (2008) reported that students evaluating a pre-qualifying IPE curriculum involving ten educational programmes mentioned that interprofessional collaboration has a positive impact on care delivery, and that lack of interprofessional collaboration could have a negative impact on care and result in inconsistent or inappropriate treatment.

My own experience, not confirmed in any study, is that several patients at the emergency ward specifically asked to be admitted to the "student ward" since they had been treated there earlier and were very satisfied with the care they had received.

Interprofessionally educated students are supposed to carry their interprofessional experience, skills and attitudes into their qualified professions so that these, in their future work, will benefit their patients. This means that there is a delay of several years before any benefits can be measured. Also, students with IPE experience are supposed to cooperate better as professionals, but there is probably a "critical mass" of students needed to assure that they really meet after graduation. In Study II (Hylén et al, 2007) there is an attempt to explore any behavioural changes after graduation from the IPE intervention.

In 2009 the latest Cochrane review on IPE was published (Reeves et al, 2009); reviewing 1801 abstracts and finding six studies that met the inclusion criteria. The

results showed positive outcome on level 4a or 4b in four studies. In this review all included IPE interventions were made with qualified professionals. The authors concluded that the quality of quantitative IPE research has improved, but there is still need to strengthen the quality of both qualitative and quantitative studies (Reeves et al, 2010).

TIMING

There has been – and still is – a debate about when to introduce IPE into the health care educational programmes. It has been argued earlier that students must develop a professional identity of their own before they can participate in learning activities together with students from other programmes (Pirrie, 1998), and also that students need to gain confidence in their professional identity before being able to undertake interprofessional learning (Wood, 2001). On the other hand, in a small study by Hill (1998) regarding multiprofessional teamwork registered nurses had difficulties in understanding their professional roles since there was too much role blurring. Furthermore, there are arguments that early IPE prevents development of negative stereotypes (Horder, 1996) or changes negative attitudes (Parsell et al, 1998; Leaviss, 2000), but many students have negative stereotypes already when they enter their educational programmes (Tunstall-Pedoe et al, 2003) or they develop stereotypical notions early (Reeves, 2000). The students themselves contribute to the developing of stereotypical notions, since they are not only eager to learn knowledge and skills, but also to adopt values and traditions that define the professions (Ryan and Brewer, 1997).

However, Parsell et al (1998) reported change in attitudes among final-year students from seven health professions after a two-day IPE course. Hofseth Almås (2007, p 238) discusses if it is easier or harder to learn interprofessionally when the students are familiar with the “cultural capital” of their professions, but when she studied OT and PT students in Norway and Sweden, where the IPE trainings were introduced early and late, respectively, she found no differences in their understanding of their own or the others’ professions.

Anderson et al (2006) reported positive outcome from an interprofessional initiative when the students were in their mid-point of their educations, already with experience from hospital settings and with a developed professional perspective. On the other hand, the same main author reported that medical students participating in a one-day IPE workshop during their clinical rotations showed fear in the student groups as they had left their comfort zone (Anderson et al, 2009). It was also highlighted that early

introduction of IPE teaching methods made the students feel more prepared (Anderson and Lennox, 2009). Also, one of the first systematic reviews of IPE implies that introducing IPE early during professional educations may make practitioners more comfortable with interprofessional teamwork (Barr et al, 2000). Oandasan and Reeves (2005) suggested that the time to introduce interprofessional education should be based upon the course goals and not follow a general rule. Allison (2007) recommended that professions should learn about each other before they start to rely on one another, and argued that learning to collaborate too late will harm the patients. Also Tunstall-Pedoe et al (2003) recommend early IPE as it prepares for effective team working. After the implementation of the first IPTW in Linköping, Areskog (1988) proposed early introduction of IPE, and in one of the studies in this thesis the students clearly argued for an early onset of IPE (Study II: Hylin et al, 2007). In one study reported by Markey and Barnes (2009) first year students from five educational programmes participated in a five-week IPE intervention, and in another, four-week IPE intervention, second-year nursing students were paired with third year medical students. All students and all facilitators except one agreed that IPE should be introduced early.

I have noticed a possible trend in the literature towards the opinion that IPE should be introduced early during the educational programmes. The findings in this thesis also support early introduction of IPE. Firstly, the students in Study II, who based their opinion in relation to their professional experience, clearly argued for an early introduction of IPE. Secondly, in Study III a group of students with a non-collaborative approach to learning was identified. Since cooperation in teams is essential to deliver qualitative health care, these students may need more and earlier training in interprofessional teamwork.

FACILITATORS

A facilitator is a person who helps the students to work together. The facilitator is not a teacher; he or she is not “teaching” in the meaning “transferring information”, rather a person who can start intellectual processes by asking the right questions. The facilitator is not a bank of answers, rather a source of questions to help the students start thinking or start working in the right direction.

Facilitators from each profession represented by students must be available. They may not need to be present all the time, but every student must have a professional of the same profession to discuss with and to get feedback from.

The facilitators themselves must be collaborating interprofessionally. The students will model themselves on their facilitators, and if the team of facilitators are not collaborating interprofessionally, the student team probably will not do that either.

Interprofessional collaboration among the facilitators can be difficult to realize; the traditional separation between schools and academic departments, together with increasing academic specialization and differentiation are cultural borders (Clark, 2004) which need to be addressed.

Pedagogic support

It is not easy to start facilitating interprofessional education without any previous interprofessional experience. The IPE facilitator needs to use a pedagogic method allowing the students to learn from each other – not from the facilitator. The facilitators will need to develop their pedagogic skills, and they will need to meet other facilitators for exchange of experiences and social development. Marshall and Gordon (2005) stated that education and preparation of staff is essential for interprofessional mentorship to be effective. Pollard et al (2008) also stressed the importance of an adequately trained and supported teaching staff, also receiving support from senior staff members. The university must provide resources for this kind of support.

Furthermore, there must be a clear documentation. Information about what, when, who and why must be easily accessible and saved for the future. The first enthusiasts must not keep the information in their heads as it will disappear when they quit or retire.

Professional support

The IPE facilitator must also keep the contact with his or her own profession, develop professional skills and stay informed about progress in their professional area. Possibly a good idea is to split the facilitation on several persons, working part time as facilitators and part time as ordinary professionals. Another reason for engaging several facilitators is that no one should be left alone with the responsibility for all students.

Interprofessional support

In the same way that the students learn from, with and about each other, the facilitators need to learn from, with and about each other. In order to understand the students' situation, and to be able to support the student in interprofessional collaboration, the facilitators need to collaborate interprofessionally themselves. They must agree on the term "teamwork" and find ways for their own interprofessional teamwork. Probably the team of facilitators sometimes needs to cooperate in clinical practice without students in order to develop their interprofessional collaboration. This can be done during student holidays or some other time when the students are not in clinical rotation. Interprofessional mentorship (Marshall and Gordon, 2005) is also important in the development of interprofessional collaboration and facilitation. Furthermore, facilitators need to understand how groups develop and function and how to use this knowledge in interprofessional educational practice (Hammick et al, 2009). One part of the interprofessional support is to keep in touch with others who share your ideas. Attending local groups at the university, joining national or international networks, or visiting national or international conferences are ways to find the like-minded.

Student support

Student feedback is important information, both during formal feedback sessions and from student evaluations of their educations, both uni- and interprofessional theoretical courses and clinical rotations. There must be protected time for feedback sessions. When student evaluations are carried out, the information in the evaluations must reach the facilitators, and they must use this information for constant improvement of the facilitation. By giving written and oral feedback students play an active part in developing interprofessional education and this must not be underestimated (Philippon et al, 2005).

OTHER FACTORS

Apart from the subjects discussed above; goals, timing and facilitators, there are several other important factors that influence development, implementation and sustainability of IPE in clinical practice. Here I will discuss some topics I find important.

Teamwork

In health care work in teams with different professionals is essential, but during traditional educational programmes in health care there is no or very little training in teamwork. The need for health care workers to learn to work teams has been repeatedly pointed out. Mariano (1989) argued that team training, where students learn principles and skills of collaboration, must be implemented. In a review of different team training programs, Baker et al (2005) clearly states that teamwork does not automatically occur when people come together, and that there is a need for the health care community to implement methods to develop team competences among health care professionals. During IPE in clinical practice the students have great opportunities to practise teamwork, but the quality of the teamwork will benefit from education in team communication and cooperation (Study IV).

Organizational structure

At higher educational institutions IPE is often difficult to establish since the organizational and academic structure separate different scientific subject areas and also keep different educational programmes apart (Clark, 2004). At Karolinska Institutet the formal connection between the different educations are at the level of the dean, and that is too far up in the hierarchy. One major success factor in IPE is when teachers from different educations work together (Tucker et al, 2003), but to reach this it must be easy to communicate and to meet across departments. It must also be uncomplicated to set up and implement small IPE projects in the already existing settings. Stew (2005) argues that is important that the students actually come together and learn interprofessionally in any setting and that IPE should be fitted to the setting and to the needs of the staff and students involved. Management support is another factor crucial to the implementation of IPE (Hammick et al, 2007).

When the Faculty of Health Sciences in Linköping was founded in 1986, they started from the beginning with six educational programmes and a new curriculum. This was probably a unique situation; at other universities IPE has to be incorporated into rigid organizations and already overloaded curricula.

Faculty support

In order to support the idea of IPE in clinical practice, colleagues and staff members must be invited to learn and thereby understand the purpose and possible outcome of the IPE initiative. If the knowledge and understanding about the IPE initiative is too

low, there is a risk that faculty members treat it as an isolated subject and nothing they have to deal with. Many IPE projects are started by a small group of dedicated people but the projects cease either when the key workers move to another task or when they get exhausted from lack of support (Freeth, 2001). Faculty and staff members must be invited and engaged to the same extent as they probably are in the traditional education. They may need to revise or modify their way of teaching, therefore they need to be encouraged and helped to overcome resistance to change.

As Philippon et al (2005) reported, success in an IPE project depends on faculty members who cross professional borders and collaborate themselves. But some people find that the educational system is good as it is, or that it was better before. They are not keen on changing their ways of working and they may see interprofessionalism as a threat to their position. McNair (2005) discusses the need for health care professionals to be reflective and aware of their own behaviour and also refers to arrogance and abuse of power as factors preventing interprofessional relationships. Maybe you can not win them all, but inviting the opponents and engaging them in the process is probably a good start. I think it is important not to keep them out.

Challenge

If the interprofessional training is “too easy” or if the students are left with “nothing to do”, they will turn it down. They must receive information about the goals and objectives of the course. Stew (2005) reported that student welcome IPE when it is relevant to their learning outcomes and their formal assessment. The students must be given adequate tasks to find the training challenging. They must be given enough responsibility to feel that they are independent, that the teachers are not standing behind their backs reading over their shoulders. The tasks must also be challenging in several ways, professional, for teamwork and educational. The students should be forced to use their knowledge and skills to the edge, and have to combine their different knowledge in different professions to solve the tasks.

In my opinion the interprofessional course or training should be mandatory and the students should earn credits. An optional course with no credits is probably not seen important by the students.

GENERAL FINDINGS

From the studies in this research and from the discussion above I have some general findings which I summarize here:

- Students in general are positive to the concept of IPE in clinical practice on interprofessional training wards. They develop their understanding of professional roles and they learn about other professions.
- When putting different students, who have never met each other, together in teams it is advisable to first let them get to know each other and to let them learn to collaborate, for example by a team-building session.
- In the different curricula IPE should probably be introduced early and with relevant content and goals. The IPE courses should be mandatory and the students should earn credits.
- The quality of the supervision is highly essential. Education and support of facilitators are of crucial importance.

IMPLICATIONS FOR FURTHER RESEARCH

The studies in this thesis have shown that students in general have positive experience of clinical training and learning on an interprofessional training ward. It was also shown that medical students as a group is the student category rating their IPE experience lowest. This should be investigated further to describe and understand the medical students' situation and the factors influencing their attitudes.

The ultimate goal of interprofessional education is to improve the quality of care, but there are few published studies that really investigate this (Reeves et al, 2010). The need for more studies that explore the impact of IPE on quality of care is obvious.

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If you look at the front page of this book, it has only one author. This may lead to the conclusion that this single author made all the work, but that is wrong. This project could not have been carried out and the book could not have been written without the help and efforts of many colleagues and friends, to whom I express my genuine appreciation.

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REFERENCES

- Allison, S.** (2007) Up a river! Interprofessional education and the Canadian healthcare professional of the future. *Journal of Interprofessional Care*, 21(5): 565-568.
- Anderson, E., Lennox, A.** (2009) The Leicester Model of Interprofessional Education: Developing, delivering and learning from student voices for 10 years. *Journal of Interprofessional Care*, 23(6): 557-573.
- Anderson, E., Manek, N., Davidson, A.** (2006) Evaluation of a model for maximizing interprofessional education in an acute hospital. *Journal of Interprofessional Care*, 20(2): 182-194.
- Anderson, E., Thorpe, L., Heney, D., Petersen, S.** (2009) Medical students benefit from learning about patient safety in an interprofessional team. *Medical Education*, 43(6): 542-552.
- Andry, N.** (1743) Whether moderate Exercise is not the best Preserver of Health. In: *Orthopaedia: or the Art of Correcting and Preventing Deformities in Children*, Volume 2. London: A Millar, Buchanan's Head, the Strand. p 212-225.
- Areskog, N-H.** (1988) The need for multiprofessional health education in undergraduate studies. *Medical Education*, 22(4): 251-252.
- Areskog, N-H.** (2009) Undergraduate interprofessional education at the Linköping Faculty of Health Sciences – How it all started. *Journal of Interprofessional Care*, 23(5): 442-447.
- Baker, D., Gustafson, S., Beaubien, M., Salas, E., Barach, P.** (2005) [Online] Medical Team training Programs in Health Care. In: *Advances in Patient Safety: From Research to Implementation*. Vol 4, AHRQ Publications No 05-0021-4. Agency for Healthcare Research and Quality, Rockville, MD. Available at: <http://www.ahrq.gov/QUAL/advances/> [Accessed 24 April 2010]
- Barr, H.** (1998) Competent to collaborate: Towards a competency-based model for interprofessional education. *Journal of Interprofessional Care*, 12(2): 181-187.
- Barr, H.** (2000) *Interprofessional Education 1997-2000. A Review*. London: CAIPE.
- Barr, H.** (2002, revised 2005) [Online] *Interprofessional education: today, yesterday and tomorrow: a review*. London: CAIPE. Available at: <http://www.health.heacademy.ac.uk/publications/occasionalpaper/occp1revised.pdf>. [Accessed 24 April 2010]

Barr, H., Freeth, D., Hammick, M., Koppel, I., Reeves, S. (2000) *Evaluations of interprofessional education*. London: CAIPE.

CAIPE. [Online] *Interprofessional education, the definition*. Available at: <http://www.caipe.org.uk/about-us/defining-ipe/> [Accessed 30 March 2010].

Carifio, J., Perla, R. (2008) Resolving the 50-year debate around using and misusing Likert scales. *Medical Education*, 42(12): 1150-1152.

Clark, P. (2004) Institutionalizing interdisciplinary health professions programs in higher education: the implications of one story and two laws. *Journal of Interprofessional Care*, 18(3): 251-261.

Creswell, J. W., Plano Clark, V. L., Gutman, M. L., Hanson, W. E. (2003) Advanced mixed methods research designs. In: Tashakkori, A., Teddlie, C. B. (ed), *Handbook of Mixed Methods in social behavioural research*. Thousand Oaks, California (USA): Sage Publications Inc Sage Publications. p 209-240.

Dahlgren, L., Fallsberg, M. (1991). Phenomenography as a qualitative approach in social pharmacy research. *Journal of Social and Administrative Pharmacy*, 8(4): 150-156.

Delany, C., Molly, E. (2009) *Clinical Education in the Health Professions*. Australia: Elsevier.

D'Eon, M. (2004) A blueprint for interprofessional learning. *Medical Teacher*, 26(7): 604-609.

Fallsberg, M. B., Wijma, K. (1999) Student attitudes towards the goals of an inter-professional training ward. *Medical Teacher*, 21(6): 576-581.

Francis, D., Young, D. (1992) *Improving Work Groups: a practical manual for team-building*. San Fransico (USA): Jossey-Bass/Pfeiffer. p 147-151.

Freeth, D. (2001) Sustaining interprofessional collaboration. *Journal of Interprofessional Care*, 15(1): 37-46.

Freeth D., Reeves S. (1999) *Interprofessional Training Ward Pilot Phase. Evaluation Project Report. City University Internal Research Report*. City University, London.

Freeth, D., Reeves, S. (2002) The London training ward: an innovative interprofessional learning initiative. *Journal of Interprofessional Care*, 16(1): 41-52.

Freeth, D., Reeves, S., Goreham, C., Parker, P., Haynes, S., Pearson, S. (2001) 'Real life' clinical learning on an interprofessional training ward. *Nurse Education Today*, 21(5): 366-372.

- Hammick, M., Freeth, D., Koppel, I., Reeves, S., Barr, H.** (2007) A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical Teacher*, 29(8): 735-751.
- Hammick, M. Olckers, L., Campion-Smith, C.** (2009) Learning in interprofessional teams: AMEE Guide no 38. *Medical Teacher*, 31(1): 1-12.
- Hall, P., Weaver, L.** (2001) Interdisciplinary education and teamwork: a long and winding road. *Medical Education*, 35(9): 867-875.
- Hallin, K., Kiessling, A., Waldner, A., Henriksson, P.** (2009) Active interprofessional education in a patient based setting increases perceived collaborative and professional competence. *Medical Teacher*, 31(2): 151-157.
- Harden, R. M.** (1998) AMEE guide No. 12: Multiprofessional education: Part 1 – effective multiprofessional education: a three-dimensional perspective. *Medical Teacher*, 20(5): 402-408.
- Hill, A.** (1998) Multiprofessional teamwork in hospital palliative care teams. *International Journal of Palliative Nursing*, 4(5): 214-221.
- Hofseth Almås, S.** (2007) *Interprofessional education. An analysis of the introduction of a common core in curricula for selected health professions.* Bergen: University of Bergen.
- Horder, J.** (1996) The Centre for the Advancement of Interprofessional Education. *Education for Health*, 9(3): 397-400.
- Hylin, U., Nyholm, H., Mattiasson, A-C., Ponzer, S.** (2007) Interprofessional training in clinical practice on a training ward for health care students - A two year follow-up. *Journal of Interprofessional Care*, 21(3): 277-288.
- Illingworth, P., Chelvanayagam, S.** (2007) Benefits of interprofessional education in health care. *British Journal of Nursing*, 16(2): 121-124.
- Institute of Medicine** (2001) *Crossing the Quality Chasm: A New Health System for the 21st Century.* Washington, D.C.: The National Academic Press.
- Institute of Medicine** (2003) *Health professions education: A bridge to quality.* Washington, D.C.: The National Academic Press.
- Jacobsen, F., Fink, A. M., Marcussen, V., Larsen, K., Bæk Hansen, T.** (2009) Interprofessional undergraduate clinical learning: Results from a three year project in a Danish Interprofessional Training Unit. *Journal of Interprofessional Care*, 23(1): 30-40.
- Jamieson, S.** (2004) Likert scales: how to (ab)use them. *Medical Education*, 38(12): 1212-1218.

- Knapp, T. R.** (1990) Treating Ordinal Scales as Interval Scales – An attempt to Resolve the Controversy. *Nursing Research*, 39(2): 121-123.
- Kirkpatrick, D. L.** (1967) Evaluation of training. In: Craig, R., Bittel, L. (Eds) *Training and development handbook*. New York: McGraw Hill.
- Knowles, M.** (1980) *The modern practice of adult education – From pedagogy to androgogy* (revised). Chicago: Follett Publishing Co.
- Kvarnström, S.** (2008) Difficulties in collaboration: A critical incident study of interprofessional healthcare teamwork. *Journal of Interprofessional Care*, 22(2): 191-203.
- Landstinget Blekinge** (2010) [Online] *Verksamhetsförlagd utbildning* (Information in Swedish). Available at: <http://www.ltblekinge.se/omlandstinget/arbetahososs/verksamhetsforlagdutbildningvfu.4.742c1dd01253506c9e68000312340.html> [Accessed 24 April 2010].
- Lasarettet i Enköping** (2010) [Online] *Klinisk Utbildningsavdelning – KUA* (Information in Swedish). Available at: http://www.lul.se/templates/page_____13224.aspx [Accessed 1 May 2010].
- Lauffs, M., Ponzer, S., Saboonchi, F., Lonka, K., Hylin, U., Mattiasson, A.C.** (2008) Cross-cultural adaptation of the Swedish version of Readiness for Interprofessional Learning scale (RIPLS). *Medical Education*, 42(4): 405-411.
- Leaviss, J.** (2000) Exploring the perceived effect of an undergraduate multiprofessional educational intervention. *Medical Education*, 34(6): 483-486.
- Lidskog, M., Löfmark, A., Ahlström, G.** (2007) Interprofessional education on a training ward for older people: Students' conceptions of nurses, occupational therapists and social workers. *Journal of Interprofessional Care*, 21(4): 387-399.
- Lidskog, M., Löfmark, A., Ahlström, G.** (2008a) Students' learning experiences from interprofessional collaboration on a training ward in municipal care. *Learning in Health and Social Care*, 7(3): 134-145.
- Lidskog, M., Löfmark, A., Ahlström, G.** (2008b) Learning about each other: Students' conceptions before and after interprofessional education on a training ward. *Journal of Interprofessional Care*, 22(5): 521-533.
- Lidskog, M., Löfmark, A., Ahlström, G.** (2009) Learning through participating on an interprofessional training ward. *Journal of Interprofessional Care*, 23(5): 486-497.
- Likert, R.** (1932) A Technique for the Measurement of Attitudes. *Archives of Psychology*, 22(140): 1-55.

- Lindblom, P., Scheja, M., Torell, E., Åstrand, P., Felländer-Tsai, L.** (2007) Learning orthopaedics: Assessing medical students' experiences of interprofessional training in an orthopaedic clinical education ward. *Journal of Interprofessional Care*, 21(4): 413-423.
- Linköping University** (2009) [Online] *Kliniska undervisningsavdelningar* (Information in Swedish). Available at: <http://www.hu.liu.se/kua> [Accessed 24 April 2010].
- Lonka, K., Lindblom-Ylänne, S., Nieminen, J., Hakkarainen, K.** (2001) Conceptions of learning and personal epistemologies: Are they intertwined? A paper presented at Earli conference, Fribourg, Switzerland, Aug 28 – Sept 1, 2001.
- Lonka, K., Olkinuora, E., Mäkinen, J.** (2004) Aspects and prospects of measuring studying and learning in higher education. *Educational Psychology Review*, 16(4): 301-325.
- Lonka, K., Sharafi, P., Karlgren, K., Masiello, I., Nieminen, J., Birgegård, G., Josephson, A.** (2008) MED NORD – A tool for measuring medical students' well-being and study orientations. *Medical Teacher*, 30(1): 72-79.
- Luft, J., Ingham, H.** (1955) *The Johari window, a graphic model of interpersonal awareness. Proceedings of the western training laboratory in group development.* Los Angeles: UCLA.
- Mariano, C.** (1989) The case for interdisciplinary collaboration. *Nursing Outlook*, 37(6): 285-288.
- Markey, K., Barnes, C.** (2009) Promoting partnership working for undergraduate students. *British Journal of Nursing*, 18(11): 677-684.
- Marshall, M., Gordon, F.** (2005) Interprofessional Mentorship: Taking on the Challenge. *Journal of Integrated Care*, 13(2): 38-43.
- McNair, R.** (2005) The case for educating health care students in professionalism as the core content of interprofessional education. *Medical Education*, 39(5): 456-464.
- Mogensen, E., Elinder, G., Widström, A-M., Winbladh, B.** (2002) Centres for Clinical Education (CCE): Developing the Health Care Education of Tomorrow – A Preliminary Report. *Education for Health*, 15(1): 10-18.
- Oandasan, I., Reeves, S.** (2005) Key elements for interprofessional education. Part 1: The learner, the educator and the learning context. *Journal of Interprofessional care*, Supplement 1: 21-38.
- Olsson, I., Bergroth, A., Ekholm, J.** (2006) [Online] *Med fokus på teamarbete och helhetssyn. En processutvärdering av projektet KUA – den kliniska*

utbildningsavdelningen inom Jämtlands läns landsting (Report in Swedish). Available at: <http://www.jll.se/download/18.617573401178cec42ef800016309/Utv%C3%A4rdering+av+KUA-projektet++2006.pdf> [Accessed 14 April 2010].

Ortopediska Kliniken Lund (2002) [Online] (Information in Swedish) *Utbildningsenheten vid Ortopediska kliniken, USIL*. Available at: <http://www.skane.se/Public/USIL/Dokument/Akutdivisionen/Ortopedi/Utbildningsenheten/UtbildningsenhetOrtopedi2007.pdf> [Accessed 24 April 2010].

Osgood, C. E., Tannenbaum, P. H., Suci, G. J. (1957) *The Measurement of Meaning*. Urbana: University of Illinois Press.

Parsell, G., Bligh, J. (1998) Interprofessional learning. *Postgraduate Medical Journal*, 74(868): 89-95.

Parsell, G., Bligh, J. (1999) The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Medical Education*, 33(2): 95-100.

Parsell, G., Spalding, R., Bligh, J. (1998) Shared goals, shared learning: evaluation of a multiprofessional course for undergraduate students. *Medical Education*, 32(3): 304-311.

Patton, M. Q. (2002). *Qualitative research and evaluation methods*, 3rd ed. Thousand Oaks, CA: Sage Publications Inc.

Pell, G. (2005) Use and misuse of Likert scales. *Medical Education*, 39(9): 970

Pelling, S. (2007) [Online] *5 poäng "Händerna på ryggen" –Handledning i interprofessionell, praktisk utbildning*. Linköping University (Report in Swedish). Available at: <http://www.liu.se/hu/KUA/content/dok/HandledUTB%205%20p.pdf> [Accessed 1 April 2010].

Philippon, D., Pimlott, J., King, S., Day, R., Cox, C. (2005) Preparing health science students to be effective health care team members: the InterProfessional Initiative at the University of Alberta. *Journal of Interprofessional Care*, 19(3): 195-206.

Pirrie, A., Wilson, V., Harden, R. M., Elsegood, J. (1998) AMEE Guide No. 12: Multiprofessional education: Part 2 – promoting cohesive practice in health care. *Medical Teacher*, 20(5): 409-416.

Pollard, K., Rickaby, C., Miers, M. (2008) [Online] *Evaluating student learning in an interprofessional curriculum: the relevance of pre-qualifying interprofessional education for future professional practice*. School of Health and Social Care, University of the West of England, Bristol. Available at: <http://www.health.heacademy.ac.uk/projects/miniprojects/kpollard.pdf> [Accessed 24 April 2010].

- Ponzer, S., Hylin, U., Kusoffsky, A., Lauffs, M., Lonka, K., Mattiasson, A. C., Nordström, G.** (2004). Interprofessional education in the context of clinical practice: Goals and students' perceptions on clinical education wards. *Medical Education*, 38(7): 727-736.
- Reason, J.** (2000) Human error: models and management. *British Medical Journal*, 320(7237): 768-770.
- Reeves, S.** (2000) Community-based interprofessional education for medical, nursing and dental students. *Health and Social Care in the Community*, 8(4): 269-276.
- Reeves, S., Freeth, D., McCrorie, P., Perry, D.** (2002) 'It teaches you what to expect in future...': interprofessional learning on a training ward for medical, nursing, occupational therapy and physiotherapy students. *Medical Education*, 36(4): 337-344.
- Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Hammick, M., Koppel, I.** (2009) Interprofessional education: effects on professional practice and health care outcomes (Review). *Cochrane Database of Systematic Reviews*, Issue 1. Art. no.: CD002213. DOI: 10.1002/14651858.CD002213.pub2.
- Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Koppel, I., Hammick, M.** (2010) The effectiveness of interprofessional education: Key findings from a new systematic review. *Journal of Interprofessional Care*, 24(3): 230-241.
- Richardson, J.T.E.** (2000) *Researching student learning. Approaches to studying in campus-based and distance education*. Suffolk, G.B.: The Society for Research in Higher Education & Open University Press.
- Ryan, D., Brewer, K.** (1997) Mentorship and Professional Role Development in Undergraduate Nursing Education. *Nurse Educator*, 22(6): 20-24.
- Sahlgrenska Universitetssjukhuset** (2003) [Online] (Information in Swedish) *Studiehandledning för Göteborgs Utbildnings Avdelning GUA*. Available at: http://www.hsv.se/download/18.539a949110f3d5914ec800087677/kvalitetskonferens2003_wijk.pdf [Accessed 2 May 2010].
- Sahlgrenska Universitetssjukhuset** (2010) [Online] (Information in Swedish) *Avdelning 605*. Available at: <http://www.sahlgrenska.se/SU/6/Geriatrik-Sahlgrenska/Avdelning-612-Geriatrik/> [Accessed 24 April 2010].
- Schutz, W.C.** (1958) *A three dimensional theory of interpersonal behaviour*. New York (USA): Holt, Rinehart & Winston.
- Stew, G.** (2005) Learning together in practice: A survey of interprofessional education in clinical settings in South-East England. *Journal of Interprofessional Care*, 19(3): 223-235.

- Svensson, E.** (2001) Guidelines to statistical evaluation of data from rating scales and questionnaires. *Journal of Rehabilitation Medicine*, 33(1): 47-48.
- Thomé, G.** (2006) [Online] *Utbildningsavdelningen på Akutkliniken Universitetssjukhuset MAS – en utvärdering ur ett utbildnings- och studentperspektiv* (Report in Swedish). Available at: <http://www.skane.se/pages/71022/utv%C3%A4rdering.pdf> [Accessed 14 April 2010].
- Tucker, K., Wakefield, A., Boggis, C., Lawson, M., Roberts, T., Gooch, J.** (2003) Learning together: clinical skills teaching for medical and nursing students. *Medical Education*, 37(7): 630-637.
- Tunstall-Pedoe, S., Rink, E., Hilton, S.** (2003) Student attitudes to undergraduate interprofessional education. *Journal of Interprofessional care*, 17(2): 161-172.
- Wahlström, O., Sandén, I., Hammar, M.** (1996) The student ward at Hälsouniversitetet, the Faculty of Health Sciences, Sweden. *European Nurse*, 1(4): 262-267.
- Wahlström, O., Sandén, I.** (1998) Multiprofessional Training Ward at Linköping University: Early Experience. *Education for Health*, 11(2): 225-231.
- Wahlström, O., Sandén, I., Hammar, M.** (1997) Multiprofessional education in the medical curriculum. *Medical Education*, 31(6): 425-429.
- Wakefield, A., Boggis, C., Holland, M.** (2006) Team working but no blurring thank you! The importance of team work as part of a teaching ward experience. *Learning in Health and Social Care*, 5(3): 142-154.
- Walton, H.J.** (1995) Multidisciplinary Education. *Medical Education*, 29(5): 329-331.
- Willard, H.S., Spackman, C.S.** (1947) *Principles of occupational therapy*. Philadelphia: Lippincott.
- Wood, D. F.** (2001) Interprofessional education – still more questions than answers? *Medical Education*, 35(9): 816-817.
- Wood, D. F.** (2004) 'Not if I was very ill'. *Medical Education*, 38(7): 684-685.
- World Federation for Medical Education** (1988) The Edinburg Declaration. *Lancet*. 8608: 464.
- World Federation for Medical Education** (1994) Proceedings, World Summit on Medical Education, Edinburgh, 8-12 August 1993. *Medical Education*. 28 (Supplement 1).
- World Health Organization** (1973) *Continuing Education for Physicians*. Technical Report Series No. 534. Geneva, World Health Organization.

World Health Organisation (1978) World Health Organisation and United Nations Save the Children's Fund: *Alma- Ata 1978 – Primary Health Care*. Geneva: World Health Organisation. [Also available at: http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf].

World Health Organization (2009) *WHO Patient Safety Curriculum Guide for Medical Schools*. Geneva: WHO Press. [Also available at: www.who.int/patientsafety/education/medical_curriculum/en/index.html].

World Health Organization (2010) *Framework for Action on Interprofessional Education & Collaborative Practice*. Geneva: World Health Organisation.

Xyrichis, A., Ream, E. (2008) Teamwork: a concept analysis. *Journal of Advanced Nursing*, 61(2): 232-241.

Örebro University (2010) [Online] *Teamsamverkan. Studiehandledning Klosterbackens Utbildningsavdelning Örebro*. (Document in Swedish) Available at: <http://www.oru.se/PageFiles/18993/Studiehandledning%20Klosterbacken%20vt10.pdf> [Accessed 14 April 2010].

APPENDIX

QUESTIONNAIRES

The questionnaire used in Study I, III and IV

The original questionnaire used in Study I is presented here. For Study III and IV it was divided into two parts, the first part distributed before the course and the second part distributed after the course. There were some other minor changes to the questionnaire in Study III and IV.

The questionnaire used in Study II

This questionnaire was posted to the students two years after their practice at the IPTW.

Dear student!

**We need your opinion about the training at the
interprofessional training ward**

The training at the interprofessional training ward (IPTW) is a part of the Karolinska Institutet's (KI) goal "to learn together to be able to work together". When starting a new educational activity, it is important to evaluate it properly. We kindly ask you to answer a few questions concerning your training at the IPTW.

The questionnaire has been developed by a group made up by teachers from the different educational programs, student representatives, and a pedagogic consultant from KI.

Thank you in advance for your help!

General questions

A. At which Hospital are you studying?

- Danderyds sjukhus
- Huddinge sjukhus
- Södersjukhuset
- Karolinska sjukhuset

B. What educational program are you studying?

- Occupational therapy
- Medicine
- Physiotherapy
- Nursing

C. Sex?

- Male Female

D. Earlier experience of health care?

- Yes No

If yes: for how long: _____ months

Working as (profession) _____

Questions about your training period at the IPTW

Please mark on the scale the number corresponding to your opinion.

1. To what extent has your team, with independence, provided the patients with

	Extent								
	very little				very much				
Medical care?	1	2	3	4	5	6	7	8	9
Nursing care?	1	2	3	4	5	6	7	8	9
Rehabilitation?	1	2	3	4	5	6	7	8	9

2. How did you understand your professional role, before your training period at the IPTW, and after?

	Not clear					Clear			
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

3. What knowledge did you have about the other professionals' work in health care, before your training period at the IPTW, and after?

		Knowledge								
		None					very much			
Occupational therapists	Before IPTW	1	2	3	4	5	6	7	8	9
	Now, after IPTW	1	2	3	4	5	6	7	8	9
Physicians	Before IPTW	1	2	3	4	5	6	7	8	9
	Now, after IPTW	1	2	3	4	5	6	7	8	9
Physiotherapists	Before IPTW	1	2	3	4	5	6	7	8	9
	Now, after IPTW	1	2	3	4	5	6	7	8	9
Nurses	Before IPTW	1	2	3	4	5	6	7	8	9
	Now, after IPTW	1	2	3	4	5	6	7	8	9

4. To what extent were you motivated to ask for other professions' competence before your training period at the IPTW, and after?

	not at all motivated					very motivated			
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

5. To what extent did you understand the patient as a resource in health care, before your training period at the IPTW, and after?

	Understanding								
	very little				very much				
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

6. To what extent did you understand the ethical aspects of health care, before your training period at the IPTW, and after?

	Understanding								
	very little				very much				
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

7. To what extent did you understand the importance of communication for teamwork, before your training period at the IPTW, and after?

	Understanding								
	very little				very much				
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

8. To what extent did you understand the importance of communication for health care, before your training period at the IPTW, and after?

	Understanding								
	very little				very much				
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

9. Rate your satisfaction with

	not satisfied				satisfied				
the overall supervision at the IPTW	1	2	3	4	5	6	7	8	9

the profession-specific supervision at the IPTW	1	2	3	4	5	6	7	8	9
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10. The ending seminar -
was it meaningful?

Not at all Yes, very
1 2 3 4 5 6 7 8 9

11. What attitude did you have towards
interprofessional education at the IPTW
before your training period at the IPTW,
and after?

	Negative					Positive			
Before IPTW	1	2	3	4	5	6	7	8	9
Now, after IPTW	1	2	3	4	5	6	7	8	9

12. Mention the most positive things about the IPTW (not more than 3).

13. Mention the most negative things about the IPTW (not more than 3).

14. Make suggestions about how the training at the IPTW can be developed!

Thank you!

Karolinska Institutet

Your opinion about the training at the Interprofessional Training Ward

The training at the interprofessional training ward (IPTW) is a part of the Karolinska Institutet's (KI) goal "to learn together to be able to work together".
Your opinion is very important for the future plans for the IPTW.

We kindly ask you to complete the questionnaire. Please return it within a few days. Use the pre-stamped envelope. Your answer is confidential and anonymous. When we receive your questionnaire we will send you a lottery ticket.

Thank you!

**To send you the lottery ticket we need your name and address
(this paper will be separated from your answers):**

A. At which hospital were you studying?

- Danderyds sjukhus
 Huddinge sjukhus
 Södersjukhuset
 Karolinska Sjukhuset

B. What educational program were you studying?

- Occupational therapy
 Medicine
 Physiotherapy
 Nursing

C. Sex

- Male
 Female

D. Your age (today)? _____ years

E. What kind of work have you been working with, and for how long, after your training at the IPTW?

Work _____ for how long (months)

1. Do you have any lasting impressions of the interprofessional course on the training ward?

- no / almost nothing
 yes, a few
 yes, many

Give some examples of both positive and negative impressions:

2. The general goals for the course at the IPTW were:
- to develop one's own professional role and get a perspective on that role in the team
 - to enhance the level of understanding of the other professions and of the role of the patient
 - to become more aware of ethical aspects of health care
 - to stress the importance of good communication for teamwork and for patient care

Do you consider, in relation to your experience, that the goals for the course at the IPTW...

	no	yes
a. ...were realistic in relation to course length	1 2 3 4 5 6 7 8 9	
b. ...represent today's healthcare?	1 2 3 4 5 6 7 8 9	
c. ...should pervade healthcare training to a greater extent?	1 2 3 4 5 6 7 8 9	
d. ...should be applied to future healthcare?	1 2 3 4 5 6 7 8 9	

3. What understanding did you have about the other professionals' competence in health care, before and at the end of your training period at the IPTW, and now? (do not rate for your own profession)

	none	very good
Occup therapists	Before IPTW	1 2 3 4 5 6 7 8 9
	At the end of IPTW	1 2 3 4 5 6 7 8 9
	Now	1 2 3 4 5 6 7 8 9
Physicians	Before IPTW	1 2 3 4 5 6 7 8 9
	At the end of IPTW	1 2 3 4 5 6 7 8 9
	Now	1 2 3 4 5 6 7 8 9
Physiotherapists	Before IPTW	1 2 3 4 5 6 7 8 9
	At the end of IPTW	1 2 3 4 5 6 7 8 9
	Now	1 2 3 4 5 6 7 8 9
Nurses	Before IPTW	1 2 3 4 5 6 7 8 9
	At the end of IPTW	1 2 3 4 5 6 7 8 9
	Now	1 2 3 4 5 6 7 8 9

4. Compare your opinion today with your opinion at the end of the IPTW course: Are you more motivated to ask for the competence of other professions? (do not rate your own profession)

	don't know	no	yes, partly	yes, much
Occupational therapy	()	()	()	()
Medicine	()	()	()	()
Physiotherapy	()	()	()	()
Nursing	()	()	()	()

8. Since the course at the IPTW, you have had different experiences of collaborative work among different professions in health care. Please rate if you find this stimulating or frustrating.

My experiences of collaborative work in health care are:

	No	Yes
mainly frustrating	1 2 3 4 5 6 7 8 9	
mainly stimulating		1 2 3 4 5 6 7 8 9

Comment:

9. For the future, would you recommend that the course at the IPTW is

kept unchanged	<input type="checkbox"/>
kept, but changed	<input type="checkbox"/>
closed down	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

If you marked "kept, but changed" or "closed down", please motivate:

10. Free comments:

ORIGINAL PAPERS I – IV

- I. Ponzer S, *Hylén U*, Kusoffsky A, Lonka K, Mattiasson A-C, Nordström G: Interprofessional training in the Context of Clinical Practice: the goals and the students' perceptions on Clinical Education Wards. *Medical Education* 2004; 38: 727-736.
- II. *Hylén U*, Nyholm H, Mattiasson A-C, Ponzer S: Interprofessional training in Clinical Practice on a Training Ward for Health Care Students – A follow up Study. *Journal of Interprofessional Care* 2007; 21: 277-288.
- III. *Hylén U*, Lonka K, Ponzer S: Students' approaches to learning in clinical interprofessional context. Submitted.
- IV. *Hylén U*, Kalén S, Longueville A, Hjälml M, Ponzer S: Does team building training enhance interprofessional collaboration at a training ward? A prospective intervention study. Submitted.

