

# Learning with, from and about each other: Outcomes from an interprofessional training unit

PhD dissertation

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**Preface**

This thesis is based on studies conducted during my employment as an educational consultant in the Interprofessional Training Unit and Orthopaedic Research Unit, Regional Hospital Holstebro.

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This thesis is based on the following five papers which will be referred to in the text by their Roman numerals:

- I. Jacobsen, F., Fink, A.M., Marcussen, V., Larsen, K., & Hansen, T.B. (2009) Interprofessional undergraduate clinical learning: results from a three year project in a Danish Interprofessional Training Unit. *J Interprof.Care*, 23, 30-40.
- II. Jacobsen, F. & Lindqvist, S. (2009) A two-week stay in an Interprofessional Training Unit changes students attitudes to health professionals. *J Interprof.Care*, 23, 242-250.
- III. Hansen, T.B., Jacobsen, F. & Larsen, K. (2009) Cost effective interprofessional training: an evaluation of a training unit in Denmark. *J Interprof.Care*, 23, 234-241.
- IV. Jakobsen, F., Larsen, K., & Hansen, T.B. (2010) This is the closest I have come to being compared to a doctor: Views of medical students on clinical clerkship in an Interprofessional Training Unit. *Med Teach.*, 32, e392-e399)
- V. Jakobsen, F., Hansen, T.B., & Eika, B. (2011) "Knowing more about the other professions clarified my own profession". Students' and alumni's self-reported learning outcomes after clinical placement in a Danish Interprofessional Training Unit *J Interprof.Care*, Accepted for publication 6 June 2011

**Abbreviations**

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CAIPE	Centre for the Advancement of Interprofessional Education
AHPQ	Attitudes to Health Professionals Questionnaire
COW	Conventional orthopaedic ward
HRQOL	Health-related quality-of-life
ICER	Incremental cost-efficacy ratio
IPE	Interprofessional education
IPC	Interprofessional collaboration
ITU	Interprofessional training unit
JET	The Interprofessional Education Joint Evaluation Team
LOS	Length of stay
NIPNET	Nordic Interprofessional Network
OT	Occupational therapist
PT	Physiotherapist
QALY	Quality-adjusted life years
THA	Total hip arthroplasty
TKA	Total knee arthroplasty
WHO	World Health Organisation

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## English summary

### Introduction

For decades, the World Health Organisation has emphasised the need for interprofessional education, not because interprofessional education is an end in itself, but as a means of ensuring that different types of health professions can work together to meet the needs of the people.

Danish authorities, professional societies and universities have called for interprofessional collaboration as a means of achieving better care and treatment and shorter hospital stays, thereby creating the possibility that patients can return to work more rapidly.

The higher education system in Denmark has also recently put a stronger emphasis on interprofessional education and collaboration by explicitly mentioning the necessity of all students' ability to participate independently in uniprofessional and interprofessional collaborations.

Interprofessional education for health professional students can take place in Interprofessional Training Units. This dissertation, with the support of five articles, describes results from a Danish Interprofessional Training Unit (ITU).

### Methods

**Study I:** This study included focus group interviews of the following: one head nurse and two superintendent physiotherapists; two students from occupational therapy, two students from physiotherapy, two students from medicine and two students from nursing; three deans from occupational therapy, physiotherapy, and nursing; three clinical tutors and one associate professor. Furthermore, interviews were conducted with an external observer and the project manager. We chose a qualitative approach for this project and performed a transverse analysis as a Systematic Text Condensation.

**Study II:** In this study, 162 students from occupational therapy, physiotherapy, medicine, and nursing completed the Attitudes to Health Professionals Questionnaire before they started in the ITU and again on their last day in the ITU. Data were collated by measuring the 10 cm scale with a conventional ruler. Data was inputted in Epidata and analysed using Excel and SPSS 13.0.

**Study III:** This study included patients admitted for primary hip or knee replacement surgery. We included 72 patients from the ITU and 62 patients from the conventional ward (COW). We estimated the daily costs in the ITU and in the COW. We calculated the effect of the intervention from change in self-reported health-related quality-of-life from the preoperative inpatient visit to the three-month postoperative control visit.

**Study IV:** In this study, we distributed a fifteen-item questionnaire to 55 medical students on their last day in the ITU and supplemented this questionnaire with a group interview with 22 of the students. We chose a qualitative approach for this project. The interview was analysed using Systematic Text Condensation. The results from the analysis of the interview were used to elaboration and validation of the questionnaire completed by all 55 students.

**Study V:** In this study, we asked on two occasions a cohort of 428 students studying occupational therapy, physiotherapy, and nursing to write three short statements describing what they perceived as the most important learning outcome that resulted from their stay in

the ITU. The first time we asked for these statements was on the students' last day in the ITU; the second time we asked them was after their graduation. We performed a qualitative analysis of the statements. After the analysis, we counted the statements addressing different themes from both data collections and obtained a quantitative distribution of the statements. Finally, we controlled for differences in perceived learning outcome from students and alumni.

## **Results**

**Study I:** The goals of the ITU were fulfilled because the students learned interprofessional teamwork, strengthened their own professional role and worked together in an organisation for the benefit of the patient. All this took place in a secure learning environment, in which new methods of coordinating and integrating clinical and theoretical interprofessional learning were developed and tested.

**Study II:** After the ITU experience, students viewed most professions as more "caring" and less "subservient" (apart from physicians who were seen as being more "subservient" after the ITU experience). This study indicates that an IPE initiative, such as the ITU, can have a positive impact on students' attitudes.

**Study III:** The patients in the two intervention groups were comparable at baseline. The ITU was found to be more cost-effective than the COW.

**Study IV:** Results show that a stay in the ITU with a safe learning environment can increase both uniprofessional and interprofessional learning for medical students. The students stressed the importance of supervision before and after carrying out a hospital task.

**Study V:** The study showed, that over time, students differ in their perceptions of the outcome of the learning experiences in an ITU. Whereas students state uniprofessional outcome more frequently, alumni in retrospect see professional identity and interprofessionalism as more important.

## **Conclusion**

A two-week stay in an ITU helps students obtain uniprofessional and interprofessional learning and aids the formation of professional identity. What alumni remember most clearly after graduation is the interprofessional learning and the formation of professional identity. Furthermore, these studies found that the ITU was cost-effective compared to the conventional ward.



## Danish summary

### Baggrund

I årtier har World Health Organization lagt vægt på behovet for interprofessionel uddannelse, ikke fordi interprofessionel uddannelse er et mål i sig selv, men som et middel til at sikre at forskellige sundhedsprofessioner kan arbejde sammen for at opfylde befolkningens behov.

Danske myndigheder, faglige sammenslutninger og universiteter efterspørger interprofessionelt samarbejde, som et redskab for bedre pleje og behandling og dermed kortere indlæggelsestider, som vil give patienterne mulighed for hurtigere at komme tilbage til deres arbejde.

De højere uddannelsesinstitutioner lægger nu også større vægt på interprofessionel uddannelse og samarbejde ved eksplicit at nævne nødvendigheden af alle studerendes færdigheder til selvstændig deltagelse i monofagligt og interprofessionelt samarbejde.

Interprofessionel uddannelse for studerende indenfor sundhedsprofessioner kan foregå i tværfaglige studieafsnit. Med baggrund i fem artikler beskrives i denne afhandling resultater fra et dansk tværfagligt studieafsnit.

**Studie I:** I dette studie blev der udført fokusgruppe interview af: En afdelingssygeplejerske og to ledende fysioterapeuter; to studerende fra hver af professionerne ergoterapi, fysioterapi, læge og sygeplejerske; tre uddannelseschefer fra professionerne ergoterapi, fysioterapi og sygepleje; tre kliniske vejledere og en klinisk lektor. Desuden blev der udført interview af: En ekstern observatør og af projektlederen. Til dette projekt valgtes en kvalitativ tilgang og en tværgående analyse blev udført ved hjælp af systematisk tekstkondensering.

**Studie II:** I dette studie besvarede 162 studerende fra professionerne ergoterapi, fysioterapi og sygepleje "Attitudes to Health Professionals Questionnaire" inden de startede i studieafsnittet og igen på deres sidste dag i studieafsnittet. Resultaterne blev sammenlignet ved udmåling af den 10 cm lange skala. Data blev indtastet i Epidata og analyseret i Excel og SPSS 13.0.

**Studie III:** I dette studie inkluderedes patienter indlagt til hofte eller knæ alloplastik. Vi inkluderede 72 patienter fra studieafsnittet og 62 patienter fra den konventionelle afdeling. Vi estimerede daglige omkostninger i studieafsnittet og i den konventionelle afdeling. Effekten af interventionen blev beregnet som ændring i selvrapporeret sundhedsrelateret livskvalitet fra præoperativt ambulatoriebesøg til tre-måneders postoperativ kontrol.

**Studie IV:** I dette studie uddelte vi et spørgeskema med femten spørgsmål til 55 medicinstuderende på deres sidste dag i studieafsnittet og supplerede dette med et gruppeinterview af 22 af de studerende. Vi valgte en kvalitativ metode og interviewet blev analyseret ved hjælp af systematisk tekstkondensering. Resultatet af analysen blev brugt til sammenligning og validering af spørgeskemaet, som var udfyldt af alle 55 studerende.

**Studie V:** I dette studie bad vi to gange en kohorte bestående af 428 studerende fra professionerne ergoterapi, fysioterapi og sygepleje om at skrive tre korte udsagn, som beskrev det de, efter at have været i studieafsnittet, opfattede som det vigtigste, de havde lært. Første gang, vi spurgte dem, var på deres sidste dag i studieafsnittet og anden gang, vi spurgte dem, var nogen tid efter de var færdiguddannede. Vi foretog en kvalitativ analyse af deres udsagn. Efter analysen talte vi udsagnene i de temaer vi havde fundet og fik derved en

kvantitativ fordeling af udsagnene. Herefter kontrollerede vi for forskelle i selvrapporteret læringsudbytte mellem studerende og færdiguddannede.

### **Resultater:**

**Studie I:** Målene for studieafsnittet var opfyldt, idet de studerende lærte interprofessionelt samarbejde, styrkede deres professionelle rolle og arbejdede sammen i en organisation for patienternes bedste. Alt dette fandt sted i et trygt læringsmiljø, hvor der blev udviklet og testet ny måder for koordinering og integrering af klinisk og teoretisk interprofessionel læring.

**Studie II:** Efter opholdet i studieafsnittet opfattede de studerende de andre professioner som mere "omsorgsfulde" ("caring") og mindre "villige til at underordne sig" ("subservient"), bortset fra lægerne, der efter opholdet i studieafsnittet blev set som mere "villige til at underordne sig". Resultatet af studiet indikerer at interprofessionel uddannelse, som det foregår i studieafsnittet, kan påvirke studerendes holdninger positivt.

**Studie III:** Patienterne i de to grupper var sammenlignelige ved baseline. Det viste sig, at studieafsnittet var mere omkostningseffektivt end det konventionelle afsnit.

**Studie IV:** Resultaterne viser, at et ophold i studieafsnittet med et trygt læringsmiljø kan forbedre medicinstuderendes monofaglige og interprofessionelle læring. De studerende lagde vægt på vigtigheden af vejledning både før og efter udførelsen af en hospitalsopgave.

**Studie V:** Studiet viser, at studerendes opfattelse af læringsudbytte fra studieafsnittet ændres over tid. Mens studerende oftere siger, at det vigtigste var monofaglig læring, siger de færdiguddannede, at set i bakspejlet er professionsidentitet og interprofessionalisme det vigtigste.

### **Konklusion**

Et to ugers ophold i studieafsnittet bidrager til de studerendes monofaglige og interprofessionelle læring samt dannelse af professionsidentitet. Tidligere studerende husker bedst den interprofessionelle læring og dannelsen af professionsidentitet. Desuden viste det sig, at studieafsnittet var mere omkostningseffektivt end den konventionelle afdeling.

## Introduction

### The call for interprofessional collaboration and education

The need for interprofessional education (IPE) has been apparent for decades, not because IPE is an end in itself, but as a means of ensuring that different types of health professions can work together to meet the health needs of the people (World Health Organisation, 1988; World Health Organisation, 2010).

Not only the World Health Organisation, but also Danish authorities, professional societies and universities have called for interprofessional collaboration. One example of many such proposals in the health care sector is the Danish reference programme for apoplexy, which recommends that a systematic and interprofessional plan for treatment and rehabilitation be established no later than 24 hours after an incident of apoplexy occurs (Dansk Selskab for Apopleksi, 2009). Likewise, a reference program for patients with hip fracture recommends that all patients receive care and rehabilitation as soon as possible from an interprofessional team that focuses on early planning for discharge (Jensen, 2008).

A third and final example is from a Health Technology Assessment report from the Danish National Board of Health entitled "Multidisciplinary and multisectoral interventions targeting patients with back pain". This report concludes that interprofessional interventions are more effective than uniprofessional interventions, e.g., patients who received interprofessional intervention returned more rapidly to work than patients treated with usual practice (Løvschall C. et al., 2010).

Recommendations for interprofessional collaboration are accompanied by calls for interprofessional education, as interprofessional education can contribute to better interprofessional collaboration (Hammick, Freeth, Koppel, Reeves, & Barr, 2007; Reeves et al., 2008)

In a recently published plan addressing enhanced effort in rehabilitation and coherence in cancer patient courses, the Danish National Board of Health proposes the advancement of interprofessional education by ensuring that undergraduate and postgraduate education focus on the importance of strengthening the training of competencies in communication and collaboration among the different professions involved in a patient's care, thereby achieving greater understanding of the various professional groups' knowledge and functions (Sundhedsstyrelsen, 2010).

The higher education system has also recently put a stronger emphasis on interprofessional collaboration. Stress is put on the necessity for all students to acquire the ability to participate independently in uniprofessional and interprofessional collaborations (Retsinformation, 2009).

The Danish Qualification Framework for Higher Education describes requirements for learning outcomes concerning knowledge, skills and competencies at various educational levels. One of the competencies required for the bachelors level is that the students must be capable of participating independently in uniprofessional and interprofessional collaborative efforts. In accordance with this requirement, the executive orders for undergraduate training for occupational therapy, physiotherapy and nursing all begin identically by stating: "The object of the education to the Bachelor of (profession) is to qualify students after graduation to work independently as a (profession) and to enter into a professional and interprofessional collaboration" (Retsinformation, 2008).

For candidates at the masters' level there are further demands that students acquire the competency to initiate and implement interprofessional collaborative efforts and to assume

professional responsibility for such collaborations (Undervisningsministeriet, 2007). In summary, these examples of calls for interprofessional collaboration and education from international and Danish authorities, professional societies and universities underscore the need for enhanced efforts to foster interprofessional education in Denmark.

### **Discrepancies in terminology and concepts**

Due to the fact that the same word can have different meanings to different people, and because some concepts are labelled differently but possess the same meaning, I will begin with defining some key terms. I will begin with an attempt to clarify different terms concerning the cross professional continuum for education and collaboration. I will then briefly reflect on the definitions of “teamwork and collaboration” and “profession and discipline”.

#### *The cross professional continuum*

In the WHO report “Learning together to work together”, the educational experience shared by members or students of different health professions was labelled “multiprofessional education” even though “interprofessional” was also mentioned as a term with the same meaning (World Health Organisation, 1988). Likewise, in 2006, a working group under the Danish Ministry of Education described the requirements for the future education of health professionals. In the report, the group alternated between the words “multiprofessional” and “interprofessional”, though they apparently were referring to identical concepts (Sørensen, 2006).

As illustrated above and as also found by McCallin (2001), the terms interdisciplinary, multidisciplinary and interprofessional are problematic (McCallin, 2001). Furthermore, many different combinations of prefixes such as cross-, multi-, inter- and trans- have been combined with adjectives such as professional and disciplinary; they have, furthermore, been combined with nouns such as education, learning and training (Barr, 2002).

Different models of organising education can be located on a continuum that ranges from multiprofessional, through interprofessional to transprofessional (figure 1) (Thylefors, Persson, & Hellstrom, 2005). The two-pointed arrow at the bottom of the figure illustrates that these are not three fixed positions. Also, the circles representing the interprofessional part of the continuum can change in size and in location relative to each other.

At the extreme left of figure 1, we find the term “multiprofessional”, which is also often called “multidisciplinary”. Education at this end of the cross-professional continuum might also be termed “uniprofessional”. In this model, members or students of multiple professions learn and work independently and only share information, but not tasks, with each other. Each profession is focused on its own tasks and not on the collective process (Petrie, 1976). In short, multiprofessional education can be defined as follows: “Occasions when two professions learn side by side” (Barr H, Koppel, Reeves S, Hammick, & Freeth, 2005). In the Danish hospital sector, undergraduate clinical learning follows the organisational model from the universities and is, therefore, also organised multiprofessionally.

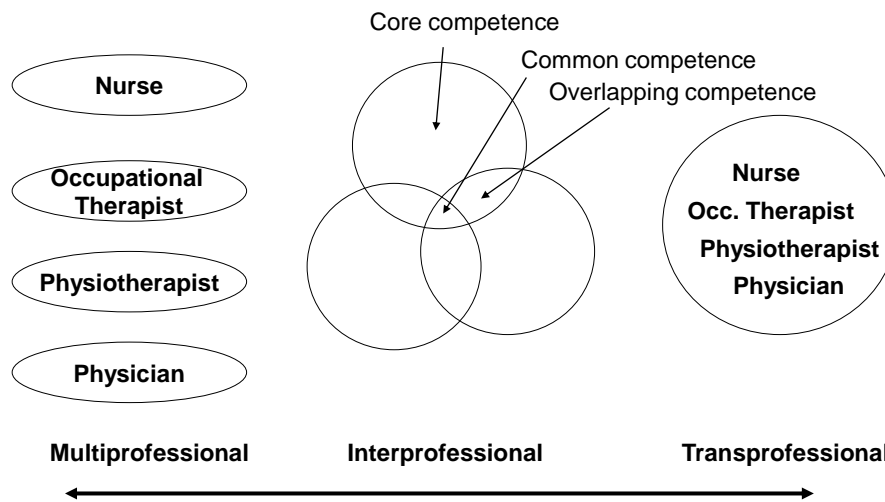


Figure 1. The cross-professional continuum.

“Interprofessional” is placed in the middle of the cross-professional continuum. In interprofessional education, each profession retains its own core competencies, but also possesses overlapping competencies. Overlapping competencies means that part of one profession’s competencies overlap with parts of other professions’ competencies, resulting in common competencies. The existence of such competencies means that all professions in the team are capable in that common area.

The term “Interprofessional education” is defined by The Centre for the Advancement of Interprofessional Education (CAIPE) and widely cited 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, 2002). McCallin (2001) states that “Interdisciplinary describes a deeper level of collaboration in which processes such as evaluation or development of a plan of care are done jointly, with the professionals of different disciplines pooling their knowledge in an independent matter”. Interprofessional collaboration and interprofessional team-work can be accomplished only through the interactive effort and contribution of the professionals involved. Interprofessional teamwork implies close collaboration between the professions involved, including collective planning, communication and shared responsibility (Thylefors et al., 2005; Petrie, 1976).

“Transprofessional education” is placed at the extreme end of the “Cross-professional continuum”. The documented definitions of “transprofessional” are less comprehensive than those of “interprofessional”.

Transprofessional teams are dependent on effective and frequent communication among members (Dyer, 2003). Such teams are highly organised and in the health care system consist of professionals who embrace the ultimate goal of promoting an integrated treatment plan jointly carried out by all team members (Webster.J, 2002). The transprofessional approach

can also be described as a framework for professionals which allows for the sharing and integration of expertise among the team members (Bell, Corfield, Davies, & Richardson, 2010).

#### *Definitions of teamwork and collaboration*

Teamwork and collaboration are often used in connection with the word interprofessional; therefore, a clarification seems appropriate here.

Barr et al., (2005) provides the following definition: "Teamwork is the process whereby a group of people, with a common goal, work together, often, but not necessarily, to increase the efficiency of the task in hand". Reeves synthesises the core of teamworking by using the following elements: 1) Shared team identity, which means that team members should feel a common identity; 2) clarity regarding roles, tasks and goals, which means that team members should have an understanding of all members' roles and tasks; 3) interdependence, which means that team members should feel dependent on each other; 4) integration, which means working in an integrated fashion with one another, and 5) shared responsibility, which means that even though team members should have their own individual role, they also have a shared responsibility (Reeves S, Lewin, Espin, & Zwarenstein, 2010).

Collaboration is defined as "...an active and ongoing partnership, often between people from diverse backgrounds, who work together to solve problems or provide services" (Barr H et al., 2005).

At first glance, these two definitions appear very much alike. But when we analyse the definitions, there is a clear difference because it is possible to collaborate without working as a team. However, when working as a team, we take for granted that collaboration must take place.

#### *Definitions of profession and discipline*

Profession and discipline are also often used interchangeably. Discipline can be defined as an academic discipline, such as sociology or biology, or as a subspecialty within a profession, e.g., anaesthesia or paediatrics within the profession of medicine. In contrast, a profession is a self-regulating group of people who possess a common body of knowledge, and who are entitled to call themselves a specific, protected, professional name, e.g. occupational therapist, physiotherapist, physician or nurse (Hammick, Olckers, & Champion-Smith, 2009; Barr H et al., 2005). In my interpretation, a profession can cover more than one discipline; consequently I deem profession the more comprehensive concept.

### **Possible barriers to collaboration and communication among professions**

In the Danish health system, theoretical and clinical education is mainly conducted multiprofessionally, resulting in professional socialisation caused by spending more time with colleagues from one's own profession and less time with colleagues from other professions. Such socialisation can result in the formation of strong stereotypes of one's own profession, as well as stereotypes attached to other professions (Hilton & von Hippel, 1996); therefore, it is appropriate that we dwell shortly on the concept of stereotypes.

#### *Stereotypes*

In short, stereotypes can be defined as beliefs regarding other groups, including beliefs regarding the characteristics, attributes, and behaviour of members of the groups in question. Stereotypes can be accurate representations of a person's experiences of a group, but they can also be formed independently of reality. Whether stereotypes represent reality or not, they do

serve the purpose of allowing the person holding them to rely on knowledge from past experiences, thereby making it easier to handle incoming impressions, but with the risk of losing information and lumping persons together instead of evaluating individual persons. Stereotypes are not necessarily negative in nature, but stereotypes about out-group members (members of groups to which we perceive we do not belong) often have more negative secondary meanings to us than do stereotypes of in-group members (members of groups to which we perceive we belong) (Hilton & von Hippel, 1996).

For example, medical students and nursing students have more favourable attitudes towards their own colleagues than to each other (Carpenter, 1995). The stereotypical image of a doctor is someone who is confident, decisive and dedicated, though arrogant; nurses, in contrast, are stereotyped as caring, dedicated, good communicators and not arrogant or detached (Carpenter J, 1995).

It is likely that students already, on their entry into a institution of higher education, possess stereotypical impressions of their own and other professions. When examining first year medical students' perceptions of the characteristics and backgrounds of nurses and doctors, Rudland and Mires found that medical students considered nurses to be more caring and doctors to be more arrogant and that they also considered nurses as possessing lower academic abilities, competence and status when compared to doctors (Rudland & Mires, 2005).

In another study regarding stereotyping, this time involving physiotherapy and occupational therapy students, researchers found that even though the two professions possessed both positive and negative descriptors for the other group, the assessments of a student's own group was clearly more positive than that of the other group (Streed & Stoecker, 1991). From the evidence discussed above, we can postulate that stereotypes allow the person who holds them to rely on past knowledge, thereby making easier the processing of incoming experiences; but at the same time, stereotypes also pose the risk of blurring information regarding a group of persons, as opposed to assessing individual persons. Finally, we see that stereotypes regarding out-group members often possess more negative connotations than do those describing in-group members. These negative aspects of stereotyping can contribute to hinder collaboration across professional boundaries.

#### *Written documentation and communication*

Written documentation is an important communication tool in the health care sector.

I will now provide an example to illustrate how the sharing of knowledge can be slowed when each profession has its own patient record instead of a common record.

According to the Danish National Board of Health, health professionals are obliged by law to keep a medical record for all patient activities (Sundhedsstyrelsen, 2008). Notes for the medical record are dictated by the physician, e.g., when going on the rounds the physician dictates changes in medication for the patient and further plans for the patient's treatment. The medical record is a working tool which, for the sake of patient safety, creates a base for documentation and communication among staff involved in the patient's care and provides information to the patient (Retsinformation, 2006).

To further insure continuity, safety and quality in treatment and care to patients, the Danish National Board of Health also demands that health care professionals (e.g. occupational therapists, physiotherapists and nurses) keep records on their work with the patients (Sundhedsstyrelsen, 2008). The requirements for these three types of records are largely identical with regard to demands for basic information on the patient, information on specific

aspects of the patient's contacts, information and consent, access to the record and record keeping. But there are some differences in the wording, e.g., one of the aims of the nurses' record is, to fix possibility for finding relevant information concerning both uniprofessional and interprofessional communication, with the addition that professional approved abbreviations can be used. In contrast, the requirements for the physiotherapists' record state that "When using abbreviations they should readily be understandable by peers". The possibility of using abbreviations only understandable to colleagues from one's own profession can contribute to developing a profession specific language (Petrie, 1976) accessible only to one's own profession because only when using these profession-specific words is it possible to be precise and to have a common, uniprofessional understanding of the concepts (Barr H et al., 2005).

The occupational therapy record and the physiotherapy record are normally kept in the occupational therapy and physiotherapy department and used for documentation and, to some degree (e.g. in connection with sick leave or other vacancy) for communication among colleagues in the same profession. The nurses' record, which is kept in the ward where the patient resides, is open to all professions involved with the patient to read, but is mainly used as a communication tool among the nurses. The doctor's record is also kept in the patient's ward and is also accessible to all professions.

These profession specific records are helpful in the daily work of each profession and, no doubt, the records are beneficial to the patient. But it is apparent that in a complex organisation consisting of four groups, each group operates in its own professional area when it comes to written documentation. Communication separated among multiple records can contribute to building and underpinning the social and cognitive boundaries that members of a profession create in relation to other professions.

Currently, an electronic patient record is being developed in Denmark. The purpose of this record is to gather all information about the patient in one place, so that all staffs involved with the treatment of the patient have easy access to information about the patient (Region Midtjylland, 2011). This effort seemingly solves the present problem concerning accessibility to information in the records, and it is hoped that it will also have positive implications for developing communication by means of a universally comprehensible language. But only the future can answer this question.

### **Less negative stereotyping and prejudices through intergroup contact**

Above, I accounted for the impact of stereotypes and boundaries, created by professional roles, identities and work practices, on the sharing of knowledge in general. I have also provided concrete examples of the potential negative consequences that may result from the existence of four more or less parallel record systems.

Intergroup contact is one way of reducing the negative prejudices that exist among different professions. A relevant theoretical approach to understanding intergroup contact is contact theory. This theory was originally developed for racial and ethnical encounters, but can be extended to other groups (Pettigrew & Tropp, 2006) including interprofessional education in the health sector (Hean & Dickinson, 2005).

More than fifty years ago, Allport, in the course of discussing contact theory, wrote about the positive changes that could be obtained through intergroup contact. According to Allport "Prejudice (unless deeply rooted in the character structure of the individual) may be reduced by equal status contact between majority and minority groups in the pursuit of common goals. The effect is greatly enhanced if this contact is sanctioned by institutional supporters (i.e., by



law, custom or local atmosphere), and provided it is a sort that leads to the perception of common interests and common humanity between members of the two groups” (Allport, 1954). Pettigrew structures, summarises, and extends Allport’s contact hypothesis like this: 1) equal status: it is important that both groups expect and perceive equal status in the situation; 2) common goals: prejudice reduction through contact requires an active, goal-oriented effort; 3) intergroup cooperation: attainment of common goals must be an interdependent effort without intergroup competition; 4) support of authorities, law, or custom: authority support establishes norms of acceptance; finally, with regard to development of optimal intergroup contact, Pettigrew adds 5) friendship potential: the contact situation must provide the participants with the opportunity to become friends (Pettigrew, 1998; Pettigrew, 1997).

#### *Use of the contact theory in interprofessional education*

In an editorial regarding “The need for multiprofessional health education in undergraduate studies” from the Faculty of Health Sciences at Linköping University, Areskog describes how six different professions in their first year of study participated in an interprofessional ten-week study period called “Man and Society” (Areskog, 1988). Contact theory is implicitly mentioned. The study period aimed to create a common base for teamwork (equal status and common goals). The study period also attempted to develop communication skills and an aptitude for group work (intergroup cooperation). It was understood that the University supported the students (support of authorities), and finally, by bringing together students from six different professions in small groups for ten weeks, the programme provided good opportunities for the students to learn each other better to know (friendship potential).

#### **A short overview of Interprofessional Training Units**

In order to further stimulate interprofessional cooperation, teamwork and knowledge of different professional competencies and skills, the first permanent ward for interprofessional clinical placement in Sweden was established in Linköping in 1996 (Fallsberg & Wijma, 1999). The goals of the training ward were to provide students with training in teamwork; to enable students to develop their own professional role; to enable students to develop an understanding of other healthcare professionals’ competencies and skills and to enable the students to recognise patients’ needs. Students from the community care supervision, medical, medical laboratory technology, nursing, occupational therapy and physiotherapy professions worked and trained together during a mandatory two-week period.

Two years later, the Karolinska University Hospital in Stockholm established four sites for interprofessional clinical placement (Mogensen, Elinder, Widstrom, & Winbladh, 2002).

In the period from 2001 to 2008 seven more ITU’s were established in Sweden. With inspiration from the experiences of the Swedish ITU’s, the first Danish ITU was established in Holstebro in 2004. In 2007, two more ITU’s were established in Denmark, in Kolding and Aalborg. Outside Scandinavia I have only been able to identify two additional, permanent ITU’s, namely in London, where an ITU was established in Queen Mary’s Hospital in 2004 and another ITU in Princess Alice Hospice, established in 2008 (Dando, d’Avray, Colman, Hoy, & Todd, 2011).

An overview of permanent ITU’s in Sweden and Denmark is presented in table 1. The ITU’s are identified and described with the help of the Nordic Interprofessional Network homepage (NIPNET, 2011) and supplemented by searching the internet and by personal communication.

As can be seen from table 1, different terms are used for the units. In Sweden seven sites are called “Clinical Education Ward”. In Denmark, two of the sites are called “Interprofessional Clinical Training Unit” and one is called “Interprofessional Training Unit”. However, all the ITU’s have the same purpose, which is to bring students from several professions together to learn more about their own profession as well as the other professions.

Orthopaedic patients are the most commonly admitted group in the ITU’s described in table 1; they are admitted to nine of the fifteen units. Geriatric patients are admitted to three units; one unit receives internal medical patients and one unit (an emergency room) receives acute patients for medical, surgical, and orthopaedic diagnosis and treatment.

The professions represented in the fifteen units are nurses (15 of 15), occupational therapists (14 of 15), physiotherapists (14 of 15), physicians (12 of 15), health care assistants (2 of 15), dietician (1 of 15), radiographer (1 of 15), medical laboratory technician (1 of 15) and speech therapist (1 of 15).

Setting	Patients	Professions	Weeks	Start	Under the name
UHL, ward 30, Sweden	Ward for 8 orthopaedic patients	Ph, Nu, PT, OT	2	1996	Clinical Education Ward (CEW)
KUHS, Solna, Sweden	Emergency ward for surgery-, orthopaedic- and medical patients	Ph, Nu, PT	2	1998	Clinical Education in an out-patient setting
KUHS, Huddinge, Sweden	Ward for 8 orthopaedic patients	Ph, Nu, PT, OT	2	1998	Interprofessional Training Ward (IPTW)
KUHS, Danderyd Sweden	Ward for 8 orthopaedic patients	Ph, Nu, PT, OT	2	1998	Clinical Education Ward (CEW)
KUHS, Södersjukhuset, Sweden	Ward for 9 orthopaedic patients	Ph, Nu, PT, OT	2	1998	Clinical Education Ward (CEW)
UHL, Vrinnevi, Norköping, Sweden	Ward for 6 orthopaedic patients	Ph, Nu, PT, OT	2	2001	Clinical Education Ward (CEW)
Remonthagen, Østersund, Sweden	Ward for 8 orthop. rehab. patients	Ph, Nu, PT, OT, Hc	2	2003	Clinical Education Ward (CEW)
Klosterbacken / Örebro University, Sweden	Ward for 12 geriatric patients	Nu, OT	3	2003	Training Ward (TW)
SUH, Göteborg, Sweden	Ward for 15 geriatric patients	Nu, PT, OT, Di	2	2003	Clinical Education Ward (CEW)
Holstebro Regional Hospital, Denmark	Ward for 8 orthopaedic patients	Ph, Nu, PT, OT	2	2004	Interprofessional training unit (ITU)
Malmö University Hospital, Sweden	Ward for 8 medical patients	Ph, Nu, PT, OT	2	2005	Clinical Training Ward (CEW)
UHL, ward 82, Sweden	Ward for 6 geriatric patients	Ph, Nu, PT, OT, St	2	2006	Clinical Education Ward (CEW)
Kolding Hospital, Denmark	Ward for 8 orthopaedic patients	Ph, Nu, PT, OT, Ra, Me	2	2007-2010	Interprofessional clinical training unit (ICTU)
Aalborg Hospital, Denmark	Ward for 8 orthopaedic patients	Nu, OT, PT, Hc	2	2007	Interprofessional clinical training unit (ICTU)
Lasarettet i Enköping, Sweden	Ward for 9 orthopaedic patients	Ph, Nu, PT, OT	2	2009	Clinical Education Ward (CEW)

Table 1. Clinical Interprofessional Education Wards in Sweden and Denmark. UHL: University Hospital Linköping; KUHS: Karolinska University Hospital Stockholm; SUH: Sahlgrenska University Hospital; Ph: physician; Nu: nurse; PT: physiotherapist; OT: occupational therapist; Hc: Health care assistant; Di: dietician; Ra: radiographer; Me: medical laboratory technician; St: speech therapist.

The length of placement was two weeks in all but one unit; in that unit, the length of placement was three weeks.

To sum up this brief overview, the most common ITU in Sweden and Denmark has eight beds in an orthopaedic ward and is staffed with students from medicine, nursing, occupational therapy and physiotherapy for periods of two weeks.

When further searching the literature to identify possible ITU's, the question: "Where in the world is interprofessional education" seemed to be a good place to start. This question was recently asked by the World Health Organization, which performed an environmental scan in the form of an internet-based survey (Rodger & Hoffman, 2010). The purpose of the paper was to investigate where, how and why IPE is conducted.

From three hundred and ninety-six completed responses, it appeared that the majority of the respondents work in the developed countries and of these, two thirds are from Canada, the United Kingdom and the United States.

Approximately one-third of the respondents indicated that interprofessional education took place in the form of working as a part of team to care for patients in a hospital setting or in the community, or as an apprentice under the direction of a practitioner. However, the article includes no further description of how this clinical, interprofessional education experience was organised. Therefore, this article did not provide information regarding duration, place and content of the experience, nor any information regarding other possible ITU's.

### **A short overview of publications from Interprofessional Training Units**

After having described the Swedish and Danish ITU's, it seems appropriate to provide a short overview of empirical studies regarding results from Scandinavian ITU's. The studies presented in table 2 were identified with the help of the NIPNET homepage (NIPNET, 2011) and supplemented with hand searching of relevant journals and by personal communication. Twelve Swedish empirical studies (but no Danish studies except for the five in this dissertation) were identified from ongoing ITU's (table 2). Eight of the studies included only students, one study included both students and patients, one study included patients, one study included former students and one study included nurse facilitators. The methods used included quantitative methods (seven of the studies), and qualitative methods (five of the studies). Overall results of studies involving students revealed that students learned more about their own profession and about the other professions. Three of the studies identified specific challenges to relevant participation for paramedical programmes (Fallsberg & Wijma, 1999; Fallsberg & Hammer, 2000; Lidskog, Lofmark, & Ahlstrom, 2009). The two studies including patients showed that patients were highly satisfied with their stay in the ITU's. The study that included former students demonstrated that undergraduate interprofessional clinical training provides lasting impressions that may promote teamwork after graduation. The study that included nurse facilitators highlighted the nurses' role as team builders because the nurses were in the unit at all times, while clinical tutors from other professions were only in the unit during office hours.

All these twelve publications demonstrated positive results for students (learning more about own and about other professions), for patients (satisfied with their stay), former students (lasting impressions) and provided a description of nurse facilitators (describing nurses role as team builders).

In 1999, a four week pilot Interprofessional Training Ward was run in London. The results from this pilot correspond with the Swedish results (Freeth et al., 2001; Reeves, Freeth, McCrorie, & Perry, 2002; Reeves & Freeth, 2002). Dando et al., recently described similar positive results from an ITU in a palliative care unit (Dando et al., 2011).

<b>Participants</b>	<b>Method</b>	<b>Results</b>	<b>Reference</b>
<b>Students</b> from the professions: Ph, Nu, OT, PT	Questionnaire	Description of influence of <b>students</b> learning approaches on learning IPC	(Hylin, Lonka, & Ponzer, 2011)
<b>Nurse facilitators</b>	Symbolic interactionism	<b>Nurses role</b> as team builders	(Carlson, Pilhammar, & Wann-Hansson, 2011)
<b>Students</b> from the professions: Ph, Nu, OT, PT, Me, Co	Questionnaire	<b>Students</b> expectations fulfilled (medicine and paramedical programmes less positive)	(Fallsberg & Wijma, 1999)
<b>Students</b> from the professions: Ph, Nu, OT, PT, Me, Co	Interview & Critical Incident Method	1) description of <b>students'</b> strategies; 2) original concept changed (some professions were excluded since their professional tasks were too few)	(Fallsberg & Hammer, 2000)
<b>Students</b> from the professions: Ph, Nu, OT, PT	Questionnaire	<b>Students</b> increased their 1) perceived interprofessional competence and 2) their own professional role	(Hallin, Kiessling, Waldner, & Henriksson, 2009)
<b>Patients</b>	Questionnaire, case control	<b>Patients</b> treated in CEW perceived a higher grade of care than patients in the conventional ward	(Hallin, Henriksson, Dalen, & Kiessling, 2011)
<b>Alumni</b> from the professions: Ph, Nu, OT, PT	Questionnaire, follow-up	Undergraduate clinical training provides lasting impressions that may promote teamwork	(Hylin, Nyholm, Mattiasson, & Ponzer, 2007)
<b>Students</b> from the professions: Nu, OT, Sw	Interview	<b>Students</b> need opportunities for reflection on and scrutiny of each other's beliefs and knowledge	(Lidskog, Lofmark, & Ahlstrom, 2007)
<b>Students</b> from the professions: Nu, OT, Sw	Interview	A three week stay in the IPTW enhances <b>students'</b> understanding of each other's profession	(Lidskog, Lofmark, & Ahlstrom, 2008)
<b>Students</b> from the professions: Nu, OT, Sw	Case study	<b>Students</b> found the collaboration with the other students valuable, but sometimes there was a discrepancy between expectation and goals as compared to actual participation	(Lidskog et al., 2009)
<b>Medical students and Patients</b>	Questionnaire	<b>The medical students</b> in general were satisfied with the stay in the CEW. <b>The patients</b> perceived CEW as highly satisfactory	(Lindblom, Scheja, Torell, Astrand, & Fellander-Tsai, 2007)
<b>Students</b> from the professions: Ph, Nu, OT, PT	Questionnaire	Students developed their own professional role and their functions as team members	(Ponzer et al., 2004)

Table 2. Overview of twelve publications from ITUs in Sweden. Ph: physician; Nu: nurse; PT: physiotherapist; OT: occupational therapist; He: Health care assistant; Di: dietician; Ra: radiographer; Me: medical laboratory technician; St: speech therapist; Co: Community care supervisor; Sw: Social worker

### **Why this study?**

As mentioned above, the creation of the ITU in Holstebro was inspired by the experiences of similar units in Linköping and Stockholm, where all students performed both profession-specific tasks (e.g., care and treatment of the patients) and non profession-specific tasks (e.g., meals and hygiene). During the first half year (the autumn of 2004) of the ITU's operation occupational therapy students, physiotherapy students and nursing students (the medical students did not start in the ITU until 2006) participated in activities associated with basic patient care and other procedures, such as taking the patients temperature. After the autumn semester, the clinical tutors and the project manager summed up the students' evaluations and their own pedagogical experiences and decided to change the concept of IPE in the ITU by emphasising that all the students' task should be relevant to their respective profession. Making as many tasks as possible relevant to the various professions demanded new and creative thinking on the part of the clinical tutors. One example was to ensure that students would have different professional perspectives on particular activities, such as walking a patient. When the nurse walked the patient, it was preventing the complications of immobility; when the occupational therapist walked the patient, it was as an activity; and when the physiotherapist walked the patient, it was training and progression.

As mentioned above, the Swedish publications demonstrated positive results for students and patients. But because ITU's are new in Denmark and because we changed and adjusted the original Swedish concept to suit our conditions, we found it necessary to investigate how the results lived up to our stakeholders expectations concerning students uniprofessional and interprofessional learning outcomes, how students transferred interprofessional learning to their professional practice and cost-effectiveness.

### **Description of the Interprofessional Training Unit in Holstebro**

The empirical findings in this study are associated with the ITU in Holstebro. Therefore, I will now give a presentation of the case.

#### *History*

In 2002 several events stimulated the idea of establishing an ITU in Holstebro. Five former independent hospitals in the county were merged into one organisation with the purpose, among others of creating a "Good clinical pathway". Medical students from Aarhus University began to be assigned to clinical placements in Holstebro; for this reason, as well as the purpose of attracting more physicians to the region, the Executive Board of the Hospital wanted to create a well functioning learning environment (Ringkjøbing Amt, 2004). Furthermore, a new curriculum with more emphasis on interprofessional education for students from occupational therapy, physiotherapy and nursing became operational. These series of events culminated in the establishment of a steering group with the purpose of composing a project description of an ITU. The steering group consisted of twenty persons representing such stakeholders as deans, managers, and staff from the professions and departments that were expected to be involved. The steering group undertook a study trip to Linköping in Sweden and, using the inspiration gained from the trip, created an organisation and a set of objectives for the ITU. After two years of preparatory work, the ITU was launched in September 2004.

### Localisation

The decision was made to place the ITU in an orthopaedic ward and to staff it with students from occupational therapy (4<sup>th</sup> – 6<sup>th</sup> semester), physiotherapy (4<sup>th</sup> – 6<sup>th</sup> semester), medicine (8<sup>th</sup> semester) and nursing (6<sup>th</sup> semester). Work periods were set for two weeks in order for students to have the opportunity to follow the whole course of treatment for a patient with such problems as a hip fracture, or for a patient admitted for an arthroplasty of the hip; at that time, two weeks was the average length of stay for these types of patients. It was found that it was important for the therapy and medical students to become part of the ITU rather than to engage in the normal way of working and learning, which was for members of those professions to come to a ward, perform the required task and then leave.

The ITU consists of eight beds, an office and several teaching rooms that forms part of a conventional, 42 bed orthopaedic ward. During the project period, different types of orthopaedic patients were assigned to the ITU; but it ended up with only patients admitted for arthroplasty of the hip or the knee or for hand surgery were assigned to the unit.

### Time schedule

Table 3 gives an overview of the students' working hours and tasks. As shown, we do not label the students "students", but address them as members of their future profession. The medical students (physicians) participate in the ITU on terms different from the other professions. One important reason for this difference is that the physicians tasks are more different from the three other professions tasks, than the three other groups task are among them. Another reason is that the medical students are obliged to participate in shared lessons each afternoon as a part of a twenty-week clinical placement in Holstebro Regional Hospital. Finally, because we wanted to include the medical students in the professional orthopaedic surgeon team, we allowed them to participate in the joint morning meeting for all orthopaedic surgeons in the hospital.

### Staff

A full-time project manager was employed for the three year project period. The project manager was responsible for planning, documenting and evaluating the activities in the ITU. The project manager was also a resource person for the clinical tutors and responsible for fostering collaboration between the hospital and the educational institutions.

Time	Occup. Therapist	Physiotherapist	Nurse	Physician
07.00 – 08.40	Common tasks with professional focus			
07.45 – 08.40				Physicians meeting
08.40 – 09.00	Coffee break			
09.00 – 10.00	Interprofessional morning meeting			
10.00 – 11.30	Examination, nursing, treatment, exercising, planning			Round, dictate for the record, dinner break, operation Shared lessons
11.30 – 12.30	Serve dinner, mobilise patients, dinner break			
12.30 – 14.00	Meeting, lessons, tutoring, administrative tasks			
14.00 – 14.30				
14.30 – 16.00	Examination, nursing, treatment, exercising, planning			
16.00 – 17.30				
17.30	Serve supper, mobilise patients			
18.00	Evening round and administrative tasks			
19.45	Verbal report to night staff			

Table 3. Overview of working hours and tasks for the students.

One full-time nurse clinical tutor was employed for the first half-year of the programme, as well as one half-time occupational therapy clinical tutor, one half-time physiotherapy clinical tutor and approximately one-quarter time medical associate professor. However, it very quickly became clear that it was important that equal resources were provided for therapists and nurses; the hospital board subsequently found the necessary resources to increase the staff of full-time clinical tutors for the those three professions. Furthermore, four full-time nurses were also permanently employed in the ITU.

### *Pedagogy*

The students, under supervision from trained personnel from their own future professions, handled the daily running of the unit with regard to the care and rehabilitation of the patients. The schedule was used as a pedagogical tool, and the teaching methods included students working as professionals, with necessary tutoring provided before, during and after their activities.

Interprofessional learning builds upon adult learning methods. Adult learners are motivated by the tasks they identify and perform themselves. In the ITU, students are required to identify and perform tasks in accordance with the patients' needs. Learning that has a direct link to work and is task-centred and problem-solving is likely to be long-lasting (Barr H et al., 2005).

Our pedagogy is practice based, which means that patients' needs and the description of procedures set the agenda. In other words, the patient comes first, then the student. We emphasise that learning be active, self-directed and collaborative. The reason for employing this pedagogy is the desire for students to feel the necessity of performing their job such that they make a difference to the patient and to the ITU.

The interprofessional morning meeting is a focal point for working and learning in the ITU. Here, in a safe learning environment, students are expected to stand up for themselves, to make decisions and to answer questions from clinical tutors, associate professors and fellow students.

In the ITU, we emphasise that students work as professionals in their own profession. The interprofessional aspect of the experience arises when the students observe each other at work, or when they collaborate on a task, with each contributing their professional view on the task and afterwards discussing how approaches to the task differ by profession.

We perform no summative evaluation of the clinical placement, but formative evaluation takes place whenever appropriate during the placement. Each period concludes with a group interview of the students. The interview has three aims: 1) to make the students' reflect on their placement, 2) to inform the clinical tutors about the students' evaluation and 3) to collect data for evaluation and research.

### *The learning objectives were*

- Give care to, nurse and rehabilitate the patients in "The good clinical pathway"
- Understand and strengthen students' individual professional roles
- Understand the knowledge and skills of the other professionals
- Learn interprofessional teamwork

*Further aims for the ITU were*

- Make use of the learning potential in the study environment by developing and testing new ways of coordinating, integrating and combining clinical and theoretical teaching and learning in an interprofessional context
- To create a professional study environment for clinical research

## **Aim**

This dissertation will concentrate on interprofessional education and collaboration among students in occupational therapy, physiotherapy, medicine and nursing; the overall aim of this dissertation is to evaluate the ITU

### **Study I**

The aim of this study was to investigate the fulfilment of goals of the ITU as evaluated by students, managers, deans, clinical tutors, the project manager and an external observer (The goals were the following: to teach students interprofessional teamwork; to strengthen students' individual professional role; to teach students how to work in a complex organisation and to create a learning environment in which new methods and the integration of clinical and theoretical interprofessional learning are developed and tested).

### **Study II**

The aim of this study was to investigate how students' attitudes regarding their own and other professions change from the outset to the end of their clinical placement in the ITU

### **Study III**

The aim of this study was to investigate whether the ITU was cost-effective in treating patients when compared with a conventional ward.

### **Study IV**

The aims of this study were to investigate the medical students' development of professional knowledge and capability, including taking part in interprofessional collaboration; and to evaluate the learning environment in the ITU.

### **Study V**

The aim of this study was to investigate students' perceptions of the most important learning outcome from their experience in the ITU, both immediately after the stay in the ITU and after they had graduated.

## **Methods**

### **Time frame and participants**

The five studies included in this thesis were undertaken in the period from 1 September 2004 to 15 January 2008. Table 3 provides an overview of the time and participants in the studies. Students were included in studies I, II, IV, and V. Study III included patients and study I included, in addition to students, one head nurse and two superintendent physiotherapists from the hospital, three deans from the schools, three clinical tutors, an associate professor,



Study	Time frame	Participants
I	1. September 2004 – 15. June 2007	Focus group interview of 1. One head nurse and two superintendent physiotherapists 2. Two students each from occupational therapy, physiotherapy, medicine and nursing 3. Three deans from occupational therapy, physiotherapy and nursing 4. Three clinical tutors and one associate professor Interview of 5. One external observer 6. The project manager
II	1. September 2006 – 15. June 2007	29 occupational therapy students 31 physiotherapy students 33 medical students 69 nursing students
III	1. September 2006 – 15. December 2006	62 patients from the conventional ward 72 patients from the ITU
IV	1. September 2006 – 30. January 2008	55 medical students
V	1. September 2004 – 15. January 2008	398 of 426 eligible students and alumni from occupational therapy, physiotherapy and nursing participated

Table 4. Overview of time frames and participants in study I – V

an external observer and the project manager. Study V included, in addition to students, alumni (Table 4).

### A short overview of the methods used in the five studies

Table 5 provides an overview of the three types of methods used in the five studies. The qualitative approach used in studies I and IV was chosen because it facilitated the exploration of the phenomena as experienced by individuals themselves in their natural context (Malterud, 2001). Studies II and III were purely quantitative, in the form of questionnaire and an analysis of cost-effectiveness. In study IV, qualitative methods were supplemented with quantitative approaches in the form of a questionnaire. Study V used mixed methods (Table 5).

Study	Methods	Type	Analysis
I	Focus group interview & interview	Qualitative	Transverse analysis performed as Systematic Text Condensation
II	Questionnaire	Quantitative	Paired samples t-test and One-Way ANOVA
III	Cost-effective analysis	Quantitative	Evaluation of cost and effect
IV	a) Focus group interview b) Written statements c) Questionnaire	a) Qualitative b) Qualitative c) Quantitative	a) Systematic Text Condensation b) Systematic Text Condensation c) Counting & description
V	a) Written statements b) Written Statements c) Questionnaire	a) Mixed methods b) Mixed methods c) Quantitative	a) Editing Organising Style & counting b) Template Organising Style & counting c) Chi-square test & Mann-Whitney rank sum test

Table 5. Overview of methods for study I - V

### **Study I Data collection and analysis**

This study investigated the fulfilment of the goals of the ITU, as evaluated by students, managers, deans, clinical tutors, the project manager and an external observer.

**Data collection:** In order to accomplish a thorough analysis, a purposeful sampling was chosen (Malterud, 1993) by including informants from local management (head nurse and superintendent physiotherapists), students (from the four professions), educational institutions (deans), educators (clinical tutors and associate professor) and the project manager. Furthermore, a PhD student who, as part of her study regarding “Power – knowledge and nursing” served as an external observer and made observational studies in the ITU, was also interviewed.

Using as a starting point the aims for ITU, a common, semi-structured interview-guide was constructed, and four focus group interviews and two interviews were performed. Even though the same interview guide was used in all interviews, emphasis was placed on different subjects depending on whom were interviewed: 1) for the focus group interview of the head nurse and two superintendent physiotherapists, emphasis was placed on organisation and cultural-co-operational subjects; 2) for the focus group interview of eight students from the four professions, discussion focused on interprofessional learning, the learning environment, responsibility and independence; 3) for the focus group interview of the three deans, the discussion concentrated on the learning environment and organisation; 4) for the focus group interview of three clinical tutors and one associate professor, discussion emphasised the learning environment, as well as learning and teaching conditions; 5) for the interview of the PhD student, who as part of her PhD programme observed students and working methods in the ITU, emphasis was placed on the learning opportunities created by the setting and organisation; 6) for the interview of the project manager, emphasis was put on organisational and learning matters.

**Analysis:** The six interviews were transcribed using “slightly modified verbatim mode” and a transverse analysis was performed as Systematic Text Condensation (Malterud, 2003). Five interview transcriptions were coded individually by three of the authors and one interview transcript was coded individually by two of the authors. Any disagreement in individual coding was discussed until consensus was reached.

### **Study II Data collection and analysis**

This study investigated how students’ attitudes towards their own and other professions changed from the outset to the end of their clinical placement in the ITU.

**Data collection:** In this study we used the “Attitudes to Health Profession Questionnaire” (AHPQ) because it was developed with the aim of understanding differences in attitudes among healthcare groups and to evaluate attitudinal change over time (Lindqvist, Duncan, Shepstone, Watts, & Pearce, 2005). The AHPQ was translated into Danish by the method described by Beaton and colleagues (Beaton, Bombardier, Guillemin, & Ferraz, 2000). The AHPQ consisted of 20 items with two opposite attributes placed at either end of a 10 cm visual scale. The AHPQ was located in the 20 items that measured two different dimensions termed “caring” and “subservient”: Examples of the “caring” dimension include empathetic, approachable and values teamwork. Examples of the “subservient” dimension include assertive, values autonomy and technically focused.

The questionnaire consisted of four sections, one for each profession. All professions were requested to fill in all four sections. The questionnaire was administered on two occasions: at the outset of the students experience at the ITU and after the two-week experience.

Analysis: Data were collated by measuring the 10 cm scale using a conventional ruler. Data were keyed into Epidata as centimetres with one decimal and analysed using Excel and SPSS 13.0. Levels of significances within and between groups were estimated using a paired samples t-test and One-Way ANOVA respectively.

### **Study III Data collection and analysis**

This study assessed whether the ITU was cost-effective in treating patients when compared with a conventional ward.

Data collection: All patients admitted to the conventional orthopaedic ward (COW) and to the ITU for scheduled total hip arthroplasty (THA) or knee joint arthroplasty (TKA) during the research period were randomly allocated to the COW or the ITU. Use of resources for care, rehabilitation, diagnosis/treatment and instruction/guidance were identified from time studies and observations by an independent observer. Hotel management costs for the patients were calculated from the hospital's central accounting system. Data regarding diagnosis, procedure codes, gender, age, length of stay (LOS), and operating surgeon were drawn from the hospital's patient register. Data regarding self-reported quality-of-life (HRQOL) were collated from the preoperative in-patient visit and the three-month postoperative control-visit.

Analysis: The effect of the intervention was calculated from the change in HRQOL between the preoperative in-patient visit and the three-month postoperative control visit. We measured the HRQOL by using the generic questionnaire EQ-5D ([www.euroqol.org](http://www.euroqol.org)).

Cost was estimated by multiplying daily costs with actual LOS in the COW and in the ITU.

The cost-effectiveness of the ITU intervention compared to the COW intervention was estimated by relating the incremental cost of the two interventions to the incremental effect of quality adjusted life years (QALY).

### **Study IV Data collection and analysis**

This study investigated medical students' development of professional knowledge and capability, including participating in interprofessional collaboration and evaluated the learning environment in the ITU.

Data collection: Three sources of data were used. 1) A questionnaire with a five-point Likert scale containing questions addressing the interprofessional meetings, rounds, teaching, learning about own profession, learning about other professions, an overall assessment of the stay in the ITU and, finally, room for additional comments, was distributed to 55 medical students on their last day in the ITU and filled in before the students went home that day. 2) To validate and deepen the questionnaire, 22 medical students participated in a group interview concentrating on the students' evaluation of fulfilment of the goals for the ITU. 3) Before beginning the interview, the students were asked to write down three short sentences describing what they considered the most important learning outcomes from the clinical placement in the ITU.

Analysis: 1) the answers to the questionnaire were summed up; 2) the interview was transcribed using “slightly modified verbatim mode” and an analysis was performed as Systematic Text Condensation (Malterud, 2003), the interview transcription was coded and analysed by one of the authors, after which another of the authors went through the material, any disagreement in coding was discussed between the two authors until consensus was reached; 3) the students written statements describing their most important learning outcome were sorted into according themes addressing “interprofessional” and “uniprofessional” outcomes and were used to elaborate on and validate of the answers to the questionnaire described above.

The three sources of data were utilised together to achieve the goals of the study, i.e., to describe the students’ attainment of professional knowledge and capabilities, including participating in interprofessional collaboration, and to evaluate the learning environment.

### **Study V Data collection and analysis**

This study investigated students’ perceptions of the most important learning outcome of their experience in the ITU, both immediately after the stay in the ITU and after they had graduated.

Data collection: Data were collected on two occasions, with one type of data collected on the first round (students) and two types of data on the second round (alumni). In the first data collection round, the students on their last day in the ITU were asked to write down three short sentences describing what they had found to be the most important learning outcomes from their clinical placement in the ITU. In the second data collection round, alumni 1 – 4 years after graduation were once again asked to write down three short sentences describing what they had found to be the most important learning outcomes from their clinical placement in the ITU. For the alumni, a questionnaire with twelve statements, each on a five-point Likert scale also was included.

Analysis: The statements from the first data collection were transcribed into Excel and analysed independently by two of the authors using the *Editing Organising Style* (Crabtree & Miller, 1999). Any disagreement in coding was discussed until consensus was reached. The statements from the second data collection were analysed using the *Template Organising Style* (Crabtree & Miller, 1999) with the template consisting of four themes defined during analysis of the data from the first collection. Subsequently, quotations addressing the different themes from both data collections were counted, and a chi-square test was applied to test for differences between students and alumni.

During the time of the first data collection, we had 55 teams in the ITU; we received profession-specific answers from 34 of the 55 teams. As we also wanted to examine possible differences among the statements given by participants from different professions regarding the most important learning outcomes, we controlled for differences in age (Mann-Whitney rank sum test) and gender (chi-square test) among the 34 teams and the remaining 21 teams from which we did not have professions specific answers. We found no significant differences.

## Results

### Key findings study I

This study investigated the fulfilment of the goals of the ITU, as evaluated by students, managers, deans, clinical tutors, the project manager and an external observer.

According to the informants' statements, the ITU appeared to have succeeded in fulfilment of the four goals: 1) students from all the professions involved learned more about interprofessional teamwork than they had learned in other situations; 2) students gained a better understanding of their own professional role and strengthened their own professional role; 3) students learned to work together with other professions in an organisation operating for the benefit of the patient; 4) the ITU created a learning environment with new methods of coordinating and integrating clinical and theoretical forms of interprofessional learning. The clinical tutors have succeeded in creating a unique and secure interprofessional learning environment in which students receive the necessary tutoring and learn together with, from and about each other's profession while caring for, training and rehabilitating the patients.

In summary, this study provided insights into students' and other stakeholders' views of the learning experience and its interprofessional nature.

### Key findings study II

This study investigated how students' attitudes towards their own and other professions changed from the outset to the end of their clinical placement in the ITU.

A total of 162 of 169 (96 %) possible students completed the translated AHPQ, including 29 occupational therapy students from the 4<sup>th</sup> – 6<sup>th</sup> semester, 31 physiotherapy students from the 4<sup>th</sup> – 6<sup>th</sup> semester, 69 nursing students from the 6<sup>th</sup> semester and 33 medical students from the 8<sup>th</sup> semester.

Regarding students' views as a whole, both before and after their stay in the ITU, students viewed doctors as the least "caring", followed by the physiotherapists, occupational therapists, and finally nurses who were seen as the most "caring". Differences in how students perceived the four professions before their stay in the ITU were significant (One-way ANOVA). The same relationship between students' views of the professions was observed when examining the "subservient" axis, as students perceived nurses as the most "subservient", followed by occupational therapists, physiotherapists and finally doctors, who were seen by the students as the least "subservient". These differences, observed at the outset of the intervention, were also significant (One-way ANOVA).

Students' views changed after the two-week stay in the ITU. Students' viewed all professionals as more "caring" after working together for two weeks in the ITU. Students' views regarding doctors underwent the greatest change on the "caring" dimension. Doctors were seen as have become more "subservient", whilst physiotherapists, occupational therapists and nurses were viewed as being less "subservient". All these changes were significant (Paired samples t-test).

In general, each professional group viewed members of their own profession as more "caring" than students from other professional groups. The stay in the ITU did not change any profession's view of itself very much.

The results suggest that students came to better appreciate the "caring" aspects of each other's role after the clinical placement in the ITU. Results also showed that the nursing students' attitudes towards other professions changed the most. However, despite this change in attitude regarding perceptions of "caring", the pattern remained very similar, with medical doctors being regarded as being less "caring" and less "subservient" than members of the three other professions.

In summary, this study demonstrated changes in reciprocal attitudes among the four involved professions.

### **Key findings study III**

This study assessed whether the ITU was cost-effective in treating patients when compared with a conventional ward.

Patients from the conventional ward (62) and the ITU (72), who were otherwise comparable at base line and admitted for primary hip or knee replacement surgery, were included in the study. All costs were recorded in the ITU and in the conventional ward. Follow-up was done by a quality of life questionnaire three months after the operation. Comparisons were made by using univariable and multivariable testing of costs and effect. The results of both the univariable and the multivariable tests deemed the ITU was more cost-effective than the conventional ward. No difference was found in complications and patient-reported quality of life. In conclusion, clinical training can be given to students in an ITU without reducing productivity in a hospital environment if pedagogic principles, clinical tutors and patient logistics all adapt to the challenge of the teaching environment.

In summary this study demonstrated improvement for patients in the form of shorter length of stay in the hospital than comparable patients in the conventional ward.

### **Key findings study IV**

This study investigated medical students' development of professional knowledge and capabilities, including participation in interprofessional collaboration, and evaluated the learning environment in the ITU.

Our results showed that the 55 medical students who participated in this project during their clinical placement in the ITU developed their professional knowledge and capabilities and became more aware of their role as a doctor. In the interprofessional morning meeting, the medical students learned about the work of occupational therapists, physiotherapists and nurses simultaneously with learning about interprofessional collaboration. The medical students valued the learning environment, in which all students were equal in status. The associate professors emphasised that the students were in the forefront and were to be treated as professionals. Future focus areas for medical students' clinical placement in the ITU involves more homogeneous instruction and a better introduction to the ITU.

In summary, this study: 1) provided insight into students' views on the learning experience and its interprofessional nature and 2) demonstrated changes in reciprocal attitudes between the four involved professions.

### **Key findings study V**

This study investigated students' perceptions of the most important learning outcome of their experience in the ITU, both immediately after the stay in the ITU and after they had graduated.

The first round of data collection included 1,087 statements from 93 % (398) of the 428 students. In the second round of data collection, we identified 392 of the 428 former students who were now alumni. After two postal reminders, 86 % (336 of 392) of the alumni returned the questionnaires and provided 825 statements.

Four themes emerged from the first round of data collection. These were 1) "uniprofessionalism", 2) "interprofessionalism", 3) "professional identity" and 4) "learning environment". These themes were used as a template for analysing the results from the second round of data collection.

The most important theme for students was "uniprofessionalism" (35 %) followed by "interprofessionalism" (31 %) and "professional identity" (28 %). "Learning environment" (6 %) was ranked as the lowest of the four identified themes. When examining the answers provided by alumni, the rating of "uniprofessionalism" as the most important learning outcome decreased from 35 % to 21 % ( $p < 0.05$ ), "interprofessionalism" increased from 31 % to 36 % ( $p < 0.05$ ), and "professional identity" increased from 28 % to 38 % ( $p < 0.05$ ). There was no significant change for "learning environment".

When examining the professions separately, there was a similar trend for all professions (as mentioned above). However, there were differences among the professions in the scoring of "professional identity". Both as students and as alumni, the nurses scored "professional identity" approximately twice as highly as the other professions, at the expense of "uniprofessionalism" and "interprofessionalism".

When the alumni were asked about their agreement with statements concerning the four categories mentioned above they agreed or partly agreed with the given statements (77 – 93 %).

In summary this study indicated that, over time, the students differ in their perceptions of the outcome of the learning experiences in an ITU. Whereas students state uniprofessional outcome more frequently, alumni in retrospect see professional identity and interprofessionalism as the most important.

## **Discussion**

The overall aim of this dissertation was to evaluate the ITU. One widely used model for evaluating training programs is the "Kirkpatrick Model" (Kirkpatrick, 1998). Freeth et al., (2002) recognises the value of Kirkpatrick's evaluation model for summarising the outcomes of education. However, over time and through an iterative approach informed by the evaluations they have studied, they have adjusted and extended the model to better suit it for evaluation of interprofessional education (Freeth, Hammick, Koppel, Reeves, & Barr, 2002) (table 6).

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

Table 6. The JET (The Interprofessional Education Joint Evaluation Team) classification of interprofessional education outcomes, modified Kirkpatrick's model, from: Freeth et al., 2002

Outcomes in each of the levels are not hierarchical. However, gathering trustworthy data related to an educational intervention becomes increasingly more difficult at each level (Freeth et al., 2002)

Beginning with table 3, I will for each level provide a short description of Kirkpatrick's definition of the level, followed by a description of the modified model and, finally, a description of how I adapted and used the model in the evaluation of the ITU.

### Level 1: Reaction

According to Kirkpatrick, the reaction level measures how the participants in a program react to it. Kirkpatrick also calls the reaction level "a measure of customer satisfaction" and argues that the reaction must be positive if one "wants to stay in business and attract new customers". He also reasons that, whereas positive reaction may not ensure learning, negative reactions almost certainly reduce the possibility of its occurring (Kirkpatrick, 1998).

Part of Freeth and colleagues (2002) adaptation of the Kirkpatrick model to match the interprofessional field of education is an expansion of the reaction level to encompass not only the students' view of the learning experience, but also its interprofessional nature (Freeth et al., 2002).

The programme in the ITU consists of many parts which, when taken together, are labelled the learning environment. The learning environment consists of, e.g. the clinical tutors approach to addressing the students, teaching methods, students collaboration with fellow students, the permanently employed staffs' attitude towards the students and the physical environment.

In this dissertation, I regard the students' reactions to the ITU to be revealed by their answers to direct and indirect questions regarding the learning environment.

To investigate the students' reaction to the learning environment, we utilised three different approaches, namely interviews, focus group interviews, and questionnaires.

All three methods indicated that students had positive reactions to the learning environment. The students' reaction included, for example, feelings that in the morning meetings, an atmosphere of equality existed among the professions; they felt that they had common goals, which were to meet the patients needs; they felt that they collaborated in the daily tasks; they



felt support from the clinical tutors and they felt there was room for learning each other sufficiently to become friends.

These reactions fulfil Allports (1954) four conditions for optimal intergroup contact, which are equality among the professions, common goals, collaboration among the professions and support from the authorities. They also fulfil Pettigrew's (1998) addition of friendship potential (Allport, 1954; Pettigrew, 1998) .

Some of the attributes that gave rise to the positive reactions were not necessarily interprofessional in nature but could have been found in any clinical placement. Other attributes, however, were truly interprofessional in their nature. For example collaboration among the professions and the feelings of equality among the professions could only take place because of the interprofessional nature of the clinical placement. The clinical tutors as role models also demonstrated equality and common ownership by addressing to students both from their own and from other professions. Equality was also expressed in sharing knowledge, where the students could both challenge each other by asking questions to colleagues from other professions and also instruct students from other professions in subjects associated with their own profession.

The focus in the ITU was moved from the student to the patient, and all students pursued a common goal. The students quickly realised the necessity of collaboration among the professions and the necessity of their own profession's contribution to providing the best possible care and rehabilitation in the effort to facilitate the patient's recovery and earliest possible discharge.

### **Level 2: Learning**

Kirkpatrick has placed "Learning" on level two. He defines learning as the extent to which participants change attitudes, improves knowledge, and / or increase skill as a result of participating in the programme. Further, he says "those are the three things that a training program can accomplish" and that "one or more of these changes must occur if change in behaviour is to occur" (Kirkpatrick, 1998).

Freeth et al., (2002) modifies level 2 by dividing it into two parts: a) modification of perceptions and attitudes; and b) acquisition of knowledge and skills.

Even though I acknowledge this definition of the content of levels 2a and 2b, I find it difficult to separate level 2 into two parts because I perceive a very close connection between modification of perceptions and attitudes and the acquisition of knowledge and skills. When examining our results, I find they influence on one another, and it is difficult to determine which comes first.

### **Level 2a: Modification of perceptions and attitudes**

According to Freeth and colleagues, this level can be defined as the extent to which a change has occurred in: a) reciprocal attitudes or perceptions between student groups, and b) perception or attitude towards the value and / or use of team approaches to caring for the patients (Freeth et al., 2002).

We measured changes in attitudes towards the other professions by the Attitudes to Health Professionals Questionnaire and found that all professions after the stay in the ITU perceived the other professions as more "caring" than they did before they started in the ITU. We therefore were able to conclude that a two-week stay in the ITU can impact positively on

students' attitudes. Even though we do not know what the optimal level of "caring" in each profession should be, it seems reasonable to assume that when members of a profession perceive colleagues from other health care professions in a way similar to the way they perceive themselves, such an outcome is a positive development (Petrie, 1976).

Also when using qualitative methods such as interviews, we found that students acquired more positive attitudes to colleagues from other professions. In the interviews the students also expressed positive attitudes regarding working as a team.

### **Level 2b: Acquisition of knowledge and skills**

Again, to match the interprofessional field of education, Freeth et al (2002) at this level includes knowledge and skills linked to interprofessional collaboration.

In this level I include what in article I is called "uniprofessional learning – learning about own profession" and "interprofessional teamwork and learning about other professions". In article IV, these types of knowledge are labelled "professional knowledge and capability" and "interprofessional collaboration". In article V they are labelled "uniprofessionalism" and "interprofessionalism".

In both interviews and questionnaires, the students indicated that they had acquired knowledge and skills linked to uniprofessional and interprofessional collaboration.

Examples of uniprofessional learning are the expansion of an occupational therapist student's professional repertoire by finding new ways of training the patient in activities of daily living, or a medical student learning to do rounds and to communicate with patients.

An example of interprofessional learning is communication in the interprofessional morning meeting, where all professions, taking patient's needs as a starting point, and must explain to colleagues from their own profession and from the other professions, about their plans for the patient.

One reason for the students' changed attitudes towards each other and their acquired knowledge and skills regarding interprofessional collaboration could be that they have a central focus in their work, namely the patient. Petrie (1976) writes that one of the central considerations for interprofessional success is that there must be a clear and recognisable idea which can serve as a central focus for the work. Further, he says that the idea must be imposed by some external necessity clearly perceived by all students. In the ITU, this central focus is provided by the necessity of providing the patients the best possible care and rehabilitation. Finally, following Petrie, the idea in the ITU is embodied in a new and powerful model – the interprofessional model, which is not found in regular clinical placements (Petrie, 1976).

Another reason for the positive modification of perceptions and attitudes found was that the students were together with other students and, therefore, had the possibility both to share their knowledge and ignorance on an equal basis.

Normally, students work multiprofessionally and collaborate mostly with members from their own future profession; therefore, they are only superficially informed about what, why and how the other professions undertake particular tasks. In contrast to this regular way of

working, the planning and distribution of tasks in the ITU takes place in the interprofessional morning meeting, where there is the highest possible degree of openness regarding how each student alone or together with a colleague from his or her own or from another profession will undertake a given task. This openness provides the students an understanding of all team members' role and function and, thus, a more positive attitude towards the value and use of team approaches for patient care. In other words, the students have entered the "community of practice" and learns by participating in the interprofessional community of student colleagues (Barr H et al., 2005)

Working together in an interprofessional team for many hours a day also provides the opportunity for informal communication, where the students may enjoy time together and get to know each other, thereby providing "friendship potential" (Pettigrew, 1998).

### **Level 3: Behavioural change**

According to Kirkpatrick (1998) behaviour can be defined as the extent to which change in behaviour has occurred because the participant attended the training program. This question is more complicated and difficult to answer than evaluating the previous levels (Kirkpatrick, 1998).

Except for an addition regarding interprofessional learning, Freeth et al., (2002) follow Kirkpatrick and hold that this level of evaluation identifies individuals transfer of interprofessional learning to their practice setting and their changed professional practice (Freeth et al., 2002).

Transferring learning to behaviour can also be described as establishing congruence between espoused theories, which are those theories people report as a basis for their actions, and theories in use, which are the theories of action inferred from how people actually behave (Argyris, 1976).

We have not directly investigated students' transfer of interprofessional learning to their professional practice. However, in article V we investigated students' and alumni's perceived learning outcomes after a placement in the ITU. The results of this project elaborates upon what the alumni perceived as the most important learning outcome resulting from their clinical placement in the ITU, and these results, with reservations, can be taken as an expression of possible changed behaviour.

The results showed that the students valued most the uniprofessional learning, followed by interprofessional learning and formation of professional identity. But in retrospect, when the former students, who were now alumni, had experienced the world of work and the realities of working as professionals in interprofessional teams, they most valued the formation of professional identity and interprofessional learning followed by uniprofessional learning.

### **Level 4: Results**

Kirkpatrick holds that "results can be defined as the final results that occurred because the participants attended the program". Final results can take the form of improved quality or increased production accompanied by a reduction of costs. It is important to recognise that the final results should coincide with the aim of the training (Kirkpatrick, 1998).

Freeth et al., (2002) modifies level 4 by dividing it into two parts: a) change in organisational practice and b) benefit to the patients.

#### **Level 4a: Change in organisational practice**

Freeth et al., (2002) evaluates wider changes in the organisation and delivery of care at this level.

In article I, we described changes in organisation and delivery of care.

One very important change in the organisation is that the occupational therapists and physiotherapists in the ITU are affiliated with the ward and following both morning and evening shifts. The presence of additional professions in the ward throughout the day means there are more opportunities for targeting and coordinating patients' care and rehabilitation. Also, the medical students stay more hours in the ward than they would in other wards; thus, those students have better opportunities for communicating closely with students from other professions. These improved opportunities for contact and communication among the professions may result in more structured interprofessional team based care, a development that would be beneficial to the patient (Hallin et al., 2011).

Though not reported in the articles, the concept of the interprofessional morning meeting is now also used in the conventional orthopaedic ward, with positive impacts on collaboration and coordination among the graduated staff and, consequently, positive impact on the patient care.

The concept of a daily, one-hour interprofessional morning meeting was developed in the ITU. The clinical tutors and associate professors have succeeded in including efficiency to the patient flow in a safe interprofessional learning environment, with opportunities for reflection, learning and teaching.

Another impact on the organisational and clinical practice, which is reported in the articles is the opportunity of using the ITU for testing of new clinical methods. Because the permanent staff in the ITU is relatively small and adaptable, and because the students do not need to unlearn former working methods before implementing new working methods, it is rather easy to test new clinical and organisational working methods. An example of this was the testing of a new pain management regime for patients who had an arthroplasty of the knee. This testing took place over a three-month period and was subsequently implemented in the conventional orthopaedic ward.

Finally, I will mention the impact of the ITU on the learning environment on the Regional Hospital West Jutland as a whole. The methods developed in the ITU were used in connection with launching the project "The Best Danish Hospital for Teaching and Learning". This project entailed the initiation of two experiments, one called "Interprofessional reflection for students – without clinical tutor", and the other called "Students and interprofessional collaboration – coordination of daily tasks" (Hansen, 2011).

#### **Level 4b: Benefit to patients**

In this level Freeth et al., (2002) concentrate on improvements in the health or well being of patients.

In article III, we studied improvements in the health and well being of patients. We found that the ITU is cost-effective when compared to the conventional orthopaedic ward. The reason for this was that the length of stay for comparable patients in the ITU in 2006 was 3.9 days compared with 5 days in the conventional ward. No significant or clinically relevant differences in average effect between the two patient groups were found in the three months

postoperative control visit; we, therefore, regard the shorter stay in the hospital for patients admitted to the ITU as a benefit to the patients.

We had assumed that the patients stay in the ITU would be longer because students would use more time to provide care and to rehabilitate the patients than would the trained staff. It was, therefore, surprising to find that patients' length of stay was shorter in the ITU than for comparable patients in the conventional ward.

One reason for this result could be the planning and coordination that took place in the interprofessional morning meeting. The tight interprofessional planning with the use of checklists, means a minimum of wasted time for the patient because all staff know what to do and when to attend the patient. This hypothesis is in accordance with the findings of Lिंगard et al., which describes a significant decrease in number of communication failures per procedure in the operating room when an interprofessional checklist is used for briefing (Lिंगard et al., 2008).

The planning and exchange of information in the interprofessional morning meeting also means that all students approach the patient with a common professional attitude instead of maybe more personal and individual approaches.

In the ITU, we experimented with admitting different types of patients, e.g. patients with fractures of the hip and patients with other various acute orthopaedic lesions. But we have ended up with only three types of patients: patients admitted for planned arthroplasty of the knee or the hip, and patients admitted for hand surgery. Having so few types of patients, usually without co-morbidities, means that the students very quickly can acquire basic knowledge regarding the care and rehabilitation of the patient in question and also can learn within the first two or three days how to handle situations professionally and efficiently. The consequence is relatively shorter length of stay for the patient.

A third reason for the short length of stay might be that the occupational therapy students and the physiotherapy students are in the ward for both morning and evening shift, in contrast to normal working procedures, in which therapists only are present during the morning shift. Providing patients the opportunity for training more hours a day could also contribute to shortening the patients' length of stay.

## **Limitations**

A possible limitation of these findings is that the qualitative part of students' reactions is self-reported, but the possible recall-bias in some of the studies is likely to be outweighed by triangulation, in the form of results reported in the a supplemental questionnaire and the results found with the help of focus group interviews and interviews.

In study V, all results were self reported from students and alumni. These results ought to have been triangulated e.g., by observational studies. Furthermore, a greater depth in the qualitative phase of the work could have been achieved by performing in depth-interviews of the students and the alumni.

Another limitation is that all empirical findings originate from only one location, the ITU in Holstebro. But similar findings from Swedish ITU's, indicate that these findings from Holstebro are probably trustworthy.

For many of the studies, the fact that I have been employed in the ITU from its beginnings, first as a project manager for three years and thereafter as an educational consultant, is both a strength and a limitation. I have closely collaborated with the clinical tutors and other staff both as a colleague and as a supervisor. I have had the pleasure of conducting group interviews with almost all students (more than one hundred teams). I have functioned as secretary for the steering group and handled many administrative tasks concerning the ITU. This deep involvement in operations, organisation and pedagogy has provided me an in-depth knowledge of the entire process of the ITU, which can be perceived as a strength for all the studies. However, that level of involvement may also be perceived as a weakness because my preconceptions may result in misinterpretation of the findings. Attempts were made to avoid such possible misinterpretations by recruiting and involving additional authors on all articles to provide a broader view on the findings.

## **Perspectives and future research**

The studies in this thesis demonstrate that students in the ITU strengthened their uniprofessional knowledge and capabilities and as well their knowledge and capabilities in interprofessional collaboration. Furthermore, the students strengthened their professional identity. All this took place in a safe, cost-effective, interprofessional learning environment.

I believe that the implementation of interprofessional collaboration and new teaching methods for undergraduate health care students in the ITU will function as an example and, at the local level migrate to other clinics in the hospital, be utilised for both undergraduate and postgraduate learning, and benefit the organisation and the patients.

The results also can be used to inspire interprofessional clinical teaching and learning at other places in Denmark and in other countries.

These positive results gesture to the need to proceed one step further and investigate what actually happens in the ITU on a day-to-day basis. A place to start could be the interprofessional morning meeting and the clinical tutors' operational methods. Who takes the lead? How do the clinical tutors share their responsibilities and tasks? How and when do they change their roles from listener to peer or teacher? How do clinical teachers function as role models? These are just some of the questions that could be asked.

The methods employed in such a study could be in-depth interview of clinical tutors. Group interviews of students could be used to explore whether the students' description of what is happening is the same as what the clinical tutors are saying. To investigate whether there is coherence between what is said and what is done, observational studies, eventually in the form of video, should be performed.

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## Original papers I - V (abstracts)

I. *J Interprof Care*. 2009 Jan;23(1):30-40.

**Interprofessional undergraduate clinical learning: results from a three year project in a Danish Interprofessional Training Unit.**

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On entering higher education students become professionally socialized, and parallel with this, stereotyping takes place, students developing a more positive assessment of their own roles than those of other professions. This difference between the view of their own and other professions can contribute to creating cognitive and social boundaries between professions that hinder sharing of knowledge, which can result in poor cooperation. Interprofessional training can provide students with good clinical expertise in their own profession as well as teach them about other professions encouraging more positive attitudes between the professions. This project has taken place from 2004 to 2007 in a Danish Interprofessional Training Unit manned with students from the professions occupational therapy, physiotherapy, medicine and nursing. As part of an evaluation of the project, four focus group interviews and two in-depth interviews were analysed using the technique of Systematic Text Condensation. Results show that the goals of the Interprofessional Training Unit were fulfilled because the students learned interprofessional teamwork, strengthened their own professional role and worked together in an organization for the benefit of the patient. All this took place in a secure learning environment in which new methods of coordinating and integrating clinical and theoretical interprofessional learning were developed and tested.

PMID: 19142781 [PubMed - indexed for MEDLINE]

II. *J Interprof Care*. 2009 May;23(3):242-50.

**A two-week stay in an Interprofessional Training Unit changes students' attitudes to health professionals.**

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Attitudes amongst health professionals can impact on the effectiveness of teamworking and patient care. Interprofessional education (IPE) is thought to contribute to the development of positive attitudes. An Interprofessional Training Unit (ITU) was set up to create an optimal learning environment for healthcare students. Students' attitudes were assessed, using a version of the Attitudes to Health Professionals Questionnaire (AHPQ) that had been translated into the students' native language. This paper describes the process undertaken to obtain a trustworthy translation. One hundred and sixty two students from occupational therapy, physiotherapy, medicine and nursing completed the questionnaire before and after their stay at the ITU. Their responses were analysed in relation to the constructs "caring" and "subservient" from the validated English version of AHPQ. Echoing earlier studies elsewhere, at the

beginning students viewed doctors as being the least "caring" and the least "subservient" professional group. Nurses were seen by the students as being the most "caring" and the most "subservient" profession. After the ITU experience students viewed most professions as more "caring" and less "subservient", apart from doctors, who were seen as being more subservient after the ITU experience. This study indicates that an IPE initiative such as the ITU can impact positively on students' attitudes and that the translated AHPQ can be used to monitor this attitudinal change.

PMID: 19280378 [PubMed - indexed for MEDLINE]

### **III. J Interprof Care. 2009 May;23(3):234-41.**

**Cost effective interprofessional training: an evaluation of a training unit in Denmark.**

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In 2004, the first Danish undergraduate interprofessional training unit (ITU) was established at the Regional Hospital Holstebro, inspired by experiences from Sweden. In this unit, medical, nursing, occupational therapy and physiotherapy students are given responsibility, under supervision by trained and motivated personnel, for rehabilitation and care of patients in a subunit of an orthopaedic department. The aim of this study was to see whether the ITU was cost effective in treating patients compared with a conventional orthopaedic ward. One-hundred and thirty-four patients admitted for primary hip or knee replacement surgery were included in the study. All costs were recorded in the ITU and in the conventional ward. Follow-up was done by a quality of life questionnaire three months after the operation. Comparison was done by univariable and multivariable testing of costs and effect. In both, the ITU was more cost effective than the conventional ward. No difference was found in complications and patient-reported quality of life. In conclusion, clinical training can be given to students in an ITU without reducing productivity in a hospital environment if pedagogic principles, clinical tutors and patient logistics all adapt to the challenge of the teaching environment.

PMID: 19387912 [PubMed - indexed for MEDLINE]

### **IV. Med Teach. 2010;32(9):e399-406.**

**This is the closest I have come to being compared to a doctor: views of medical students on clinical clerkship in an Interprofessional Training Unit.**

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BACKGROUND: The need for interprofessional education has been apparent for decades and in 2004, we established the first Interprofessional Training Unit (ITU) in Denmark. Nursing, occupational therapy and physiotherapy students were in the ITU for its first 2 years and in 2006, medical students joined in. The students in collaboration run a ward with eight beds under the supervision of

trained personnel.

**METHODS:** A questionnaire consisting questions concerning the interprofessional meetings, the rounds, teaching, learning about own profession, learning about other professions and finally an overall assessment of their stay in the ITU was filled in by 55 medical students. To validate and deepen the questionnaire, 22 medical students participated in a group interview concentrating on the students' evaluation of fulfilment of the goals for the ITU. The transcribed interview and the written comments in the questionnaire were analysed using Systematic Text Condensation.

**RESULTS:** Our results showed that the medical students in the ITU developed their professional knowledge and capability simultaneous with the learning of interprofessional collaboration. The students valued the teaching methods because the students were in the forefront and treated as professionals. The students demanded more homogeneous instruction and a better introduction to the ITU.

**CONCLUSION:** A stay in an ITU with a safe learning environment can increase both uniprofessional and interprofessional learning for medical students. The students stressed the importance of supervision before and after carrying out a hospital task.

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#### **V. J Interprof.Care, Accepted for publication 6 June 2011**

**"Knowing more about the other professions clarified my own profession".  
Students' and alumni's self-reported learning outcomes after clinical placement  
in a Danish Interprofessional Training Unit**

**Jakobsen,F., Hansen,T.B., & Eika,B. (2011)**

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The purpose of this study was to compare which learning outcomes relating to an Interprofessional Training Unit (ITU) experience were found to be most important by students and by alumni. A cohort of 428 students in the ITU was asked to write three short statements describing the most important learning outcomes from the ITU. Alumni from the same cohort were after graduation asked the same question. Furthermore, they were asked to fill out a twelve-item questionnaire. The statements concerning learning outcome were analysed qualitatively and categorised. The number of statements in each category was counted and tested for statistical difference between students and alumni. Students stated "uniprofessionalism" as the most important learning outcome followed by "interprofessionalism", "professional identity" and "learning environment". Alumni on the other hand stated "professional identity" as most important learning outcome followed with "interprofessionalism", "learning environment" and "uniprofessionalism". The study indicated that over time the perceived outcome of learning experiences from an ITU change in priority.