Newly graduated nurses’ perception of competence, critical thinking and research utilization

Sigrid Wangensteen has the recent years been engaged in doctoral studies at Karlstad University in combination with teaching at the bachelor program in nursing at Gjøvik University College.

This doctoral thesis is focused on newly graduated nurses, their perception of competence, critical thinking dispositions, research use and their experiences of being a nurse during their first year as a nurse. Qualitative and quantitative methods were used.

The very first period of time was experienced as tough but when looking back the newly graduated nurses appreciated the tough time. They described the need for a supportive environment, and gaining competence through managing challenging situations. The leadership role constituted the main difference between being a student and being a nurse. In the quantitative study the nurses perceived their competence as good, rating the Helping role competence category highest and the Ensuring quality competence category lowest. With respect to critical thinking the CCTDI total scores indicated a positive disposition. As regards the CCTDI subscale scores the nurses reported highest values for intellectual curiosity (Inquisitiveness) and lowest for intellectual honesty (Truth-seeking). The nurses reported a positive attitude towards research, but only 24% were classified as research users. Supportive environment was a significant predictor for research use. Critical thinking was a prominent predictor for attitude towards research, for research use and perception of competence.

Nurse leaders in clinical practice and nurse educators in nursing education and clinical practice play an important role in nurturing student nurses and newly graduated nurses with respect to critical thinking. There is a need to assess whether teaching strategies meet the requirements of critical thinking and EBP in nursing education.
Sigrid Wangensteen

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DISSERTATION

Karlstad University Studies 2010:24
ISSN 1403-8099
ISBN 978-91-7063-316-4

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Distribution:
Karlstad University
Faculty of Social and Life Sciences
Department of Nursing
651 88 Karlstad
Sweden
+46 54 700 10 00

www.kau.se

Printed at: Universitetstryckeriet, Karlstad 2010
Å våge er miste fotfeste en stund.
Å ikke våge er å miste seg selv.

Søren Kierkegaard
ABSTRACT

Newly graduated nurses’ perception of competence, critical thinking and research utilization.

Aim. The overall aim of this thesis was twofold: a) to study newly graduated nurses’ perception of competence, critical thinking and research utilization, and b) to identify predictors for research use and perception of competence.

Methods. Qualitative and quantitative methods were used. In the qualitative study (I) 12 newly graduated nurses working in medical wards (n=4), surgical wards (n=4) or home care (n=4) were interviewed individually. The interviews were analyzed by means of qualitative content analysis. In the quantitative study (II,III,IV) all nurses graduated from 18 colleges with bachelor degrees in nursing were asked to participate (n=1900). Data collection was carried out by means of three instruments: The California Critical Thinking Disposition Inventory (CCTDI), the Research Utilization Questionnaire (RUQ) and the Nurse Competence Scale (NCS). Due to a low response rate (33%), a drop-out analysis was done. Pearson’s Chi-Square test, Mann-Whitney U-test, Student t-test, simple and multiple linear regression analyses were used for statistical calculations.

Main findings. The very first period of time as a nurse was experienced as tough but when looking back the newly graduated nurses appreciated the tough time because they learned so much (I). They described the need for a supportive environment, and gaining competence through managing challenging situations (I). The leadership role constituted the main difference between being a student and being a nurse (I). In the quantitative study the nurses perceived their competence as good, rating the Helping role competence category highest and the Ensuring quality competence category lowest (IV). With respect to critical thinking the CCTDI total scores indicated a positive disposition towards critical thinking (II). As regards the CCTDI subscales the nurses reported highest values for intellectual curiosity (Inquisitiveness) and lowest for intellectual honesty (Truth-seeking) (II). The nurses reported a positive attitude towards research, but only 24% were classified as research users (III). Supportive environment was a significant predictor for research use (III). Critical thinking was a prominent predictor for attitude towards research, for research use (III) and for perception of competence (IV).

Implications. The finding that critical thinking was a significant predictor for research use and perception of competence is important information for nursing education as well as for nursing practice. Nurse leaders in clinical practice and nurse educators in nursing education and clinical practice play an important role in nurturing student nurses and newly graduated nurses with respect to critical thinking. There is a need to assess whether teaching strategies meet the requirements of critical thinking and EBP in nursing education.

Key words: Newly graduated nurses, critical thinking, research utilization, nurse competence
SAMMENDRAG
Nyutdannede sykepleieres vurdering av egen kompetanse, kritisk tenkning og bruk av forskning.

Hensikt. Avhandlingens hensikt var todelte a) å studere nyutdannede sykepleieres opplevelse og egenvurdering av kompetanse, kritisk tenkning og bruk av forskning, og b) å identifisere prediktorer for bruk av forskning og egenvurdering av kompetanse.

Metode. Kvalitativ og kvantitative metoder ble brukt. I den kvalitative studien (I) ble 12 sykepleiere som arbeidet i medisinske avdelinger (n=4), kirurgiske avdelinger (n=4) eller hjemmesykepleien (n=4) intervjuit individuelt. Intervjuene ble analyserd ved hjelp av kvalitativ innholdsanalyse. I den kvantitative studien (II,III,IV) ble alle sykepleiere utdannet ved 18 sykepleierhøgskoler invitert til å delta (n=1900). Data ble samlet inn med bruk av tre instrumenter: The California Critical Thinking Disposition Inventory (CCTDI), Research Utilization Questionnaire (RUQ) og Nurse Competence Scale (NCS). På grunn av lav svarprosent (33 %) ble det gjort en bortfallsanalyse. Persons Chi-Square test, Mann-Whitney U-test, Student t-test samt enkle og multiple regresjonsanalyser ble benyttet for statistiske beregninger.

Hovedfunn. Den aller første tiden som sykepleier ble opplevd tøff, men når de nyutdannede sykepleierne tenkte tilbake ville de ikke vært den tiden foruten; den var så lærerik (I). Sykepleierne beskrev behov for et støttende miljø, og at de oppøvde kompetanse gjennom å mestre krevende situasjoner (I). Lederrollen som sykepleier utgjorde den største forskjellen mellom student-rollen og sykepleier-rollen (I). I den kvantitative studien vurderte sykepleierne sin kompetanse som god; de vurderte kompetansen i forhold til Helping role høyest og kompetansen i forhold til Ensuring quality lavest (IV). Med hensyn til kritisk tenkning rapporterte sykepleierne en totalscore (CCTDI total score) som indikerte at de var positivt disponert for kritisk tenkning (II). I forhold til subskalaene (CCTDI subscales) rapporterte sykepleierne høyest verdi for intellektuell nysgjerrighet (Inquisitiveness) og lavest verdi for intellektuell ærlighet (Truth-seeking) (II). Sykepleierne rapporterte en positiv holdning til forskning, men bare 24 % av dem ble klassifisert som brukere av forskning (III). Et støttende miljø var en signifikant prediktor for bruk av forskning (III). Kritisk tenkning var gjennomgående en sterk prediktor for holdning til forskning, bruk av forskning (III) og for vurdering av kompetanse (IV).


Nøkkelord. Nyutdannede sykepleiere, kritisk tenkning, bruk av forskning, sykepleiekompetanse
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<tr>
<td>EBP</td>
<td>Evidence based practice</td>
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<tr>
<td>CCTDI</td>
<td>California Critical Thinking Disposition Inventory</td>
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<td>NCS</td>
<td>Nurse Competence Scale</td>
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<td>RUQ</td>
<td>Research Utilization Questionnaire</td>
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<td>RUQ indexes</td>
<td>Attitude towards research, Availability and support to implement research findings, Research use in daily practice</td>
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<tr>
<td>RU</td>
<td>Research use, Research utilization</td>
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<td>PBL</td>
<td>Problem-Based Learning</td>
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Original papers

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


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Introduction

Newly graduated nurses’ competence has been one of my interests for many years. In most of my working life I have been engaged in nursing education, which means that I have spent time with nursing students and experienced nurses in my role as a supervisor. The role as a county branch leader in the Norwegian Nurses Association (NNA) gave me opportunities to meet newly graduated nurses as new members, as well as their colleagues as existing members. One of the areas of interest for the NNA has been, and still is, nursing education. For some years I was program coordinator for nursing education at Gjøvik University College, a role which implied a focus on the whole nursing education program. This role gave me the opportunity to reflect upon what happens during nursing education, and most of all, how these former nursing students – newly graduated nurses – experience their first year as a nurse, and how they perceived their competence when entering a health-care system that is characterized by multiple changes and use of advanced technology.

Attending the first Open Conference arranged by the Workgroup of European Nurse Researchers (WENR) named “Research – a challenge for nursing practice” in 1982 was an inspiring experience. This interest led to carrying out a project on methods for the prevention and treatment of pressures sores where massage was one of the methods reported to be used (Monsbakken & Wangensteen 1986). Although massage as a method for preventing pressure ulcers was questioned already in the mid 1980s (Ek 1985), Duimels-Peeters et al. reported 20 years later that approximately half of the nurses in 2003 still used massage to prevent such ulcers. Time limits hampered them from using massage more (2006). These results inspired to reflect on both the late uptake of research findings in nursing, and on which factors that might have a positive impact on research use in nursing.

During master studies in USA (2000-2002) I was introduced to critical thinking, at that time a rather unknown concept for me. Knowledge about this concept led to reflection on what influence critical thinking might have on other aspects of competence.

The focus in this thesis is newly graduated nurses’ perception of competence, critical thinking dispositions, research use and their experiences of being a nurse during their first year as nurses.
Background

Newly graduated nurses are expected to work effectively in technically complex environments and at the same time perform nursing in a way that makes the patients feel like persons and not objects (Bevis & Watson 2000). Both medical and nursing practice are becoming more complex, and traditional boundaries between professions are diminished compared to earlier (World Health Organization 1997, 2006). Newly graduated nurses meet, and have to face, expectations and requirements from health-care authorities, diverse health professionals, from nurse leaders and nurse colleagues, and from themselves.

Student nurses just before graduation have described their ideals on which they wanted to base their practice. These values were described in terms of pursuit of patient-centred holistic care, of high quality care and theoretical knowledge, and of evidence-based care. After graduation these student nurses reported that professional constraints such as convert rules, and organizational constraints such as staff shortage hampered implementation of their ideal values into practice (Maben et al. 2007). Bisholt (2009) reported in her doctoral thesis that newly graduated nurses feel that they belong to neither the academic nor the professional environment. The initial period in nursing profession has further been reported to be dominated by gaining access to the workplace context (Ohlsson 2009). Learning and competence development is dependent on interactions with experienced colleagues (Eraut 2007, Thidemann 2005). Newly graduated nurses are expected to identify themselves as partners of the interdisciplinary team, to feel comfortable in chaos, and to have the ability to make and defend decisions (Krøll & Hansen 2000). They are also expected to do as they are told, and to not “rock the boat” (Maben et al. 2006), but it is also reported that newly graduated nurses enjoy their profession (Ohlsson 2009).

Newly graduated nurses enter a clinical practice which has undergone significant changes the recent decades. In Norway the number of patients taken care of in specialist health care has increased by almost 30% from 1990 to 2006 (Historical health statistics 2008). Further, the number of days staying in hospital has decreased in general, and especially for patients older than 79 years (Karlseth et al. 2004). Some years ago these patients would have stayed in hospital but are now taken care of in nursing homes or in their own homes. Patients living at home with mechanical ventilators (Ballangrud et al. 2009), patients in need of tube feeding (Bjureåker et al. 2008) and patients close to the end of their life (Halsnes & Giske 2009) are examples of patients living at home with complex needs. The working
environments in community health care as well as in specialist health care for nurses and other health-care workers are characterized by strict time limits. Thus these changes in health care in recent years have led to increased demands with respect to number of nurses as well as to nurses’ competence.

Historically nursing has been grounded in traditions, and nursing education has been based on an apprenticeship model, which underlines this base on tradition. In the later years it has been acknowledged that nursing should be grounded in evidence, rather than tradition (DiCenso 2005). Today in Norway as well as in most other western countries graduate nurses have a bachelor degree, and the demand for making use of research findings in clinical practice is stated in Norwegian General Plan for Nursing Education (Kunnskapsdepartementet 2008) as well as at a more global level (ICN 2006, World Health Organization 1997). The developments in academic nursing education (Heggen 2004, Kyrkjebø et al. 2002) have made greater demands on nurse educators. In Sweden it has been questioned whether this development has led to dividing nurse education into an abstract and academic part on one hand and the practical knowledge acquired in clinical context on the other hand (Furåker 2001). There is reason to believe that this may be the case in Norway as well.

The Norwegian Agency for Quality Assurance in Education (NOKUT) performed a survey on nursing education in 2004 focusing on curricula as well as on the competence level of nurse teachers. This survey revealed that the nurse teachers’ competence did not fulfil NOKUT’s expectations, especially when it came to research competence. The challenges in these respects in Norway are apparent in other European countries as well. A literature review across 20 European countries (including Norway) revealed that three factors have hampered the adjustment of faculty members in nursing into higher education settings. These were (1) limited academic background of nursing faculty members, (2) inadequate employment conditions, and (3) scarcity of mature nurse academics (Spitzer & Perrenoud 2006). A more recent report (Bakken 2010) concludes that nursing education in Norway in recent years has worked intensively to increase the nurse teachers’ competence level, and have succeeded. This national focus on competence may be understood as a kind of quality assurance that nursing education is research-based, and that nurses graduated in Norway base their clinical practice on research evidence as well as on clinical experience and patient values.

Despite changes in nursing education from yesterday’s strictly didactic and rule-governed teaching strategies to more student-active learning models, one might reflect on whether we as nurse teachers really carry out what we think we do. The
purpose of these changes with respect to student-active learning methods is to enable better learning during nursing education, which hopefully will result in better competence among nurses. One might reflect on the “null curriculum” i.e. the curriculum that exists in the hearts and minds of educators, but seldom exists in reality (Bevis & Watson 2000).

Competence

Nurses encounter people in the whole life-span, from birth until death, meeting patients and their families in various contexts which require various aspects of competence. Benner (1982) has defined nurse competence as the ability to perform a task with the desirable outcome under varied conditions of the real world. This implies that nursing practice requires application of complex combinations of knowledge, skills, values and attitudes (Cowan et al. 2005). The concept of competence has been widely discussed in nursing, but a common understanding or definition is still not agreed upon. Although the concepts of competency and competence are often used interchangeably (Tilley 2008), distinctions between these concepts as well as performance are also reported. Eraut (1998) described competence as a generic term, competency as a specific capacity, while performance was characterized by what could be observed and measured. A relationship between competency and performance is reported (Tzeng 2004) although it has also been stated that performance does not mirror what a person has learnt (Bjørk 1999). Berkow et al. (2008) have described nurse competence by means of six skills categories: communication, clinical knowledge, critical thinking, management of responsibilities, professionalism, and technical skills.

Carper (1978) has defined four patterns of knowing in nursing, stating that understanding these patterns is essential for both the teaching and learning of nursing. These four patterns of knowing – covering several perspectives – illustrate the dimensions of competence needed in nursing. This identification of patterns, although rather old, is still referred to (Brown et al. 2003, Chinn & Kramer 1999, Porter 2010). The patterns (Carper 1978) are Empirical knowing (1), which is known as scientific knowledge in general. Thus this pattern encompasses empirical, factual and descriptive knowledge aimed at developing abstract and theoretical explanations. The Aesthetic way of knowing (2) includes the expressive aspects of nursing, and requires a process of engagement and interpretation. Personal knowing (3) is concerned with “the knowing, encountering and actualization of the concrete, individual self” (p 18). Knowing oneself makes it possible to use the self therapeutically (Brown et al. 2003). Moral or ethical knowing (4) implies ethical issues in nursing, and is focused on duty and responsibility (Carper 1978). The
ability to apply moral and ethical frameworks to complex situations is an aspect of the moral knowing (Brown et al. 2003).

Benner (2001), using a phenomenological approach, identified seven domains of nursing practice: (1) The helping role; (2) The teaching-coaching function; (3) The diagnostic and monitoring function; (4) Effective management of rapidly changing situations; (5) Administering and monitoring therapeutic interventions and regimens; (6) Monitoring and ensuring the quality of health-care practices; and (7) Organizational and work-role competencies. The Helping role implies creating a climate for and establishing a commitment to healing, for example being with the patient, providing comfort and maximizing the patient’s participation. The Teaching-coaching function is described as capturing the patient’s readiness to learn, understanding the patient’s interpretation of his/her illness, and giving the rationale for procedures. The Diagnostic and monitoring function implies detection and documentation of significant changes in patients’ conditions, providing an early warning signal and anticipating problems. The fourth dimension – Effective management of rapidly changing situations – entails skilled performance in life-threatening situations and a rapid grasp of the problem. The fifth dimension is Administration and monitoring therapeutic interventions and regimens and implies administration of medications, monitoring untoward effects and reactions as well as combating the hazards of immobility. The sixth domain, Monitoring and ensuring the quality of health-care practices entails providing a back-up system to ensure safe medical and nursing care. The seventh, and final, domain, Organizational and work role competencies, implies coordinating, ordering, and meeting multiple needs and requests. Setting priorities and coping with staff shortage are critical aspects of this domain (Benner 2001).

Furthermore Benner (2001) has described the development of nurse competence as a continuum from novice to expert based upon the model of Dreyfus & Dreyfus (1986). This model consists of a five-stage skills acquisition from a rule-guide “knowing that” to an experience-based “knowing how”. Experience with real situations is required to develop a professional competence – to be an expert.

Learning takes time, and it is not sufficient to merely have the knowledge: one also has to reflect on that knowledge and make use of it in an appropriate and effective manner (Facione et al. 2000, Profetto-McGrath 1999). The newly graduated nurses are in their process of skills acquisition.
Measuring nurse competence

Newly graduated nurses’ competence has been studied from different perspectives, such as practical skill development in clinical settings (Bjørk 1999) and perception of role transition in hospitals (Delaney 2003, Whitehead 2001). These studies had a qualitative approach. Benefits of qualitative approaches are, amongst other things, the option of in-depth information about how nurses perceive their nurse performance, their nurse competence and their nurse experiences in various and complex settings.

The benefits of quantitative approaches measuring nurse competence are, amongst other things, the options of comparisons across groups in various settings in various countries as well as cultures. Several instruments have been developed to measure nurse competence. One such instrument is The Nurse Self-Description Form (NSDF) which was originally developed by Taylor et al. (1961) and further adapted and validated by the Western Interstate Council of Higher Education for Nursing in USA (Dagenais & Meleis 1982, Meleis & Dagenais 1981). The NSDF covers autonomy, scientific outlook, research ability, potential for acting as a change agent, adaptability, altruism, empathy, ability to role-take, and interest in professional involvement and improvement. The instrument presupposes that assessing one’s own competence in relation to others influences the performance and personal development (Meleis & Dagenais 1981), and respondents of the NSDF rate their competence in relation to others’.

Meretoja & Leino-Kilpi (2001), when reviewing instruments for measuring nurse competence, reported that repeated use of instruments was limited. At the time of their review eleven instruments were in their early stage, and only one instrument, the Six-Dimension Scale of Nurse Performance (6D Scale), was reported as used repeatedly (Meretoja & Leino-Kilpi 2001). This scale was developed by Schwirian in 1978, and covers leadership, critical care, teaching/collaboration, planning/evaluation, interpersonal relations/communications and professional development (Schwirian 1978).

There has been a process in recent years to develop a measurement tool for self-assessment of nurse competence across the EU (European Union) countries (Cowan et al. 2008). The ETHAN (European Healthcare Training and Accreditation Network) Questionnaire Tool (EQT) consists of 108 items in eight competence domains with between 6 and 40 items in each domain (Cowan et al. 2008). The EQT is based upon required competence categories for nursing practice in EU countries. The authors conclude that the initial psychometric test
results look promising, but they also state the need for a working definition of nursing competence which is suitable for international utilization (Cowan et al. 2008).

Meretoja et al.’s (2004a) Nurse Competence Scale (NCS) is based on Benner’s (2001) domains for nursing practice and is a generic instrument allowing comparisons across countries and cultures, and they have reported concurrent validity testing of the NCS and the 6D Scale (Meretoja et al. 2004a). The normality test for the NCS showed a normal distribution, while the same test for the 6D Scale showed skewness. These findings indicate that the NCS keeps its promises compared with the only instrument which is repeatedly used for measuring nurse competence at the time of planning the present study.

The different perspectives of expectations of nurse competence are mirrored when looking into the NCS and the EQT in that the former is based on a theoretical nursing foundation and the latter on European health-care authorities requirements.

Graduate nurses’ competence

Several qualitative studies have focused on newly graduated nurses’ competence, most of them including nurses working in hospital settings (Arbon 2004, Bjork 1999, Clark & Holmes 2007, Delaney 2003, Gerrish 2000, Ramritu et al. 2001, Whitehead 2001). The findings in these studies are that newly graduated nurses experience uncertainty in the first period of time (Arbon 2004, Clark & Holmes 2007, Whitehead 2001), that prioritizing and delegating is challenging (Gerrish 2000, Ramritu et al. 2001, Whitehead 2001), but most of all these studies conclude that the newly graduated nurses need support and feedback (Bjork 1999, Clark & Holmes 2007, Ramritu et al. 2001). Bjork (1999) concludes in her doctoral thesis that the complexity of practical skills is underrated in clinical practice, and further that learning is undervalued because the focus is to “get the work done”. It is worth mentioning that Gerrish (2000), when comparing a 1998-cohort to a 1995-cohort of newly graduated nurses, reports that the former cohort had acquired more active learning styles which made them experience the transition less stressful than did the 1995-cohort. It is reported that newly graduated nurses are not aware of faults when performing nursing, and they consequently continue to perform with faults if they do not receive feedback and corrections (Bjork 1999).

Several published quantitative studies have focused on newly graduated nurses’ competence where competence is measured by means of different instruments.
When newly graduated nurses rated their competence in relation to others, they gave themselves a somewhat high total value, but the ability to teach was rated low (Björkström et al. 2008). Löfmark et al. (2006) also reported low rates with respect to teaching, and also for planning and prioritizing. Australian newly graduated nurses have rated their general self-concept highest and the leadership self-concept lowest (Cowin & Hengstberger-Sims 2006). In this longitudinal study the nurses’ leadership self-concept increased during their first year as nurses whereas the nurse self-concept slightly decreased when comparing to baseline data. Björkström et al. (2008) reported that leadership, creativity and desire to contribute through research decreased from being a student nurse to being an experienced nurse.

As these above mentioned quantitative studies did not make use of the same instruments for data collection, comparing these results is difficult. There are, however, some studies where the same instrument, the NCS, has been used (Hengstberger-Sims et al. 2008, Meretoja et al. 2004a, Meretoja et al. 2004b, Salonen et al. 2007), and comparisons between these are therefore possible. The NCS total score in these four studies indicated a good competence although the mean scores varied. Nurses with less than two years’ experience scored lower (Salonen et al. 2007) than nurses with 11 years’ experience (Meretoja et al. 2004a). Both Australian newly graduated nurses (Hengstberger-Sims et al. 2008) and Finnish critical care nurses (Salonen et al. 2007) reported highest values for the competence category Helping role (i.e. helping the patient to cope and to provide individualized care) and lowest values for the category Ensuring quality (i.e. evaluating outcomes and contributing to further development). Both these category scores however indicated a good competence. The experienced Finnish nurses reported highest score for the category Managing situations (i.e. recognizing changing situations, prioritizing flexibly) and lowest score for the category Therapeutic interventions (i.e. planning and making decisions concerning patient care) (Meretoja et al. 2004a). Again, in both these cases the scores indicated a good competence.

Studies have shown that newly graduated nurses are not prepared for day-to-day work (Andersson et al. 2007) and that they lack competence, especially related to leadership (Havn & Vedi 1997, Vareide et al. 2001) and to responsibility (Gerrish 2000, Ross & Clifford 2002). Academics and health-care managers are reported to assess newly graduated nurses’ competence differently, in that 90% of academic leaders compared to 10% of health-care managers assessed the newly graduated nurses to be prepared to provide good nursing care (Berkow et al. 2008). This heterogeneous assessment of competence may reflect the difference between what students learn in safe and controlled conditions during education and the requirements by leaders and colleagues in clinical practice (Burns & Poster 2008).
This difference may be understood as a discontinuity between the discipline and practice of nursing (Williams 2004) or as the frequently reported theory-practice gap in nursing (Hutchinson & Johnston 2004, Mahen et al. 2006, Meijers et al. 2006, Wallin et al. 2003). Assessing nurse competence differently was also reported in a Finnish study which concluded that nurse managers assessed the nurses’ competence higher than did the nurses themselves (Meretoja & Leino-Kilpi 2003).

Critical thinking

Critical thinking is a concept widely used in health-care practice (Dickerson 2005) as well as in educational contexts (Facione et al. 2000). It implies a purposeful goal-directed thinking aimed at making judgements based on evidence rather than conjectures (Alfaro-LeFevre 1995). Critical thinking goes beyond problem-solving and implies asking questions and critiquing solutions (Fero et al. 2009). Two definitions of critical thinking, both results revealed by means of Delphi processes, have been published (Facione 1990, Scheffer & Rubenfeld 2000). The earlier one was a multidisciplinary process which included 46 participants from different disciplines. They needed six rounds to reach agreement that critical thinking is defined as a purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation and inference (Facione 1990). Although multidisciplinary, no nurses participated in this Delphi process. The other Delphi process was carried out aimed at obtaining a consensus statement on critical thinking in nursing (Scheffer & Rubenfeld 2000). This process included 55 nurses and they needed five rounds to reach the agreement that critical thinking in nursing is an essential component of professional accountability and quality nursing care, and furthermore that critical thinkers in nursing apply cognitive skills such as analyzing, applying standards, discriminating, logical reasoning and transforming knowledge (Scheffer & Rubenfeld 2000). The above mentioned multidisciplinary Delphi process gave a description of an ideal critical thinker which may well be a description of “an ideal nurse”:

“habitually inquisitive, well-informed, trustful of reason, open-minded in evaluation, honest in facing personal biases, prudent in making judgements, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit” (Facione 1990, p. 2).

The multidisciplinary Delphi process (Facione 1990) gave reason for further work which resulted in the definition of certain attributes needed to be a critical thinker, and the following were described to be needed: truth-seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisiteness, and
maturity (Facione et al. 2001). Characteristics of nurses with high and low abilities with respect to these attributes are reported (Facione et al. 1994, Smith-Blair & Neighbors 2000). Truth-seeking as an attribute to critical thinking implies the intellectual honesty (Facione et al. 2001, Giancarlo & Facione 2001), and a truth-seeking nurse continually re-evaluates new information and evidence (Facione et al. 1994). The second attribute is characterized by being open-minded and tolerant of divergent views, and being conscious about one’s possible biases (Facione et al. 1995). Nurses who are not in possession of these characteristics might preclude effective nursing interventions (Facione et al. 1994). Analyticity is characterized by using reason to solve problems (Giancarlo & Facione 2001), and analytical nurses connect clinical observations with theoretical knowledge (Facione et al. 1994). Systematicity implies the disposition to be organized, orderly, and focused (Giancarlo & Facione 2001). Nurses possessing this attribute have a systematic approach in identifying patients’ problems, in assessing data, in making decisions, and in ensuring that their action achieved the desired result (Smith-Blair & Neighbors 2000). Critical thinking Self-confidence (CT self-confidence) is the disposition to trust in one’s reasoning (Giancarlo & Facione 2001). Nurses who overrate their abilities may act with an inadequate action, whereas nurses who underestimate their disposition (lower CT self-confidence than their actual skill level) may demonstrate lack of leadership in direct patient care as well as towards team members (Facione et al. 1994). Inquisitiveness is about intellectual curiosity, the desire for learning, especially when the application of the knowledge is not apparent (Facione et al. 1995). This attribute is essential for nursing because the knowledge base for competent nursing practice continuously expands (Facione et al. 1994). The seventh attribute is maturity, which is the disposition to be judicious when making decisions in general, and especially in uncertain situations (Giancarlo & Facione 2001). This disposition has important implications for nursing when it comes to making ethical decisions in time-pressured environments (Facione et al. 1994).

The nursing Delphi process defined ten attributes needed for critical thinking: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection (Scheffer & Rubenfeld 2000). When comparing the attributes defined in the nursing Delphi process with the multidisciplinary Delphi process, six of the attributes express similar qualities. These are: confidence, inquisitiveness, integrity, (comparable to truth-seeking), intuition and reflection (both comparable to what is labelled to be judicious by Facione (1990). Flexibility and contextual perspective are thus defined as attributes of critical thinking in nursing. Taking the challenges of nursing into
account, it seems reasonable that these elements are essential in nursing, and consequently for nursing practice.

Critical thinking may be regarded as a process or as an outcome. Videbeck (1997a) has developed a model of critical thinking where the emphasis is placed on how to think and less on what to think. The concept of critical thinking has been implemented as a requirement in nursing education in America (Alfaro-LeFevre 1995, Profetto-McGrath 2003, Scheffer & Rubenfeld 2000) and in Great Britain (Banning 2006). Bevis & Watson (2000) have argued for curricula in nursing where critical thinking as a process is an important element in order to contribute to graduate nurses who are able to think critically and consequently are able to improve the health-care system to the benefit of people. Although critical thinking as a concept is not described explicitly in the authorities' requirements for nurse competence in Scandinavia (Kunnskapsdepartementet 2008, Socialstyrelsen 2005), critical thinking is implicit in the competence descriptions. Critical thinking is reported as essential for high quality nursing care (Scheffer & Rubenfeld 2000), in order to reduce the research-practice gap (Seymour et al. 2003), and to generate evidence-based nursing (Profetto-McGrath 2005).

Measuring critical thinking

Although there seems to be a certain agreement with respect to a definition of a critical thinker, there still are questions about how to measure this concept (Banning 2006, Videbeck 1997b). Several instruments for measuring critical thinking have been developed (Hicks 2001, Profetto-McGrath 1999). The Watson and Glaser Critical Thinking Appraisal (WGCTA) (Watson & Glaser 1964) and the California Critical Thinking Disposition Inventory (CCTDI) (Facione et al. 2001) have repeatedly been reported to be used in nursing (Girot 2000, Hoffman & Elwin 2004, Kawashima & Petrini 2004, Maynard 1996, Ozturk et al. 2008, Profetto-McGrath 2003, Profetto-McGrath et al. 2003). The WGCTA instrument used in the referred studies (Girot 2000, Hoffman & Elwin 2004, Maynard 1996) was developed in 1964 and is designed to estimate how well students are able to reason analytically and logically. Five subscales are used: inference, recognition of assumptions, deduction, interpretation and evaluation of arguments (Watson & Glaser 2009, Watson & Glaser 1964). The 1964 version of WGCTA has been criticized for assessing general reasoning skills rather than the discipline-specific thinking learned in nursing programmes (Walsh & Seldomridge 2006). Watson and Glaser (2009) have published a new version of the WGCTA, hereafter named WGCTA II. The authors still hold on to the belief that critical thinking includes attitudes of inquiry, knowledge, and skills in applying attitudes and knowledge.
Factor-analyses in this revision process revealed that three of the former subscales (inference, deduction and interpretation) were factored together. The WGCTA II therefore has three subscales: recognize assumptions, evaluate arguments, and draw conclusions (Watson & Glaser 2009). Published studies where the WGCTA II is reported to be used have not been found.

The CCTDI measures seven aspects of critical thinking which all stem from the Delphi Report: truth-seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness and maturity (Facione 1990). The CCTDI has been used in several educational contexts, for example including college students (Bers et al. 1996, Facione et al. 2001, Walsh & Hardy 1999) and nursing students (Ip et al. 2000, May et al. 1999, Ozturk et al. 2008, Profetto-McGrath 2003). Studies focused on critical thinking including graduate nurses where the CCTDI is used are limited, especially in European contexts. The only European study found in this review was a study including nursing students carried out in Turkey (Ozturk et al. 2008).

**Nurses’ critical thinking dispositions**

North American studies where the CCTDI has been used indicate that nurses included in these studies have a positive disposition towards critical thinking (Profetto-McGrath et al. 2003, Profetto-McGrath et al. 2009, Smith-Blair & Neighbors 2000). The highest scores were reported for the intellectual curiosity (Inquisitiveness) and for the disposition to be judicious in decision making even in uncertain situations (Maturity). However, US critical care nurses (Smith-Blair & Neighbors 2000) and Canadian nurse educators (Profetto-McGrath et al. 2009) reported higher values for intellectual curiosity than a Canadian convenience sample of nurses (Profetto-McGrath et al. 2003).

The lowest values of the above-mentioned studies were reported for intellectual honesty (Truth-seeking). Profetto-McGrath et al. (2003) reported a score below the cut value, indicating an ambivalence with respect to intellectual honesty. Nurses with low values on this attribute are disposed to not re-evaluating new information and keeping on to how things have always been done. US critical care nurses have reported values for intellectual honesty slightly above the cut score (Smith-Blair & Neighbors 2000) while Canadian nurse educators reported a positive disposition in this respect (Profetto-McGrath et al. 2009).

Japanese graduate nurses reported lower CCTDI total scores as well as subscale scores (Kawashima & Petrini 2004) than graduate nurses in USA (Smith-Blair & Neighbors 2000) and Canada (Profetto-McGrath et al. 2003, Profetto-McGrath et
In this Japanese study (Kawashima & Petrini 2004) the nurses reported scores indicating ambivalence with respect to critical thinking (i.e. CCTDI total scores and four subscale scores). Studies including nursing students carried out in Hong Kong (Ip et al. 2000, Tiwari et al. 2003) also reported lower critical thinking scores than those reported for nursing students in Canada (Profetto-McGrath 2003) and Turkey (Ozturk et al. 2008).

Relationships between critical thinking and other aspects of nurse competence have also been reported. Hoffman & Elwin found that nurses with high critical thinking scores were more hesitant in decision-making. They also discuss that being over-confident in decision-making may lead to poorer clinical outcomes, suggesting that critical thinkers, although more hesitant, think more deeply and seek more information before coming to a decision (Hoffman & Elwin 2004). Girot (2000) however, has reported no relationship between critical thinking and decision-making, and Maynard (1996) found no relationship between critical thinking and professional competence.

Studies of critical thinking including graduate nurses using the CCTDI report a positive correlation between critical thinking and research utilization (Profetto-McGrath et al. 2003, Profetto-McGrath et al. 2009), and Ozturk et al. (2008) reported significantly higher critical thinking scores among nursing students in a Problem-Based nursing program compared to those in a traditional nursing program.

Background variables, such as age, gender and health-care experience have to a limited extent been included in critical thinking studies, and Fero et al. (2009) recommend such variables to be included when studying critical thinking.

Critical thinking is a lifelong process requiring self-awareness, knowledge and practice. The development of critical thinking requires a willingness to develop a critical spirit (Brunt 2005). Critical thinking has been recommended to be studied when nurses have “real world” experience as nurses (May et al. 1999), and Redding (2001) has added that critical thinking dispositions may not become apparent until after graduation. Duchscher (2003) has described a socialization process in nursing practice that discourages critical thinking. Studying critical thinking among newly graduated nurses who have some experiences as nurses is therefore of great interest.
Research Utilization

It is widely discussed and accepted that nurses should base their practice on research-based knowledge combined with clinical experience and patient values. This requirement is stated at the global level by WHO (1997) and ICN (2006). Authorities in Scandinavia have also described the demand for making use of research findings in practice (Kunnskapsdepartementet 2008, Socialstyrelsen 2005).

The concepts of EBP and research utilization (RU) are sometimes used synonymously, although they are quite distinct. RU, the narrower of the two concepts, implies the application of research findings in clinical practice (Polit & Beck 2008) and is a corner-stone in EBP (DiCenso 2005).

Estabrooks (1999) has defined three aspects of RU: direct, indirect and persuasive RU. The direct RU is described as the concrete application of research in clinical practice, and is also referred to as “instrumental utilization”. The indirect RU encompasses situations where the research may change the mind, but not necessarily the concrete actions. This aspect of RU is also called “conceptual utilization”. The persuasive RU implies situations where research findings are used as a tool to change or legitimate practice, i.e. in decision-making settings. “Symbolic utilization” is another concept for this aspect of RU.

The implementation of research findings into practice has been a question for years, and is still described as a challenge (Rycroft-Malone et al. 2002, Wallin 2009). Doane & Varcoe (2008) have discussed the disparity between what nurses know and what they do, stating that nurses have difficulties in “walking the talk”. There is reason to reflect on the importance of individual and/or contextual factors in this respect.

Rogers’ “Diffusion of Innovations” model (2003) has been applied to nursing settings to describe and explain integration of new knowledge in nursing (Boström 2007, Kajermo 2004, Wallin 2009). The model was based and developed due to Rogers’ interest in the diffusion of agricultural innovations in farming in USA, and defines diffusion as “the process in which an innovation is communicated through certain channels over time among the member of a social system” (p.5). Innovation, communication channels, time and social system are the main elements in this theory. The innovation is an idea which is perceived new for an individual or a group. Rogers emphasizes that it does not matter if the idea is new, as long as it is perceived as new. The communication channels are the means by which information passes from one person to another. The time is part of the innovation
decision process, and encompasses knowledge, persuasion, implementation and confirmation. This innovation decision process may result in adoption, where the decision is to make use of the idea or the innovation or in rejection where the decision is not to adopt the idea. This process, which usually occurs in a time-ordered sequence, requires time. Rogers (2003) has also divided a normal adopter distribution into five adopter categories: some people are innovators (2.5%), some are early adopters (13.5%), more people are early majority (34%) or late majority (34%) and the rest are laggards (16%) (p.281). The social system is the fourth main element in the theory and consists of the organization of members involved to solve common goals.

**Measuring research utilization**

Several instruments have been developed to measure research utilization. In a systematic review Frasure made use of Estabrooks' conceptual structure of research utilization (Estabrooks 1999) to assess instruments measuring nurses' attitudes with regards to research utilization (Frasure 2008). Fourteen instruments were analysed to study if they measured indirect, direct and/or persuasive RU. All the instruments measured indirect RU, ten measured direct RU and nine measured persuasive RU. Four of the instruments were based on Rogers' (2003) theory of diffusion of innovations; among these was the BARRIERS' scale. One instrument, The Research Utilization in Nursing Survey, developed by Estabrooks (1999) was influenced by several theories, among them Rogers'. The other instruments were not based on a specified framework (Frasure 2008). The Research Utilization Questionnaire, RUQ, was with respect to reliability ranked highest of the instruments not based on a specific framework (Frasure 2008).

During the last ten years the BARRIERS' scale has been widely used to study nurses' barriers towards research in Norway (Hommelstad & Ruland 2004), Sweden (Kajermo et al. 1998), Finland (Oranta et al. 2002) and Australia (Hutchinson & Johnston 2004, Retsas & Nolan 1999).

The BARRIERS' scale was developed by Funk et al. (1991) and consists of 28 items in four subscales: characteristics of the nurse, characteristics of the setting, characteristics of the research, and characteristics of the presentation of the research. Although Funk et al. (1991) do not report that the BARRIERS' scale was based upon Rogers' (2003) theory on diffusions of innovation, this theory is used when discussing results based on this scale (Boström 2007, Kajermo 2004). In a systematic review Carslon & Ploncynski (2008) conclude that there will be minimal benefit from further description of research using the BARRIERS' scale. When
this is said, one should also note that most of the above-mentioned studies in addition to barriers also focused on facilitators to research utilization.

The RUQ in its original form consisted of four categories: attitude, availability, support and use (Champion & Leach 1989). The instrument was further developed by Pettengrill et al. (1994) and Humphris et al. (1999) and requests responses to participation in research activities, available support resources, factors that discourage the use of research findings in practice and attitudes to research.

**Nurses’ research utilization**

Variations in research utilization are explained by individual as well as organizational factors. The individual factors are reported to be most prominent (Estabrooks et al. 2007). Among individual factors are attitude towards research, time spent on the internet and emotional exhaustion. Several studies carried out in various contexts have reported that nurses have a positive attitude towards research (Andersson et al. 2007, Björkström & Hamrin 2001, Boström et al. 2006, Boström et al. 2008, Fink et al. 2005, Hommelstad & Ruland 2004, McCleary & Brown 2003, Valizadeh & Zamanzadeh 2003, Veeramah 2004). Attitude towards research is identified as an individual predictor for research use (Boström 2007, Estabrooks et al. 2008b, Tranmer et al. 2002), but it is also documented that having a positive attitude is not sufficient to become a research user (McCleary & Brown 2003, Wallin et al. 2003). Estabrooks et al. (2007) reported that time spent at internet significantly increased research use, while emotional exhaustion predicted decrease with respect to research use. A positive, but modest, correlation between critical thinking and research utilization has also been reported (Cobban & Profetto-McGrath 2008, Profetto-McGrath et al. 2003, Profetto-McGrath et al. 2009). Although respondents’ gender and age in some studies are reported (Forsman et al. 2009, Forsman et al. 2010) these individual factors as possible predictors for research use have not been found.

Lack of time, which is reported as the most frequently reported individual barrier to implement research findings in daily practice (Andersson et al. 2007, Gerrish & Clayton 2004, Hommelstad & Ruland 2004, Hutchinson & Johnston 2004, Pettengrill et al. 1994), may be more complicated than just lack of time. Thompson et al. (2008) have discussed this concept and state that it may be more a question of a “culture of busyness” than an individual’s lack of time, suggesting that it is more acceptable to report lack of time than a culture of not supporting research use. In this respect lack of time is an expression of an organizational factor explaining variation in research use. On the other hand, nurses who experience a favourable
culture, good leadership and performance feedback are reported to make use of research findings to a greater extent that those not being in such favourable settings (Cummings et al. 2007, Estabrooks et al. 2007). Other organizational factors, such as access to research findings at the workplace, support from unit manager (Boström et al. 2007) and work tempo (Nilsson Kajermo et al. 2008) are identified as predictors for research use. Furthermore, head nurses’ and other managers’ engagement is reported as critical for research use (Kajermo et al. 2001). Forsman et al. (2010) recommend in a recent study further studies on individual and contextual factors’ impact on research use.

Newly graduated nurses’ preparedness for using research is divergently reported. A Canadian study reported that newly graduated nurses have the knowledge to interpret research findings, but that they find little time to read research reports (Ferguson & Day 2007), whereas a Swedish study reports that the newly graduated nurses are not prepared for research utilization (Andersson et al. 2007). Findings that newly graduated nurses are expected to not “rock the boat” and to do as they are told (Maben et al. 2006), to “play the game” (Scott & Pollock 2008) and that they lack confidence to initiate changes in nursing practice (Gerrish et al. 2008) indicate that the atmosphere and culture at the workplace is of utmost importance. Forsman et al.’s (2009) finding that the proportion of very low research users was higher after three years compared to one year after graduation underlines the importance of a positive culture. Moreover a national survey in Sweden report that the nursing culture may have disempowered newly graduated nurses in making use of research findings (Boström et al. 2009a). It is also reported that different sanctions are used to show newly graduated nurses what behaviour is acceptable and what knowledge is necessary (Bisholt 2009).
Rationale for the thesis

Newly graduated nurses enter clinical practice in health care that is marked by a great many changes in recent years. Nurses are expected to reflect on nursing practice, and to be critical thinkers who are able to offer and to be accountable for patient-centred care in various working contexts. There is reason to ask how newly graduated nurses perceive their competence working in contexts marked by effectiveness, strict time limits and various expectations from patients, relatives, nurse colleagues and other health-care personnel.

Studies have reported that newly graduated nurses lack competence, especially leadership competence, and that the socialization process at the workplace is stressful. Critical thinking studies including newly graduated nurses are scarce, especially in a European context, and it is recommended that it should be studied after graduation, as this disposition may not become apparent before that time. Nurses have the knowledge to understand research, but findings indicate that the nursing culture discourages newly graduated nurses both with respect to critical thinking and research utilization. Individual factors predicting research utilization have been reported, but studies where critical thinking as a possible individual predictor for research use have not been found. Furthermore predictors for nurses’ perception of competence have only to a limited degree been reported.
Aims

The overall aim of this thesis was twofold: a) to study newly graduated nurses’ perception of competence, critical thinking and research utilization, and b) to identify predictors for research use and perception of competence.

The specific aims were:

- To illuminate how recently graduated nurses experience their first year as a nurse (I).

- To describe critical thinking dispositions by means of the CCTDI among newly graduated nurses in Norway, and to study whether background data had any impact on critical thinking dispositions (II).

- To describe research utilization among newly graduated nurses and to explore critical thinking dispositions and other individual and contextual factors as possible predictors for research use (III).

- To describe newly graduated nurses’ perception of competence and to identify possible predictors influencing their perceptions (IV).
Methods

This thesis includes four scientific papers (I-IV) based on two studies using different designs. The first study was descriptive with a qualitative design (I), and the second was a cross-sectional study with a quantitative design (II-IV). Combining qualitative and quantitative designs gives an opportunity to gain a broader perspective of the phenomenon under study.

Mixed methods with component design implies that quantitative and qualitative aspects are implemented and remain distinct throughout the data collection and analysis, whereas integrated design(s) implies a greater integration in all phases of the project (Polit & Beck 2008). Mixed methods may be sequential, i.e. qualitative and quantitative data are collected at different points of time, or concurrent, where qualitative and quantitative data are collected simultaneously (Creswell 2009). This thesis has a mixed methods design, with a sequential approach. An overview of characteristics of the studies and the four papers is shown in Table 1.

Table 1 Characteristics of the studies, papers I-IV

<table>
<thead>
<tr>
<th>Paper</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
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<tbody>
<tr>
<td>Number of nurses</td>
<td>12</td>
<td>618</td>
<td>617</td>
<td>618 (CCTDI), 617 (RUQ), 620 (NCS)</td>
</tr>
<tr>
<td>Design</td>
<td>Descriptive Qualitative</td>
<td>Cross-sectional Quantitative</td>
<td>Cross-sectional Quantitative</td>
<td>Cross-sectional Quantitative</td>
</tr>
<tr>
<td>Data collection</td>
<td>Individual interviews</td>
<td>Postal survey</td>
<td>Postal survey</td>
<td>Postal survey</td>
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<tr>
<td>Instruments/Questionnaires</td>
<td>Interview-guide</td>
<td>CCTDI ^1</td>
<td>RUQ ^2, CCTDI ^1</td>
<td>NCS ^3, CCTDI ^1, RUQ ^2</td>
</tr>
<tr>
<td>Data analysis</td>
<td>Qualitative content analysis</td>
<td>Descriptive and inferential statistics</td>
<td>Descriptive and inferential statistics</td>
<td>Descriptive and inferential statistics</td>
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^1 CCTDI – The California Critical Thinking Disposition Inventory
^2 RUQ – The Research Utilization Questionnaire
^3 NCS – Nurse Competence Scale
Study 1

This qualitative study, based on interviews with newly graduated nurses, made use of manifest and latent content analysis (I). Qualitative content analysis is a method which claims no particular disciplinary or methodological roots, and is described as challenging because of having no universal rules for analyzing the data (Polit & Beck 2008). Hsieh & Shannon have described three approaches to content analysis: Conventional, the directed or deductive content analysis both qualitative approaches, and the summative content analysis, which implies a quantitative approach. The characteristics for a conventional approach to content analyses are that categories are derived from data during the analysis, which may lead to a richer understanding of the phenomenon under study, whereas the directed is based upon predetermined categories (Hsieh & Shannon 2005). A conventional approach was found suitable to meet the aims of this study. Granheim & Lundeman (2004) have suggested “category” as an expression for the descriptive level of content (i.e. manifest analysis) and “theme” as an expression for latent analysis.

Participants and data collection

Twelve nurses were purposively selected, and they were all graduates from one nursing university college in Norway. Access to the field was obtained by sending a letter of request to the manager of nursing services in hospitals (two) and community health care (one). This letter included information about the study and an approximate number of informants needed. The head nurses at medical and surgical wards and in the home care district were then contacted and asked if some of the nurses graduated from the target university college in June 2001 were employed by them. Based on the names given by the head nurses, the newly graduated nurses were asked if they would like to participate. Selection of the participants aimed at covering variations, such as female and male nurses, nurses at various ages, and nurses with and without health-care experience prior to nursing education. All nurses who were asked gave their informed consent to participate.

The participants in this study consisted of ten female and two male nurses. Eight nurses worked in hospitals (four in medical and four in surgical wards) and four nurses worked in home care. Their mean age was 30 years (range 23 – 44 years). The majority (n=8) had health-care experience prior to nursing education.

Individual interviews were carried out in the latter part of their first year as nurses (April, May 2002). The interviews took place at the informants’ request; most of them at a conference room at the hospital or home care district, were tape-
recorded and lasted for 45-60 minutes. By means of an interview guide the interviews focused on the theme of interest (Kvale 1996). The participants were asked to describe their experiences as graduate nurses from the first day until the day of the interview and to share experiences they considered important for the development of their nurse competence. Questions about the informants’ background (for example age, health-care experience prior to nursing education) constituted the opening of the interview. The process of interviewing was inspired by Kvale’s (1996) aspects of qualitative research interviews in that the interviews were aimed at being descriptive, focused, interpersonal and a possible positive experience for the informants.

**Data analysis**

The analysis was inspired by Graneheim & Lundeman (2004) following their steps from meaning unit to categories and theme. The transcripts were firstly read and re-read to get a sense of the “whole”, which often is named “naive reading” (Sandelowski 1995). Secondly the meaning units were delimited and further condensed and abstracted in several steps (i.e. meaning unit, condensed meaning unit, codes) before they were grouped into sub-categories. Within each sub-category the statements were critically questioned and discussed, and adjustments were made until consensus was reached. The theme was the expression of the latent content in the text.

Each interview was transcribed verbatim before the next interview was carried out in order to ensure the best possible picture of the interview in the written text. When doing this, it is important to be aware of the fact that transcripts are constructions from oral to written mode of communication (Kvale 1996, Sandelowski 1994).

**Trustworthiness**

In qualitative studies credibility, dependability, transferability and confirmability are used to describe aspects of trustworthiness (Lincoln & Guba 1985, Polit & Beck 2008). Variation and recognition are central components with respect to credibility. The informants – as the group they constituted – were males and females at different ages who had experiences from different working contexts. Dependability was established by using an interview guide to focus the interview, by carrying out the interviews in quiet environments with no interruptions, and by performing the interviews in a relatively short period of time. Transferability refers to the extent of transferring findings to other settings or groups. Description of participants, data collection and analysis, in addition to a rich presentation of findings with
appropriate quotations, will enhance transferability (Graneheim & Lundman 2004). The presentation of findings in this study includes some quotations contributing to a rich presentation. The fourth aspect of trustworthiness described by Lincoln & Guba (1985) and by Polit & Beck (2008), but not by Graneheim & Lundman (2004) is confirmability, and deals with how coloured the findings are. Pre-understanding is critical in this respect. The author was employed at the college where the informants had graduated from. Knowledge about the curriculum and educational program may lead to coloured results, but may on the other hand also contribute to a deeper understanding of the informants’ description of their experience. More than 100 nurses graduate yearly from the college where the informants were former students, and the first author had no close relationship to any of the informants. Nevertheless, the fact that a nurse teacher was the interviewer may have contributed to “coloured” interviews despite the effort to consciously be as open-minded as possible through the interviews. With respect to the analysis all the steps, from meaning units to categories at the descriptive level as well as revealing the underlying meaning, i.e. the latent analysis, were thoroughly discussed in the research group.

**Study 2**

In this study three instruments were used, and the results are presented in three papers (II, III, IV). With help from a statistician a power analysis was carried out when planning the study, showing a need for 730 respondents to obtain a statistical power of 79.6%, with statistical significance level set at p<.050 (two tailed).

**Participants and data collection**

The target population was nurses who had graduated from 27 university colleges in Norway in June 2006 (N=2675). A pilot study which was carried out to check the procedure for mailing and response rate led to a somewhat large volume of return-to-sender mail due to nurses changing addresses after graduation. To reduce the amount of return-to-sender mail, all addresses were compared with those in the membership register of the Norwegian Nurses’Association.

All Norwegian university colleges with bachelor-programs in nursing were requested to send the names and addresses of all nurses graduated from their university colleges in June 2006. These 27 university colleges constituted the base for the cluster sampling. In the first mailing 14 university colleges were chosen by drawing lots and all nurses graduated from these university colleges (n=1463) were invited to participate. Due to low response rate another 4 university colleges were
approached by further drawing lots, and all nurses graduated from these university colleges (n=437) were invited to participate in the second mailing. In all 1900 nurses graduated from 18 university colleges were invited to participate. Data collection was carried out from October 2006 till April 2007, and two reminders were sent out. The response rate was 33%. Not all of the respondents answered all the instruments, which resulted in slightly different numbers of responses for the various instruments.

Description of sample (II,III,IV)

The respondents' mean age was 30.9 years (SD 8.67), and 90.5% of the respondents were female nurses. Sixty percent (n=375) of the newly graduated nurses reported having health-care experience prior to their nursing education. Furthermore 19% (n=117) of the respondents had education at a university/college level prior to their nursing education. The newly graduated nurses worked in different settings: 36% (n=224) worked in areas classified as community health care, whereas 63% (n=390) worked in areas classified as specialist health care, i.e. somatic and mental health hospitals. Six respondents did not answer the question about work area. Seventeen percent (n=103) of the newly graduated nurses worked in more than one setting. For more than half of these (n=56) this implied working in both specialist health care and community health care.

Drop-out analysis

Due to the low response rate (33%), a drop-out analysis was performed and the six university colleges with a response rate > 35% were included. All nurses who had not responded after two reminders from these six university colleges (n= 418) received a questionnaire with questions about age, gender, university college education and/or health-care experience prior to nursing education. In all 178 nurses responded, giving a response rate of 43%. In addition, data about gender and age of all graduate nurses in Norway in June 2006 (the target population; N=2675) was obtained from the Norwegian Health Personnel Register.

The characteristics of the study sample were compared to those of the respondents in the drop-out-analysis. Additionally the gender- and age- characteristics were compared to those of the target population. No statistically significant differences were found between the sample, respondents in the drop-out-analysis and the target population with respect to background data (II,III,IV). This is an aspect of internal validity, and contributes to strengthen the results.

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**Instruments**

The three instruments used in this study were the California Critical Thinking Disposition Inventory, The Research Utilization Questionnaire, and the Nurse Competence Scale. Additionally some questions about gender, age, work area (i.e. hospitals or community health care), education at university level and health-care experience both prior to nursing education were asked.

**The California Critical Thinking Disposition Inventory**

The California Critical Thinking Disposition Inventory (CCTDI) (II, III, IV) is designed to measure seven aspects of critical thinking which all stem from the multidisciplinary Delphi Report: Truth-seeking, Open-mindedness, Analyticity, Systematicity, Self-confidence, Inquisitiveness, and finally Maturity (Facione 1990). The CCTDI consists of 75 declarative statements gathered in seven subscales with nine to twelve items in each of the subscales. The items in the seven subscales are interspersed throughout the instrument (Facione et al. 2001).

This instrument uses a 6-point Likert scale from 1 = strongly agree to 6 = strongly disagree. The total scores range from 70 to 420, while the subscale scores range from 10 to 60. The higher the score the stronger the disposition towards critical thinking. A total score above 350 indicates a strong disposition, while a score between 280 and 350 indicates a positive inclination (i.e. high critical thinking score). Total scores between 210 and 279 fall in the ambivalent range, while scores below 210 indicate a significant opposition towards critical thinking (i.e. low critical thinking scores) (Facione et al. 2001). Subscale scores above 50 indicate a strong disposition, scores between 40 and 50 a positive inclination (i.e. high subscale scores), scores between 30 and 39 ambivalence, and scores below 30 indicate a significant opposition towards critical thinking (i.e. low subscale scores) (Facione et al. 2001).

**The Research Utilization Questionnaire**

The Research Utilization Questionnaire (RUQ) (III, IV) was developed by Champion & Leach (1989) and further revised by Pettengill et al. (1994) and Humphris et al. (1999). The questionnaire consists of questions on a) participation in research-related activities, b) availability of research-related resources, c) how active they are in seeking out research, d) ranking 10 factors that might discourage their use of research findings in practice, and 10 factors that might be helpful, and finally e) items forming three indexes. In this study the three RUQ indexes were used. These are: 1) Attitude towards research (12 items), 2) Availability and support
to implement research findings (8 items), and 3) Research use in daily practice (9 items), in total 29 items. Both positive and negative statements are included in the instrument. The items employ a five-point Likert scale ranging from 1= strongly disagree to 5= strongly agree. High scores indicate a good attitude, good availability and support to implement research findings in clinical practice and a high degree of using research findings in daily practice.

The Nurse Competence Scale

The Nurse Competence Scale (NCS) (IV) was developed by Meretoja et al. (2004) and consists of 73 items organized in seven competence categories with six to 19 items in each domain: Helping role (7 items), Teaching-coaching (16 items), Diagnostic functions (7 items), Managing situations (8 items), Therapeutic interventions (10 items), Ensuring quality (6 items), and finally Work role (19 items) (Meretoja et al. 2004a, Meretoja et al. 2004b). The NCS asks for two answers to each item: one is marking the level of competence, and the other is marking how often this competence is used in their daily work as nurses.

The level of competence was measured by means of a Visual Analogue Scale (VAS) from 0 to 100 mm. Scores <25 indicate a low competence, scores between 25 and 49 indicate a quite good competence, scores between 50 and 75 a good, and scores > 75 a very good competence (Meretoja et al. 2004a). The respondents were also asked to indicate the extent to which they actually use their competence in their clinical practice on a 4-graded scale: 0= not applicable in my work, 1= used very seldom, 2= used occasionally, 3= used very often in my work (Meretoja et al. 2004a).

Reliability and validity of the instruments

The reliability of the CCTDI has been measured in different nursing populations and different countries, although it is mostly used in USA and Canada. The Cronbach’s alpha values of the CCTDI total scores are in American studies focused on nurses reported to be lower than 0.80 (exact value not reported) (Profetto-McGrath et al. 2003) and 0.87 (Smith-Blair & Neighbors 2000). Two studies focused on nursing students carried out in Turkey and Hong-Kong both report an alpha value at 0.85 (Ip et al. 2000, Ozturk et al. 2008). The corresponding Cronbach’s alpha value in the current study was 0.83. The alpha values for the CCTDI subscales are reported lower than the for the CCTDI total score: For nurses 0.52–0.70 (Profetto-McGrath et al. 2003) and 0.70–0.80 (Smith-Blair & Neighbors 2000) and for nursing students 0.34 –0.76 (Ip et al. 2000) and 0.56-0.79 (Ozturk et al. 2008). The Cronbach’s alpha values for the CCTDI subscales in the
current study varied from 0.46 (lowest: Open-mindedness) to 0.72 (highest: CT self-confidence).

With respect to the RUQ-indexes, studies including Swedish nurses have reported Cronbach’s alpha values for the Attitude-index to be 0.88 (Wallin et al. 2003) and 0.89 (Boström et al. 2006), for the Availability-index 0.51 (Boström et al. 2006) and 0.75 (Wallin et al. 2003), and for the Research use-index 0.84 (Wallin et al. 2003) and 0.88 (Boström et al. 2006). The Cronbach’s alpha values in the current study were for the Attitude-index 0.84, for the Availability-index 0.71, and for the Research use–index 0.90.

Cronbach’s alpha value for the NCS total score is not widely reported. However, in an Australian study including newly graduated nurses the value was reported to be 0.90 (Hengstberger-Sims et al. 2008). The corresponding value in the current study was 0.97. Cronbach’s alpha coefficient for the seven competence categories has for experienced Finnish nurses been reported between 0.79 and 0.91 (Meretoja et al. 2004a), and for Finnish nurses with less than 3 years experience between 0.78 and 0.91 (Salonen et al. 2007). For the Australian newly graduated nurses the values varied between 0.79 and 0.93 (Hengstberger-Sims et al. 2008). The corresponding alpha values in the current study varied from 0.72 to 0.92.

**Validity** refers to the degree to which an instrument measures what it is intended to measure, and implies content, criterion-related and construct validity (Polit & Beck 2008). The grounding of the CCTDI in the multidisciplinary Delphi report (Facione 1990) supports its content validity. The CCTDI has also been reported to correlate with measures of personality and academic achievement (Giancarlo & Facione 2001), which is an aspect of criterion-related validity (Polit & Beck 2008). Construct validity implies validating the body of theory underlying the measure. Factor-analyses, which constitute one method for assessing construct validity (Polit & Beck 2008), were carried out when developing the CCTDI. The loadings varied between .387 (lowest; Analyticity) and .528 (highest; CT self confidence) (Facione et al. 2001). Polit & Beck (2008) state that if the developer of an instrument has taken steps to enhance the content validity, the construct validity also will be strengthened.

The RUQ is not based on a theoretical framework (Frasure 2008). Champion & Leach (1989), the developers of the RUQ, have reported that experts judged all the RUQ items for content validity. Research utilization (RU) implies both direct RU, described as the concrete application of research, indirect RU, where the research might change the attitude, but not necessarily the action, and persuasive RU, where
research findings are used to persuade others, often those in decision making positions (Estabrooks 1999). Frasure (2008) concluded that the RUQ measures both direct and indirect RU, which is an aspect of content validity. Reports on criterion-related validity for the RUQ have not been found.

The process of developing the NCS included both a literature review and the use of a Delphi process with six expert groups in a seven-step approach (Meretoja et al. 2004a). This procedure strengthens the content validity of the NCS. The competence categories were derived from Benner’s (2001) domains of competence, which also contributes to strengthen the validity of the NCS. Principal component analysis in the NCS development process provided support for Benner’s domains, although some of the items loaded on more than one factor (Meretoja et al. 2004a). These are aspects of construct validity (Polit & Beck 2008). Additionally strong correlation is reported between the NCS scale and the 6D Scale (Meretoja et al. 2004a) and between the NCS scale and the Australian National Competency Standards (ANC), which is an aspect of criterion-related validity (Polit & Beck 2008).

Instrument translation process

The instruments have different linguistic origins, which gave reason for slightly different translation processes. With respect to the NCS and the CCTDI, professionals speaking the original language as well as Norwegian were engaged in the translation process. For the NCS a Finnish speaking Norwegian nurse translated the NCS into Norwegian, and this version was discussed in the research group as well as with Finnish-Swedish speaking nurse researchers. Regarding the CCTDI the author translated the instrument into Norwegian, and discussed it in the research group before a linguistic validation by an English speaking professional translator was carried out. The RUQ was available in Swedish (Wallin et al. 2003), and the RUQ indexes from the Swedish version were translated into Norwegian by the research group. The Norwegian version was further translated into English and compared to the original version to ensure preservation of the original items’ content.

Internal drop-outs

According to directions for analyzing the CCTDI given by Insight Assessment, unanswered items were given the value 3.5. Four respondents were excluded due to 15 or more CCTDI questions not answered (Facione et al. 2001) (II,III,IV). With respect to the RUQ, missing data were substituted with the mean value of the reported rating within each index (Polit & Beck 2008). No RUQ respondents were
excluded due to unanswered questions. Thus 614 CCTDI respondents and 617 RUQ respondents remained for the analyses.

The NCS implies responses to competence level (VAS scale) and frequencies in use of the competence. In all 620 NCS questionnaires were returned. Out of these, 612 had responded to the frequencies-in-use-of-competence-questions, while 600 had responded to the VAS scale. Respondents with answer of no more than 50% of the items in a category were excluded from the analyses on the current competence category. An overview of number of respondents included and excluded from analyses in the NCS competence categories is shown in Table 2.

Table 2. Nurse Competence Scale. Overview of numbers of included and excluded respondents.

<table>
<thead>
<tr>
<th>Competence category</th>
<th>Level of competence – Visual Analogue Scale (VAS)</th>
<th>Frequency of using competence category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Included</td>
<td>Excluded 1</td>
</tr>
<tr>
<td>Helping role</td>
<td>600</td>
<td>0</td>
</tr>
<tr>
<td>Teaching-coaching</td>
<td>568</td>
<td>32</td>
</tr>
<tr>
<td>Diagnostic functions</td>
<td>592</td>
<td>8</td>
</tr>
<tr>
<td>Managing situations</td>
<td>588</td>
<td>12</td>
</tr>
<tr>
<td>Therapeutic interventions</td>
<td>569</td>
<td>31</td>
</tr>
<tr>
<td>Ensuring quality</td>
<td>569</td>
<td>31</td>
</tr>
<tr>
<td>Work role</td>
<td>584</td>
<td>16</td>
</tr>
</tbody>
</table>

1 Respondents with >50% items unanswered were excluded from the analyses

Data analyses and statistics

The three instruments used gave reason for slightly different ways of preparing the data for further analyses. For calculation of the CCTDI subscale scores the raw scores were multiplied by ten and divided by the number of items on the subscale (Profetto-McGrath 2003). With respect to the RUQ, the values of the negative items were reversed before calculating the indexes. The respondents’ scores in each index were added, and then divided by the number of items within the respective domain. The NCS competence categories (VAS-values) were calculated by adding the item scores in each category and dividing the sum by the number of items answered in the current category. This means that respondents who had answered 50% or more of the items in a category, but not all the items, were treated as mentioned above.

Furthermore, the index Research use in daily practice was dichotomized into two groups: research users (RU-group, score ≥ 3.6) and non-research users (non-RU-
group, score ≤ 3.5) for comparisons with respect to CCTDI total score and the CCTDI subscale scores. This arbitrary cut-off value at 3.6 indicates a research use behaviour more on the “user-side” than “do-not-know” or “non-user”-side of the scale. The same cut-off value is reported by Boström et al. (2008). As the index includes nine items, rating agree (=4) on five of the items and do not know (=3) on four of the items would give a mean value of 3.6 on the index.

The SPSS Version 15.0 (II), 17.0 (III, IV) and PASW Statistics 18.0 (T; i.e. the thesis) for Windows program were used, and the statistical significance was *a priori* set to *p* <.05 (two-tailed). The Kolmogorov-Smirnov test was used to test if the data were normally distributed, and gave different results for the three instruments. While the CCTDI total scores were normally distributed, the CCTDI subscale scores were not. Because of non-normal distribution of the CCTDI subscale scores, non-parametric tests were used (Altman 1991, Field 2005). None of the RUQ-index-data had a normal distribution, and consequently non-parametric tests were used. The NCS scores, however, were normally distributed, which gave reason for using parametric tests in paper IV (Altman 1991, Field 2005). Table 3 gives an overview of statistical tests used in papers II, III, IV as well as in this thesis.

Pearson’s χ² was used for analyzing differences in proportions between groups for nominal data (drop-out analyses), and for nurses with high (i.e. strong disposition and positive inclination) vs low (i.e. ambivalence and significant opposition) critical thinking scores in relation to background variables (Altman 1991, Field 2005). The Mann-Whitney U-test was used for differences related to background variables with respect to CCTDI total score and the RUQ-indexes (data not normally distributed). The independent Student t-test was carried out for differences related to background variables with respect to the total NCS as well as the competence categories (data normally distributed). The Bonferroni correction was made for the Mann-Whitney U-test and the Student t-test (Altman 1991, Field 2005). Thus the level of significance for these tests was *p* <.0125.
Table 3 Statistical tests used in papers (II, III and IV) and in the Thesis (T)

<table>
<thead>
<tr>
<th>Statistical test</th>
<th>Paper(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To describe basic data</td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td>Test for normal distribution</td>
<td>Kolmogorov-Smirnov's test</td>
</tr>
<tr>
<td>To test proportions of nominal data</td>
<td>Pearson’s Chi Square test</td>
</tr>
<tr>
<td>To test differences between two unrelated groups' mean scores</td>
<td>Mann-Whitney U-test</td>
</tr>
<tr>
<td>(index level, data not normally distributed)</td>
<td></td>
</tr>
<tr>
<td>To test differences between two unrelated groups' mean scores</td>
<td>Student t-test</td>
</tr>
<tr>
<td>(index level, data normally distributed)</td>
<td></td>
</tr>
<tr>
<td>To test one dependent variable and one independent variable</td>
<td>Simple linear regression</td>
</tr>
<tr>
<td>To test one dependent variable and several independent variables</td>
<td>Multiple linear regression</td>
</tr>
</tbody>
</table>

Simple linear regression analyses were carried out to reveal each significant predictor’s contribution to variance explanation. Multiple linear regression analyses were used to identify possible predictors for research use and perception of competence. Dependent variables were the three RUQ-indexes: Attitude towards research, Availability and support to implement research findings, and Research use in daily practice and total NCS as well as NCS competence categories. See Table 4 for overview of independent and dependent variables in regression analyses.

The independent variables were tested for multicollinearity, and the residuals (i.e. unexplained variances) were tested for normal distribution by means of the Kolmogorov-Smirnov test (Field 2005).
Table 4: Overview of dependent and independent variables in regression analyses. Response options for the California Critical Thinking Disposition Inventory (CCTDI), the Research Utilization Questionnaire (RUQ), the Nurse Competence Scale (NCS) and background variables.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Items measured</th>
<th>Response options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Research use in daily practice (RUQ index)</td>
<td>Research use in daily practice (9 items)</td>
</tr>
<tr>
<td>III</td>
<td>Attitude towards research (RUQ index)</td>
<td>Attitude towards research (12 items)</td>
</tr>
<tr>
<td>III</td>
<td>Availability and support (RUQ index)</td>
<td>Availability and support to implement research findings (8 items)</td>
</tr>
<tr>
<td>IV</td>
<td>Nurse Competence Scale</td>
<td>NCS total score</td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td>NCS Competence categories (n=7)</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III, IV</td>
<td>Critical thinking dispositions</td>
<td>Total score 75 items</td>
</tr>
<tr>
<td>III</td>
<td></td>
<td>Critical thinking subscales (n=7)</td>
</tr>
<tr>
<td>III, IV</td>
<td>Availability and support (RUQ index)</td>
<td>Availability and support to implement research findings (index,8 items)</td>
</tr>
<tr>
<td>III, IV</td>
<td>Attitude towards research (RUQ index)</td>
<td>Attitude towards research (index, 12 items)</td>
</tr>
<tr>
<td>III, IV</td>
<td>Background variables</td>
<td>Gender</td>
</tr>
<tr>
<td>III, IV</td>
<td></td>
<td>Age</td>
</tr>
<tr>
<td>III, IV</td>
<td></td>
<td>University education prior to nursing education</td>
</tr>
<tr>
<td>III, IV</td>
<td></td>
<td>Health-care experience prior to nursing education</td>
</tr>
<tr>
<td>III, IV</td>
<td></td>
<td>Work area</td>
</tr>
</tbody>
</table>
Ethical considerations

Both studies (I,II,III,IV) were guided by the Ethical Guidelines for Nursing in the Nordic Countries (Northern Nurses' Federation 2003). Participation in research is voluntary. With respect to the qualitative study (I) the author phoned the newly graduated nurses, the possible participants, informing them verbally about the study and asking if they would like to participate. After their first acceptance, the nurses received written information about the study, including a form for written informed consent, and information about the right to withdraw from the study. As the researcher was employed at their former university college these nurses might experience difficulties in refusing to participate. The author highlighted the principle of voluntariness, and the informed consent was not signed until the day of the interview, which gave them some time to reflect on their willingness to participate.

Regarding study 2 (II,III,IV) all the selected nurses received written information about the study and information on how to withdraw from the study after returning the questionnaires. Information on the e-mail address and phone-number of the researcher was also sent out in case the respondents wanted any contact. Returning the questionnaires was regarded as consent to participate. There was no use of names on the questionnaires. Additionally the names and addresses of the study sample were deleted when the data collection process had come to the end. These are elements which ensure that confidentiality was secured. The studies were approved by the Human Participants Review Board at the Pacific Lutheran University in Tacoma, WA (I) and the Ethical Committee at Karlstad University, as well as by the Norwegian Social Science Data Services (II,III,IV).
Main findings

In this chapter the main findings from the four papers are presented. Firstly, the findings from study I (I) and then the results from study 2, which is built upon three papers (II,III,IV), are presented. The findings are presented in the following order: Being a nurse – a challenging and learning experience (I), Perception of competence level (IV), Relationships between use of competence and competence level (IV), Critical thinking among newly graduated nurses (II), Newly graduated nurses’ research utilization (III), Critical thinking, research utilization and perception of competence – differences between groups (III, IV), and Predictors for research use and perception of competence (III, IV). A summary of the findings constitutes the end of this chapter.

Being a nurse - a challenging and learning experience (I)

When the newly graduated nurses reflected on their first year as a nurse, they described various experiences, descriptions which through the analysis were labelled for example “uncertainty and chaos” in the very first period of time and “managing challenging situations” as time went by. An overview of categories and subcategories is shown in Table 5.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Sub-categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of being new</td>
<td>Uncertainty and chaos</td>
</tr>
<tr>
<td></td>
<td>Need for induction</td>
</tr>
<tr>
<td></td>
<td>Need for a supportive environment</td>
</tr>
<tr>
<td>Gaining nurse experience</td>
<td>Need for recognition</td>
</tr>
<tr>
<td></td>
<td>Awareness of responsibility</td>
</tr>
<tr>
<td></td>
<td>Need for positive experiences</td>
</tr>
<tr>
<td>Gaining competence</td>
<td>Becoming experienced – reflection on the first period of time</td>
</tr>
<tr>
<td></td>
<td>Managing challenging situations</td>
</tr>
</tbody>
</table>

The experience of being new was apparent independently of being in familiar or unfamiliar work settings, indicating that the experience was related to the new role of being a nurse. This was the case for the informants working in hospitals as well as in home care settings. One home care nurse gave this description of the expectations in the new role:

I knew the district – I have been an assistant nurse here. But suddenly I was the one supposed to make the decisions!
When the newly graduated nurses started their careers as nurses they described experiences marked by unknown routines, unknown patients, and unknown co-workers, and they reported being dependent on written instructions. They felt the need for a supportive environment, but they also described a welcoming atmosphere and being encouraged to ask questions i.e. it was all right for them to be novices.

The informants described gaining nurse experience through awareness of responsibility, the need for recognition and for positive experiences. One hospital nurse described the need for good experiences in this way:

The first half year was full of new patients, new diagnoses – lots of new situations – that was strenuous. But now I have days when I feel – today was good.

The awareness of responsibility was described as the most prominent difference between being a student nurse and being a registered nurse. This challenge of responsibility was especially related to being a team leader in hospital or being the only nurse on duty, and was experienced regardless of working context. The informants also described positive experiences resulting from having encountered challenging parts of the nurse role, experiences which had improved their competence. Feedback was experienced as important for the development of their competence as nurses.

The newly graduated nurses described gaining competence through managing challenging situations. All informants had experienced situations which were life-threatening and dramatic for the patients. They described managing these situations as critical for their nurse development, and they were able to reflect on them as learning experiences and opportunities to develop their competence.

Most of all the nurses described their experiences in a way that revealed the theme: An experience of growth and development. Even though the very first time was described as tough, starting in the summer time, they appreciated the challenges when looking back, as here expressed by a hospital nurse:

The first period of time was very strenuous – but extremely instructive. Looking back – I wouldn’t have missed that time.
Perception of competence level (IV)

In all 83% of the newly graduated nurses reported a NCS total score classified as “good” (67%; VAS 50-75) or “very good” (16%; VAS >75). The remaining respondents reported their competence level as “quite good” (17%; VAS 25-49). None of the newly graduated nurses reported a NCS total score classified as “low competence” (VAS <25). The corresponding figures at competence category level are shown in Figure 1.

More than 30% of the newly graduated nurses perceived their competence “very good” for two of the competence categories. These were Helping role (34%), which is related to helping the patient to cope and providing ethical and individualized care, and Diagnostic functions (31%), which is a category implying to detect changes in patients’ conditions and to anticipate problems. Approximately four out of ten newly graduated nurses perceived their Ensuring quality competence as “quite good” (31%; VAS 25-49) or “low” (7%; VAS <25).

When looking at the mean scores, the NCS total score for the newly graduated nurses was 62.5 indicating a “good” competence. The Helping role-scores were also here highest (mean 70.0), while Managing situations was the competence category with the second highest mean scores (66.1). This latter competence...
category implies recognizing changing situations and prioritizing activities flexibly. The lowest mean score, 53.8, was found for the Ensuring quality category. However, the scores for both these categories are classified as “good competence”.

Studying the mean scores at item-level revealed that the highest item mean scores for all competence categories indicated a very good competence (range 75.3 – 83.9) – except for Ensuring quality (score 71.0 = good competence). The lowest item mean scores for all competence categories (except for the Helping role category) indicated a quite good competence, varying from 36 (lowest; Ensuring quality) to 49 (highest; Therapeutic functions). The item mean scores for the Helping role competence category varied from 56.6 (lowest; item 6 “Developing the treatment culture of my unit”) indicating a good competence to 80.0 (highest; item 1 “Planning patient care according to individual needs”) indicating a very good competence. The Helping role was the only competence category where the lowest item scores indicated a good competence.

**Relationships between use of competence and competence level (IV)**

Table 6 shows ranked values based on competence items used very often within each of the NCS competence categories. More than 90% of the newly graduated nurses used the competence items “Planning patient care according to individual needs” (Helping role category) and “Acting autonomously” (Working role category) very often. The item “Making decisions concerning patient care taking the particular situation into account” (Therapeutic interventions category) also had a quite high frequency of very often-used responses (81%). The items with the lowest frequencies of very often-used responses are mostly related to mentoring co-workers, novices and student nurses and development of care and research at the unit, although they belong to all but one competence category (the Helping role category).

Table 6 also illustrates the ranked values based on frequencies of very often-used competence within each of the competence categories and the corresponding mean VAS scores. Looking at the ranks of very often-used and the VAS mean scores, these numbers are quite corresponding. This was the case both for the competence items ranked high and for the competence items ranked low.
Table 6. Ranked values based on frequencies in use (percent) very often within each Nurse Competence Scale category. Corresponding mean VAS scores are also shown. Shaded area shows items with lowest frequencies of very often-used competence.

<table>
<thead>
<tr>
<th>Item</th>
<th>Very often</th>
<th>Rank</th>
<th>VAS score Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning patient care according to individual needs</td>
<td>92</td>
<td>1</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>Supporting patient’s coping strategies</td>
<td>81</td>
<td>2</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>Decision making guided by ethical values</td>
<td>76</td>
<td>3</td>
<td>78</td>
<td>3</td>
</tr>
<tr>
<td>Evaluating critically own philosophy in nursing</td>
<td>30</td>
<td>6</td>
<td>61</td>
<td>6</td>
</tr>
<tr>
<td>Developing the treatment culture of my unit</td>
<td>23</td>
<td>7</td>
<td>57</td>
<td>7</td>
</tr>
<tr>
<td>Taking active steps to maintain and improve my professional skills</td>
<td>73</td>
<td>1</td>
<td>79</td>
<td>1</td>
</tr>
<tr>
<td>Providing individualized patient education</td>
<td>48</td>
<td>2</td>
<td>73</td>
<td>2</td>
</tr>
<tr>
<td>Coaching others in duties within my responsibility area</td>
<td>46</td>
<td>3</td>
<td>69</td>
<td>3</td>
</tr>
<tr>
<td>Developing orientation programmes for new nurses in my unit</td>
<td>4</td>
<td>15</td>
<td>37</td>
<td>16</td>
</tr>
<tr>
<td>Developing patient education outcomes with family</td>
<td>4</td>
<td>15</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>Analyzing patient’s well-being from many perspectives</td>
<td>73</td>
<td>1</td>
<td>75</td>
<td>3</td>
</tr>
<tr>
<td>Able to identify patient’s need for emotional support</td>
<td>71</td>
<td>2</td>
<td>77</td>
<td>2</td>
</tr>
<tr>
<td>Arranging expert help for patient when needed</td>
<td>56</td>
<td>3</td>
<td>81</td>
<td>1</td>
</tr>
<tr>
<td>Coaching other staff members in patient observation</td>
<td>22</td>
<td>6</td>
<td>61</td>
<td>5</td>
</tr>
<tr>
<td>Coaching other staff members in use of diagnostic equipment</td>
<td>3</td>
<td>7</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>Planning care consistently with resources available</td>
<td>77</td>
<td>1</td>
<td>78</td>
<td>1</td>
</tr>
<tr>
<td>Prioritizing my activities flexibly according to changing situations</td>
<td>73</td>
<td>2</td>
<td>75</td>
<td>2</td>
</tr>
<tr>
<td>Promoting flexible team co-operation in rapidly changing situations</td>
<td>38</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>Arranging debriefing sessions for the care team when needed</td>
<td>8</td>
<td>7</td>
<td>47</td>
<td>8</td>
</tr>
<tr>
<td>Coaching other team members in mastering rapidly changing situations</td>
<td>7</td>
<td>8</td>
<td>49</td>
<td>7</td>
</tr>
<tr>
<td>Making decisions concerning patient care taking the particular situation into account</td>
<td>81</td>
<td>1</td>
<td>79</td>
<td>1</td>
</tr>
<tr>
<td>Planning own activities flexibly according to clinical situation</td>
<td>56</td>
<td>2</td>
<td>73</td>
<td>2</td>
</tr>
<tr>
<td>Co-ordinating multidisciplinary team’s nursing activities</td>
<td>30</td>
<td>3</td>
<td>63</td>
<td>3</td>
</tr>
<tr>
<td>Contributing to further development of multidisciplinary clinical paths</td>
<td>7</td>
<td>9</td>
<td>44</td>
<td>9</td>
</tr>
<tr>
<td>Updating written guidelines for care</td>
<td>5</td>
<td>10</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>Evaluating systematically patient’s satisfaction with care</td>
<td>52</td>
<td>1</td>
<td>71</td>
<td>1</td>
</tr>
<tr>
<td>Committed to my organization’s care philosophy</td>
<td>45</td>
<td>2</td>
<td>63</td>
<td>2</td>
</tr>
<tr>
<td>Evaluating critically my unit’s care philosophy</td>
<td>19</td>
<td>3</td>
<td>54</td>
<td>3</td>
</tr>
<tr>
<td>Utilizing research findings in further development of patient care</td>
<td>10</td>
<td>4</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>Making proposals concerning further development and research</td>
<td>3</td>
<td>6</td>
<td>36</td>
<td>6</td>
</tr>
<tr>
<td>Acting autonomously</td>
<td>52</td>
<td>1</td>
<td>84</td>
<td>1</td>
</tr>
<tr>
<td>Familiar with my organization’s policy concerning division of labour and co-ordination of duties</td>
<td>63</td>
<td>2</td>
<td>73</td>
<td>3</td>
</tr>
<tr>
<td>Professional identity serves as resource in nursing</td>
<td>63</td>
<td>3</td>
<td>72</td>
<td>4</td>
</tr>
<tr>
<td>Co-ordinating student nurse mentoring in the unit</td>
<td>6</td>
<td>18</td>
<td>43</td>
<td>17</td>
</tr>
<tr>
<td>Mentoring novices and advanced beginners</td>
<td>4</td>
<td>19</td>
<td>40</td>
<td>19</td>
</tr>
</tbody>
</table>

**VAS scores 0-100. Scores <25=low competence, scores 25-49=quite good competence, scores 50-75=good competence, scores >75=very good competence**
When studying the frequencies of using the competence at category levels, the Helping role competence was most frequently used in that 94% of the respondents reported using this competence category very often/occasionally. The least frequently used competence category was the Teaching-coaching competence category. Twenty-eight percent of the respondents reported to use this competence category very often/occasionally.

The relationships between the frequencies of use and perception of competence were further studied by means of regression analyses. In these analyses the competence levels for each competence category were the dependent variables and the corresponding responses to frequencies of using the competence were the independent variables. These regression analyses revealed that frequencies of using the competence explained a significant amount of the variance at competence level. With respect to the Helping role, the frequency of using this competence explained 40% ($R^2 = .399$) of the variance in perception of competence level. The corresponding figure for the Ensuring quality competence category was 33% ($R^2 = .334$). Between 20% and 30% of the variance in perception of competence level was explained by frequency of use for the three categories Teaching/coaching, Diagnostic functions and Work role. The lowest amount of variance explained by frequency of use was for the Managing situations category ($R^2 = .104$).

**Critical thinking among newly graduated nurses (II)**

The newly graduated nurses reported total CCTDI scores indicating a positive disposition towards critical thinking (mean score 300.2). With respect to the subscale scores the highest score was reported for the Inquisitiveness subscale (mean score 48.0), which is a subscale described in terms of intellectual curiosity and desire for learning. The further order of subscale mean scores were Systematicity (mean score 45.5), Analyticity (mean score 42.9), Maturity (mean score 42.4), CT self-confidence (mean score 41.2), Open-mindedness (mean score 40.9), and the lowest score was found for the Truth-seeking subscale (mean score 39.4). This scale, which implies intellectual honesty, was the only subscale where the mean score was below the recommended cut score of 40, indicating an ambivalence regarding the courage to ask questions and to seek the best knowledge.

The CCTDI total scores and subscale scores were dichotomized into high scores (i.e. strong disposition and positive inclination) and low scores (i.e. ambivalent and strong opposition). The recommended cut scores (280 for the total score and 40
for the subscale scores) were the cut-off values between high and low scores. Nearly 80% of the newly graduated nurses fell into the high score group with respect to the CCTDI total score. No respondents reported a significant opposition towards critical thinking, but 22% fell into the ambivalence group. A large majority of the newly graduated nurses, 90% and 80% respectively, reported high scores for the Inquisitiveness and Systematicity subscales. Corresponding figures for the Analyticity subscale were 68% and for the Maturity subscale 62%. The only subscale where the majority reported low scores was for the Truth-seeking subscale, where 58% scored below the cut score.

**Newly graduated nurses' research utilization (III, T)**

The newly graduated nurses reported a positive attitude towards research. The index value was highest at the RUQ Attitude index (mean value 4.0) and lowest for the index Research use in daily practice (mean value 3.0). An overview of the five items with the highest frequencies of Agree (strongly agree/agree) responses within each of the three RUQ indexes is given in Table 7.

Table 7. Research Utilization Questionnaire (RUQ) – the five items with highest frequencies of agree responses (i.e. strongly agree/agree) within each index.

<table>
<thead>
<tr>
<th>Index</th>
<th>Item</th>
<th>Agree</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Attitude towards research</td>
<td>Mean 4.0&lt;sup&gt;a&lt;/sup&gt; SD.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Participating in research is not waste of time (n=616)</td>
<td>580</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. It is relevant to use research findings in my day-to-day practice&lt;sup&gt;a&lt;/sup&gt; (n=614)</td>
<td>574</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I think research is interesting (n=617)</td>
<td>542</td>
<td>88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Research is understandable (n=613)</td>
<td>536</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Clinical practice should be based on research (n=606)</td>
<td>512</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Availability and support to implement research findings</td>
<td>Mean 3.1&lt;sup&gt;b&lt;/sup&gt; SD.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The clinical team I work with supports research utilization (n=613)</td>
<td>311</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The quality of research is good enough to be used in practice&lt;sup&gt;a&lt;/sup&gt; (n=613)</td>
<td>304</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I have access to research findings where I work (n=614)</td>
<td>271</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Research is performed in the community (n=610)</td>
<td>261</td>
<td>43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The unit manager supports research utilization (n=616)</td>
<td>255</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Research use in daily practice</td>
<td>Mean 3.0&lt;sup&gt;b&lt;/sup&gt; SD.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I use research findings in my clinical practice (n=614)</td>
<td>385</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. I base my practice on research (n=613)</td>
<td>347</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. My clinical practice is based on research (n=611)</td>
<td>349</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I seek out research related to my clinical practice (n=616)</td>
<td>339</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I apply research findings to my own practice (n=612)</td>
<td>318</td>
<td>52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Negative statements in the instrument are here reversed to facilitate the reading of the table.

<sup>b</sup> Response options: 1 strongly disagree to 5 strongly agree

The highest frequencies of agree-responses were related to the index Attitude towards research. More than 90% of the newly graduated nurses agreed that it is relevant to use research findings in daily practice (A10) and that it is not a waste of
time to participate in research (A4). Further 85% of the nurses think practice should be based on research (A3).

For the index Research use in daily practice two thirds of the respondents agreed that they use research findings in clinical practice (C4) and more than 50% that they base their practice on research (C1, C2).

For the index Availability and support to implement research findings in practice the proportion of agree-responses were somewhat lower. Half of the respondents agreed that their clinical team supports research utilization (B1), and 41% agreed that their unit manager supports research utilization (B2).

A relatively small number of the respondents (15%) agreed that they had time to read research reports while on duty although 44% agreed that they had access to research findings where they worked. At the item level the Mann-Whitney U-test revealed that the nurses working in specialist health care reported significantly higher mean scores for six out of eight items belonging to the Availability-index \((Z=\ -11.375-\ -3.310; \ p=\ .000-\ .001)\) (T). There was no difference with respect to having time to read research reports while on duty (B5) between the nurses working in specialist health care and those working in community health care. Finally, no difference was found for the statement “The quality of research is (not) good enough to be used in practice” (B3).

Critical thinking, research utilization and perception of competence - differences between groups (III, IV, T)

Twenty-four percent \((n=148)\) of the newly graduated nurses were classified as Research Users (i.e. RU-group) based on their scores at the index Research use in daily practice. This means that 76% \((n=469)\) fell into the non-RU-group (III). Comparisons between these two groups revealed that a higher proportion of the RU-group reported high CCTDI total scores than the non-RU group (93% vs 74%). This was also the case for the Open-mindedness (69% vs 51%), the Analyticity (81% vs 63%), the CT self-confidence (71% vs 53%), and for the Inquisitiveness subscale (97% vs 87%) (III).

Comparisons between groups in relation to background variables with respect to CCTDI total scores, the three RUQ indexes and the NCS total scores were also studied (Table 8) (T).
Table 8. Critical Thinking\(^1\), Research utilization\(^2\), and Nurse Competence\(^3\) – Comparisons in relation to background variables.

<table>
<thead>
<tr>
<th></th>
<th>CCTDI total score</th>
<th>Attitude</th>
<th>Availability</th>
<th>Research Use</th>
<th>NCS total score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean value</td>
<td>SD</td>
<td>P value(^4)</td>
<td>Mean value</td>
<td>SD</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>300.0</td>
<td>24.90</td>
<td>4.00</td>
<td>0.55</td>
<td>3.12</td>
</tr>
<tr>
<td>Male</td>
<td>302.6</td>
<td>23.62</td>
<td>4.03</td>
<td>0.57</td>
<td>3.26</td>
</tr>
<tr>
<td>Univ. edu prior to nurs ed.(^5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>306.3</td>
<td>25.11</td>
<td>4.14</td>
<td>0.48</td>
<td>3.21</td>
</tr>
<tr>
<td>No</td>
<td>298.9</td>
<td>24.61</td>
<td>3.97</td>
<td>0.56</td>
<td>3.12</td>
</tr>
<tr>
<td>Health-care exp prior to nurse ed.(^6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>301.5</td>
<td>25.63</td>
<td>3.99</td>
<td>0.56</td>
<td>3.13</td>
</tr>
<tr>
<td>No</td>
<td>298.5</td>
<td>23.48</td>
<td>4.02</td>
<td>0.53</td>
<td>3.15</td>
</tr>
<tr>
<td>Work area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist health care(^7)</td>
<td>299.1</td>
<td>25.62</td>
<td>4.01</td>
<td>0.54</td>
<td>3.31</td>
</tr>
<tr>
<td>Community health care</td>
<td>302.7</td>
<td>23.10</td>
<td>4.00</td>
<td>0.55</td>
<td>2.84</td>
</tr>
</tbody>
</table>

\(^1\) California Critical Thinking Disposition Inventory; \(^2\) RUQ-indexes Attitude towards research, Availability and support to implement research findings, Research use in daily practice; \(^3\) Nurse Competence Scale; \(^4\) Mann-Whitney U-test, Bonferroni’s correction (i.e. p<0.125); \(^5\) University education prior to nursing education; \(^6\) Health-care experience prior to nursing education; \(^7\) Somatic or mental hospitals
These comparisons demonstrated that the newly graduated nurses with university college education prior to their nursing education scored significantly higher with respect to critical thinking total score and the index Attitude towards research (RUQ(T)). Further, those with health-care experience prior to their nursing education scored significantly higher on the NCS total score (IV). The newly graduated nurses working in community health care reported significantly lower scores with respect to the index Availability and support to implement research findings (T). There were no significant differences between male and female nurses.

When studying possible differences between those working in community health care compared to those working in specialist health care at competence category level, the former group of nurses reported significantly higher scores with respect to Diagnostic functions, Therapeutic interventions and Work role (IV).

Predictors for research use and perception of competence (III,IV)

In order to explore predictors for the three RUQ-indexes, simple and multiple linear regression analyses were carried out. The RUQ indexes were used as dependent variables whereas the CCTDI total score (simple linear regression analysis) and the CCTDI subscale scores (multiple linear regression analyses) were independent variables. See Table 4 for overview of variables and response options.

With respect to the index Attitude towards research, the CCTDI total score nearly explained 20% of the variance ($R^2=.197$) (III). In the multiple linear analyses with the same dependent variable as above, the four CCTDI subscales Open-mindedness, Analyticity, Inquisitiveness and Maturity together explained 22% of the variance (adjusted $R^2=.219$) (III). For the index Availability and support to implement research findings, the CCTDI total score explained 4% ($R^2=.040$; simple linear analysis), while the three CCTDI subscales Open-mindedness, Analyticity and Maturity together explained 3.5% (Adjusted $R^2=.035$, multiple linear analysis) (III).

With regards to Research use in daily practice the CCTDI total score explained 11% ($R^2=.107$; simple linear analysis) of the variance, while the CCTDI subscales CT Self-confidence, Open-mindedness, Inquisitiveness and Truth-seeking together explained 14% of the variance (Adjusted $R^2=.136$; multiple linear analyses) (III).

Multiple regression analysis where the RUQ indexes Attitude towards research and Availability and support to implement research findings in addition to the CCTDI total score and background variables constituted independent variables were also carried out. The dependent variable in this analysis was the RUQ index Research use in daily practice.
This analysis demonstrated that the variables Attitude towards research, Availability and support to implement research findings, CTTDI total score, gender and age together explained 26% of the variance in Research use (Adjusted $R^2=.258$) (III). Table 9 also shows that the variables CTTDI total score, Research use in daily practice (RUQ-index), health-care experience prior to nursing education and age together explained 23% of the variance in the total NCS score (IV) (Table 9).


<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Independent variables</th>
<th>Adjusted $R^2$</th>
<th>$R^2$ Change</th>
<th>Unstand. B</th>
<th>Stand. $\beta$</th>
<th>95% CI for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research use in daily practice</td>
<td>Attitude-index $^1$</td>
<td>.182</td>
<td>.336</td>
<td>.298</td>
<td>.247 - .424</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability – index $^2$</td>
<td>.052</td>
<td>.216</td>
<td>.225</td>
<td>.147 - .286</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CTTDI total score $^3$</td>
<td>.018</td>
<td>.003</td>
<td>.135</td>
<td>.001 - .005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>.007</td>
<td>-.181</td>
<td>-.085</td>
<td>-.329 - .033</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>.258</td>
<td>.005</td>
<td>.005</td>
<td>.073</td>
<td>.000 - .010</td>
</tr>
<tr>
<td>NCS total score</td>
<td>CTTDI total score $^3$</td>
<td>.199</td>
<td>.199</td>
<td>.378</td>
<td>.158 - .239</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RU in daily practice $^1$</td>
<td>.018</td>
<td>3.006</td>
<td>.143</td>
<td>1.408 - 4.605</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health-care experience</td>
<td>.008</td>
<td>-.2.280</td>
<td>-.086</td>
<td>-4.191 - .368</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>.227</td>
<td>.007</td>
<td>.125</td>
<td>.083</td>
<td>.015 - .235</td>
</tr>
</tbody>
</table>

$^1$ Research Utilization Questionnaire (RUQ) – indexes $^2$ The California Critical Thinking Disposition Inventory – total score

Multiple regression analyses to identify predictors for perception of competence at competence category level were also carried out (IV). The seven NCS competence categories were dependent variables. Independent variables were background variables, the CTTDI total score and the three RUQ indexes. See Table 4 for overview of variables and response options. These regression analyses revealed that CTTDI total score was the most prominent predictor for all the NCS competence categories. CTTDI total score alone explained 19% of the variance in Helping role, 17% for the Work role, 15% of the variance for Diagnostic functions and Ensuring quality, 14% for Therapeutic interventions, 12% for Teaching-coaching, and finally CTTDI total score explained 9% of the variance for Managing situations.

The largest amount of variance explained by the significant predictors was found for the Ensuring quality competence category where the variables CTTDI total score, Research use in daily practice, age, gender and Attitude towards research together explained more than 24% of the variance. For the Helping role the explained variance also exceeded 20% in that the variables CTTDI total score, age, Availability and support to implement research findings, and gender together explained nearly 22% of the variance (IV).
Summary of findings

This thesis revealed that the newly graduated nurses had a perception of good nurse competence. The respondents rated their competence highest with respect to basic nursing care (i.e. Helping role) and lowest with respect to evaluating outcomes and further development of nursing care (i.e. Ensuring quality). The newly graduated nurses gained experience through managing situations, and experiencing a supportive environment was important to enable them to manage challenging situations. Despite a positive attitude towards research, less than one fourth of the respondents were classified as research users. With respect to critical thinking the newly graduated nurses reported highest values for intellectual curiosity (i.e. Inquisitiveness) and lowest values for intellectual honesty (i.e. Truth-seeking).

The frequency of using competence had the strongest influence on the newly graduated nurses’ perception of competence. Critical thinking played a significant role for perception of competence as well as for the newly graduated nurses’ use of research findings in the daily practice. Organizational factors in terms of supportive environments played a significant role for their use of research.
Methodological considerations

Reflections on design

Combining qualitative and quantitative designs is becoming popular in nursing research (Lipscomb 2008, Polit & Beck 2008). Nursing practice is based on a diversity of knowledge and may therefore be suitable for mixed methods design (Foss & Ellefsen 2002). Although this design might be fruitful for gaining a broad perspective of the focused theme under study, there is also a danger of unreflective, naïve or pragmatic approaches which may damage the credibility of research (Lipscomb 2008). The use of a qualitative as well as a quantitative approach in this thesis has contributed to a broader and deeper description of newly graduated nurses’ competence. A sequential approach to mixed design was used, and the qualitative data were collected first. The other way around, choosing quantitative before qualitative, is another option of sequential approach. The chosen sequence, however, gave an option of being more open-minded during data collection and analysis in the qualitative study, because the results from the quantitative study were not known.

Reflections on the qualitative study (I)

Studies based on qualitative content analysis are characterized as descriptive qualitative studies, as it does not have roots in particular research traditions (Polit & Beck 2008). Researchers doing qualitative content analyses stay closer to the data and surface of words than researchers conducting grounded theory, phenomenologic or ethnographic studies (Sandelowski 2000). Qualitative research does not aim at generalization (Polit & Beck 2008), and this study does not claim to have captured the experiences of newly graduated nurses per se.

Qualitative content analysis is described as being appropriate when the aim is to cover variations (Graneheim & Lundman 2004). The findings in this study are based on the experiences of a purposive sample of 12 newly graduated nurses. The sample consisted of female and male nurses at different ages: they had health-care experience prior to nursing education to a various extent, and they worked in different settings. Thus the sample covered variations. Although the interviewer had no close relationship with the informants when they were student nurses, the communication during the interview may have been influenced by the fact that the interviewer was a nursing teacher. The informants chose the place for the interview. This was done in an attempt to allow the informants define the area for interview and thus more known to them than to the interviewer. The researchers worked in close relationship throughout the analysis, except
for transcribing the interviews. Re-analyses were carried out when uncertainty of interpretation occurred.

The individual interviews were carried out when these nurses had been practicing nurses for nearly one year. This may have influenced both their descriptions of the very first period of time as well as their development as nurses, because they might not remember what it was like at the very beginning. Although recall bias is described related to case control studies, there is a danger of inaccuracy when data are collected retrospectively, as was the case in this thesis.

The variations that were covered with respect to the informants’ experiences prior to nursing education, their work areas, gender and age constitutes strength of this study. The informants spontaneously expressed that the interview had given them an opportunity to reflect on their experiences. There is a question as to whether the labelling of the categories should have mirrored variations to a greater extent. Two of the category names describe a development – "gaining nurse experience” and “gaining competence”. These two category labels may be considered more like than they intended to be. The main difference between these two categories is that gaining competence presupposes reflection, and thus implies learning at a higher level than gaining nurse experience. Reflection is reported as a way to professional development for nurses (Gustafsson & Fagerberg 2004). Additionally, the word “experience”, which is used in the aim of the study, is used in both the category “experience of being new” and the theme “experience of growth and development”. This may be considered as a weakness. However, Sandelowski (2000) state that researchers doing qualitative descriptions, which was done in the current study, stay close to their data and to the surface of the words. This project has been a learning process, and these reflections mirror this process.

**Reflections on the quantitative study (II, III, IV)**

The number of informants and response rate, the instruments and the statistical analyses give reason for some reflections with respect to the quantitative study.

**Informants and response rate**

More than 600 newly graduated nurses participated in this study, representing a response rate at 33%. There is a question as to whether some of the invited nurses did not receive the questionnaire because of moving to another address. Adding a third reminder might have increased the reply rate. This, however, is also an ethical question as participation is voluntary, and receiving three reminders might have been experienced as pressure to reply. The fact that three questionnaires were sent out at the same time might well have
been experienced as being “too much”, and may have contributed to the low response rate.

A power analysis, which contributes to estimate in advance how big a sample is needed (Polit & Beck 2008), was carried out when planning this study. Postal questionnaires tend to gain low response rates, and are reported in studies including nurses (McCleary & Brown 2002, McCloskey 2008, Veeramah 2004). The low response rate in the present study is worrying, and leads to questions regarding what characterizes the respondents and what characterizes the non-respondents. The drop-out analysis that was carried out showed that there were no statistically significant differences between the respondents (i.e. study sample) and the non-respondents (i.e. drop-out analysis) with respect to gender, age or health-care experience/university education prior to nursing education. Additionally there were no statistically significant differences with respect to gender and age between the respondents and the study population (i.e. all the 2675 nurses graduated in Norway in June 2006). Although there were no differences between the above mentioned samples with respect to the mentioned characteristics, the non-respondents’ critical thinking dispositions, their research use and their perception of competence remain unknown. Low response rate is a threat to external validity, and the results of the present study should therefore be interpreted with some caution.

**Instruments**

The three instruments used have different origins both with respect to language and culture. Although the RUQ and the CCTDI are well-known instruments, Norwegian versions of them were not reported at the start of the study. The RUQ, however, has been used in Swedish studies (Boström 2007, Wallin et al. 2003). Questions about cultural bias have been raised with respect to the CCTDI in Japanese (Kawashima & Petrini 2004) and Hong Kong Chinese studies (Ip et al. 2000, Tiwari et al. 2003). Even though the Norwegian culture in general may be considered more like the American than the Japanese and Chinese, there is a question as to whether the differences when it comes to critical thinking attributes may be of greater importance than in a more general perspective.

Both the CCTDI and the NCS consist of multiple items, 75 and 73 items respectively. With respect to the NCS the Cronbach’s alpha values were rather high - for the NCS total score 0.97 and for the NCS competence categories 0.71–0.92. However, other studies (Hengstberger-Sims et al. 2008, Meretoja et al. 2004a, Salonen et al. 2007) also report high values in line with ours. These facts reveal a question as to whether some of the items could be deleted. A confirmatory factor analysis might have revealed redundant items (Polit & Beck 2008). One may reflect on improvements for the NCS both with respect to the number of items and the lay-out of the instrument.
The RUQ-indexes imply “only” 29 items. This instrument is however rather old (original version from 1989). Frasure (2008) reported in a systematic review that out of eight instruments measuring research utilization without a specified theoretical framework, the RUQ, whose Cronbach’s alpha values were between 0.94 (Attitude towards research) and 0.71 (Research use in daily practice), was the most reliable instrument. Considering changes which have taken place in nursing practice and education in the last 20 years, there is a question as to whether the instrument is “too old”. Knowledge about research, critiquing research, and availability of research have changed the last 20 years. This may imply a question if the RUQ-indexes should be further developed to include these changes. On the other hand, findings in the present study do not indicate that newly graduated nurses experience availability and support to implement research findings, and the majority of them were not classified as research users.

Data level and decisions on statistical methods

Two of the instruments (the CCTDI and the RUQ) employ Likert scales, while the NCS has a VAS scale (0-100mm). These data levels give reason for using non-parametric methods. When ordinal data are calculated to an index level, the data may be considered suitable for parametric methods, on condition of normally distributed data. In our study only the NCS data had a normal distribution, and consequently non-parametric methods were used for the CCTDI and the RUQ data (II and III), while parametric methods were used for the NCS data (IV). With respect to regression analyses (III and IV), predictor variables may be at nominal, ordinal or scale level, but the outcome variable has to be at scale level (Field 2005). When ordinal data are calculated into indexes, they may be considered as data at a scale level.

Imputations or not

Missing data give reason for some considerations on how to deal with these data. This question was considered differently during the study, mostly because of the learning process on the way. The Insight Assessment has copyright on calculating the CCTDI total and subscale scores and we had to follow their directions for missing data, which implied giving missing items the value of 3.5. For the RUQ, the missing data were substituted with the mean value of the reported ratings within each index. Polit and Beck (2008) described this solution as acceptable, and it is also reported used in other studies (Boström 2007, Wallin et al. 2003). With respect to the NCS, no imputations were made.

Substituting missing values with mean values entails more narrow Standard Deviation values, which may result in significant results where there are no reasons for significance (danger of type I error, i.e. null hypothesis is rejected without reason). This is the case for parametric tests which are based on mean and SD values, but also for non-parametric
tests, as imputations lead to ties when ranking the values. These facts reveal that there might be dangers of type I error in the quantitative study.

**Meeting assumptions for regression analyses**

The forward method was chosen for the multiple regression analyses in both papers III and IV. Backward and enter methods for regression analyses were also carried out simultaneously. Independently of the method chosen, the same variables turned out to be significant predictors. When testing the data sets for multicollinearity, these values were well below “critical values”. The residuals in the regression analyses were all tested for normal distribution by means of the Kolmogorov-Smirnov test. With respect to paper III, this test revealed that the residuals when Research Use in daily practice (RUQ-index) was the dependent variable had a small deviation for normal distribution. When the RUQ-indexes Attitude towards research and Availability and support to implement research findings were dependent variables, these residuals were normally distributed (III). For all regression analyses in paper IV the residuals were normally distributed.

The most important assumptions to be met when doing regression analyses are related to data level for the dependent variable, multicollinearity and residuals. In this thesis the dependent variables were at scale level. The independent variables were not too highly inter-collateralized (i.e. no multicollinearity), and the residuals (i.e. unexplained variances) had an overall normal distribution. When the assumptions of regression analyses are met, the model of regression analyses are unbiased (Field 2005), and the results can be applied to the study population.

**Statistical validity**

Threats to statistical validity are low statistical power, violated assumptions for statistical tests, multiple tests and reliability of instruments (Burns & Grove 20001). The number of respondents did not quite meet the power analysis’ requirement of 730 respondents. The sample size did however satisfy the requirements for doing the statistical analyses. Non-parametric tests were carried out for data at ordinal level. When appropriate, i.e. when multiple testing was carried out, Bonferroni’s correction was made. The sample size and data level met the requirements for doing regression analyses. Furthermore, the instruments demonstrated acceptable to good reliability (Polit & Beck 2008).
Discussion

The overall aim for this thesis was to study newly graduated nurses’ perception of competence, critical thinking and research utilization, and to identify predictors for research use and perception of competence. The findings in the included studies (I, II, III, IV) are that newly graduated nurses have good competence, the majority were not research users, and they were in general positively disposed to critical thinking. Furthermore, the findings indicate that newly graduated nurses develop competence in working situations and that critical thinking may be a “key” to nurse competence. Perception of competence and gaining competence in working situations constitute the first parts of this chapter. The next parts are discussions on aspects of competence which have been found to have an impact on the newly graduated nurses’ perception of their competence. These are the newly graduated nurses’ use of research, the importance of a supportive environment, and critical thinking.

Perception of competence

The newly graduated nurses perceived their overall competence as “good” (IV), which is comparable to Finnish studies including experienced nurses (Meretoja et al. 2004b) and nurses with less than 3 years experience (Salonen et al. 2007), and an Australian study among newly graduated nurses (Hengstberger-Sims et al. 2008). All the above mentioned studies made use of the NCS. Other studies report that newly graduated nurses perform a higher level of competence than expected by senior nurses (O’Connor et al. 2001), and that their competence is good or strongly developed (Löfmark et al. 2006).

At the competence category level the newly graduated nurses perceived their competence good, although the mean scores varied from 70.0 (highest: Helping role) to 53.8 (lowest: Ensuring quality) (IV). The Helping role competence has been rated highest in several studies (Hengstberger-Sims et al. 2008, Meretoja et al. 2004a, Salonen et al. 2007) independently of the nurses’ experience. Ensuring quality was the lowest rated competence category among Finnish nurses (Meretoja et al. 2004a, Salonen et al. 2007) and second lowest among Australian newly graduated nurses (Hengstberger-Sims et al. 2008, O’Connor et al. 2001), who also studied newly graduated nurses’ competence, reported the highest rated competence with respect to basic nursing, an aspect of nursing that might be comparable to the Helping role. These findings indicate that nursing education is quite successful with respect to preparing the future nurses for the Helping role competence.

Newly graduated nurses’ ability to teach has been reported low in two Swedish studies (Björkström et al. 2008, Löfmark et al. 2006). Although the Teaching-coaching
The nurses’ description of being dependent on written instructions in the beginning (I) may correspond to Benner’s description of the novices’ rule-governed performance of nursing. According to Benner (2001) the competent level (third level) of competence is not achieved until after two or three years in the same setting. The nurses in the present study perceived their competence comparable to an advanced beginner (second level) after nearly a year as a nurse. Competence development however is not a linear process. Benner states that nurses are not novices, competent or experts (Benner 2001), i.e. competence is dependent on the actual situation and context. Thus the current findings that the newly graduated nurses perceived their competence differently with respect to competence categories support Benner’s idea of competence development.

Aspects related to the leadership role of being a nurse, such as the responsibility when being the only nurse on duty, was reported to be the most prominent difference between the role of the student nurse and the role of being a nurse (I). These aspects have also been reported as challenging and stressful in other studies (Gerrish 2000, Havn & Vedi 1997, Ross & Clifford 2002, Solli 2009), one of which states that newly graduates are not prepared for this role (Ross & Clifford 2002), and that these aspects of competence are not acquired until three years after graduation (Solli 2009). Interestingly, Björkström et al. (2008) report that graduate nurses’ assessment of their leadership competence did not increase significantly over time. Data in Björkström et al.’s (2008) study were based upon nurses who graduated in 1995 and 1998. The leadership-related activities are covered in the Managing situations competence category in the NCS, which was reported as the third highest mean score (IV). In comparison with other studies this mean score was higher than the score reported for newly graduated Australian nurses (Hengstberger-Sims et al. 2008) and for Finnish nurses with less than 3 years’ nurse experience (Salonen et al. 2007), but lower than for experienced Finnish nurses (Meretoja et al. 2004a). Findings in the present study indicate that Norwegian newly graduated nurses after nearly a year as nurses have gained an acceptable leadership competence (I, IV), and may reflect changes in nursing education in recent years.

The nurses with health-care experience prior to nursing education perceived their competence higher than those without such experience with respect to three competence categories (i.e. Diagnostic functions, Managing situations and Therapeutic interventions) as well as for the NCS total score (IV). These findings indicate that having this kind of experience prior to nursing education has a positive influence on the nurses’ perception
of competence. Furthermore, the nurses working in community health care perceived their competence higher with respect to identifying and analyzing the individual situation (Diagnostic functions), planning and making decisions concerning patient care (Therapeutic interventions) and acting collegially, accountably and autonomously (Work role) than the nurses working in specialist health care (IV).

Interestingly, with respect to these competence categories, the newly graduated nurses working in community health care in the present study reported scores comparable to scores reported by experienced nurses (Meretoja et al. 2004b). These findings raise some intriguing questions. Do the nurses in community health care have a higher competence with respect to these competence categories by graduation, or do they develop their competence related to these categories by means of work experiences in community health care?

The nurses working in community health care reported significantly higher frequencies of using the Therapeutic interventions and Work role competence categories compared to those working in specialist health care (IV). Thus the differences in perceived competence level between these groups may be explained by the fact that nurses in community health care more frequently use their competence related to these competence categories and gain competence by their practice. For Diagnostic functions, however, no such difference with respect to frequency of use was found. Thus the higher scores for Diagnostic functions must be explained by other factors than frequency of using the competence. The nurses working in community health care were however significantly older than the nurses working in specialist health care (mean age 33 compared to 30), but as age did not turn out to be a significant predictor for perception of competence for these competence categories (i.e. Diagnostic functions, Therapeutic interventions and Work role) the differences in perception of competence must be explained by other factors than age.

Gaining competence in working situations

The newly graduated nurses reported using competence related to the Helping role most frequently (IV), which is a finding reported in studies including newly graduated nurses (Hengstberger-Sims et al. 2008) as well as more experienced nurses (Meretoja et al. 2004a, Salonen et al. 2007). The least frequently used competence reported was the Teaching-coaching competence category (IV). This finding is in contrast to findings in studies with more experienced nurses (Meretoja et al. 2004a, Salonen et al. 2007), and might be a finding worth reflecting on. One explanation may be that the Teaching-coaching competence category includes competence items focused on coaching students and team members, developing orientation programs for newly graduated nurses in addition to educational needs of patients and their families. These are aspects of competence in
which the nurses may not have had the opportunity to develop during their first year as nurses. The items which included competence related to coaching students, team members and novices (i.e. those described firstly) were reported as least frequently used, and may have contributed to a low frequency at the competence category level.

The frequencies of using competence explained up to 40% of the variance in the newly graduated nurses’ perception of their competence (IV). The explained variance was highest for the Helping role competence category. A positive correlation between frequency of use and competence level has been reported earlier (Meretoja et al. 2004b), but studies of these relations by means of regression analyses have not been found. Newly graduated nurses also experienced managing situations as important for gaining nurse competence (I) which underlines that using competence contributes significantly to perception of higher competence level (IV). However the need for a supportive environment, which included feedback, not only on that nursing procedures are done, but also how they were performed, was apparent in this study (I). Björk et al. (2000) reported that newly graduated nurses felt improved by time, but when studying the video-taped recordings, they did not usually notice their own mistakes. This finding underlines the need of feedback, which has also been reported by other authors (Clark & Holmes 2007, Ramritu et al. 2001).

The newly graduated nurses’ use of research

A positive attitude towards research was reported (III), which has also been widely reported before (Björkström & Hamrin 2001, Björkström et al. 2003, Boström et al. 2006, Valizadeh & Zamanzadeh 2003, Veeramah 2004). Although a positive attitude was found to be a significant predictor for research use in the present study, such an attitude is clearly not sufficient to be a research user, since less than one fourth of the newly graduated nurses were classified as research users (III). Low research use among nurses has been reported in earlier (Parahoo 1998, Veeramah 1995) as well as in more recent studies (Boström et al. 2009b, Boström et al. 2008, Forsman et al. 2009, Forsman et al. 2010). These findings might indicate that nurses’ use of research has not increased as much as expected in recent years. As research use constitutes one of the cornerstones in Evidence-Based Practice (DiCenso 2005), the low proportion of research users among newly graduated nurses was a discouraging result. Rogers’ (2003) model of Diffusion of Innovations takes into account both individual and organizational factors. Time, which is one of the elements in Rogers’ theory, may be understood as an individual or as an organizational factor. Another factor in this model is the social system, which may be comparable to a supportive environment. Newly graduated nurses work in different contexts, and gaining access to the social system has been reported as stressful (Ohlsson
This may indicate that the social system is important for newly graduated nurses’ use of research.

A supportive environment in terms of availability and support to implement research findings was found to be a significant predictor for research use (III). The nurses working in specialist health care reported significantly higher scores for Availability and support to implement research findings than the nurses working in community health care (T). There was a significant difference in the same direction with regards to the item “I have access to research findings where I work”, but not when it came to having time to read research reports while on duty. These results indicate that even though there might be differences between specialist health care (i.e. somatic and mental hospitals) and community health care with respect to access to research findings, the time limits allowing reading research on duty seem to be the same. The question of lack of time, which have frequently been reported as being a barrier towards research (Andersson et al. 2007, Gerrish & Clayton 2004, Hutchinson & Johnston 2004), may be seen from a broader perspective than just the lack of time. Thompson et al. (2008) describe that an image of busyness may protect nurses from unfamiliar aspects of research utilization. Hutchinson & Johnston (2006) report that nurses lack the support from doctors, from nurse colleagues and from other health-care staff, and state the imperative that nurses leaders must take the lead to create a culture of research use. Gerrish et al. (2008) reported that nurses relied on work-based information, and further that junior nurses, when compared to senior nurses, to a significantly less degree used research findings to change nurse practice. It has been reported that research use remains low during the first two years after graduation and moreover that the low research users tended to become even lower research users, and these changes could not be explained by changes in working conditions (Forsman et al. 2010). Nurse leaders play an important role in helping newly graduated nurses as well as senior nurses in developing a positive attitude towards research and in creating possibilities to use research findings in daily practice.

With respect to nursing education, tremendous efforts have been invested in developing nursing education into an academic education in the last 30 years, efforts that hopefully should have given some results in this respect. The methods or approaches whereby nursing education promotes research as a fundamental education objective have an influence on if and how nurses in clinical practice and nursing students base their practice on evidence (Chaboyer et al. 2004). These researchers recommend benchmarking as a useful approach to reinforce the concept of EBP in nursing curricula. It has been reported that nurses in every-day practice have difficulties “walking the talk” (Doane & Varcoe 2008). There has been a change of focus in nursing education from “teaching” to “learning” in terms of focusing more on what students learn than what teachers teach. Nurse educators tend to teach the way they were taught (Dickerson 2005), which implies
that nurse educators have to change their way of teaching. Changing the way of learning may also be stressful for students, creating frustrations when instead of getting “the answer” they are expected to seek for relevant information (Lusardi et al. 2002), which may also cause frustrations for the teachers. There may be reason to ask whether nurse teachers have changed the way they teach, or whether this change is something we keep talking about without doing. In other words, do nurse teachers also have difficulties “walking the talk”? Doane & Varcoe have recommended asking students “what kind of nurse would you like to be in this situation?” stating that these kinds of questions may help students bring together empirical, ethical, aesthetic and contextual different knowledge and recognize potential contradictions between them (Doane & Varcoe 2008).

Individual factors, such as characteristics of the nurses themselves were found to have an impact on research use (III), which is also reported earlier (Estabrooks et al. 2008a, Estabrooks et al. 2007). A significant amount of variance in research use was explained by the individual factors attitude towards research (strongest predictor), critical thinking scores, gender and age (III). Attitude towards research as a significant predictor for research use is also reported in studies which included experienced nurses (Boström 2007, Boström et al. 2009b, Estabrooks et al. 2008a, Tranmer et al. 2002), indicating that this is an important predictor for research use independent of years of nurse experience. Estabrooks et al. (2008b) reported significantly higher research use in nursing units where the nurses had a positive attitude towards research and stronger critical thinking dispositions.

The mean values for the three RUQ-indexes were higher, although not significantly higher, for the nurses without health-care experience than for those with health-care experience. These figures might indicate that being socialized into nursing practice prior to nursing education plays a role for research utilization after nursing graduation. Bisholt reports that novices (although they were graduate nurses in her study) are formed into the profession through both explicit and hidden norms, rules and principles (Bisholt 2009). These aspects of health-care experience prior to nursing education and the possible impacts on nurse competence should be further studied.

Being a newly graduated nurse - the importance of a supportive environment

Although they did not receive feedback on how they performed nursing activities to the extent needed, the nurses described a supportive environment including being allowed to be new, and being encouraged to ask questions (I). They also reported that managing situations was important for their competence development (I). Bisholt has reported four crucial areas for socialization into the nursing profession: (1) The master-apprenticeship model that stills exists, (2) the development of vocational skills, (3) entering the nursing
profession, and (4) being in a marginal situation (Bisholt 2009). The area “entering the nursing profession” includes different sanctions where the newly graduated nurses experience what knowledge and what behaviour is acceptable in the workplace (Bisholt 2009), and may be comparable to what other authors have described in terms of “playing the game” and “learning the culture” where they work (Scott & Pollock 2008), and “fit in and don’t rock the boat” (Maben et al. 2006).

Michael Eraut, who has studied newly graduated nurses from a more learning perspective, has documented the importance of cultural knowledge which is acquired informally through participation in a social context (Eraut 2007). In working processes where learning is a by-product as well as in recognized learning processes, learning implies asking questions, listening, observing, locating resource people, and giving and receiving feedback, such as relationships which might provide feedback and support (Eraut 2007). The importance of a learning area for competence development has been reported (Thidemann 2005) as well as consequences of the opposite, a context of uncertainty, which has been reported as leading nurses to choose retreating to a zone of safety, doing what they are told to do, and focusing on routines (Scott et al. 2008). Thus these organizational factors are of great importance for newly graduated nurses.

Nurses working in contexts marked by a positive culture, good leadership, positive evaluation and/or performance feedback have reported significantly higher research use than those working in contexts not marked by these characteristics (Cummings et al. 2007). Furthermore Fink et al. (2005) conclude that creating environments that value research use is important for the organization’s success. It seems to be well documented that environmental factors play an important role for research use in nursing. The finding that 17% of the newly graduated nurses are working in more than one setting (III) might be of some concern in this respect, as they will then have to be socialized into more than one working context, to learn to know different working routines, and to work together with high number of nurse colleagues as well as other health-care personnel. There is reason to believe that these different working contexts imply working with different patients, which may also pitch their demands, in addition to being a newly graduated nurse. For some of these nurses working in different contexts implied working in both community health care and specialist health care. This combination of working contexts may contribute to a nurse competence that has a broad perspective in terms of recognizing the roles of community health care and the specialist health care in providing high quality nursing care for people in need of nursing care. However, there is reason to believe that these working situations are challenging for the newly graduated nurses.

Nurse leaders and nurse colleagues play an important role for newly graduated nurses in creating environments where these nurses are allowed to be new, but also where their
newly acquired competence and their positive attitude towards research, are respected and valued.

**Critical thinking – a key to nurse competence?**

A positive disposition towards critical thinking was reported (II), which is a finding in line with other studies including graduate nurses (Profetto-McGrath *et al.* 2003, Profetto-McGrath *et al.* 2009, Smith-Blair & Neighbors 2000). Critical thinking implies making judgements on evidence rather than conjectures (Alfaro-LeFevre 1995), it goes beyond problem-solving and includes asking questions and critiquing solutions (Fero *et al.* 2009) and it is reported to generate EBP (Profetto-McGrath 2005, Seymour *et al.* 2003).

The highest subscale score was found for the Inquisitiveness subscale which measures the intellectual curiosity and desire for learning (II). Nurses with high Inquisitiveness scores are reported to be motivated to expand their knowledge bases. Moreover, when expected patient outcomes are not achieved, these nurses might continue to question the given treatment and care options (Smith-Blair & Neighbors 2000). This attribute is also described in terms of valuing learning for learning’s sake (Profetto-McGrath *et al.* 2009). High values for intellectual curiosity are also reported in studies including experienced nurses (Profetto-McGrath *et al.* 2003, Profetto-McGrath *et al.* 2009, Smith-Blair & Neighbors 2000). The newly graduated nurses’ abilities with respect to intellectual curiosity are acceptable compared to these more experienced nurses. The finding in the qualitative study that the nurses looked upon challenges as opportunities for learning (I) might mirror the values for intellectual curiosity found in the quantitative study (II).

The intellectual honesty (Truth-seeking) was reported low (II) - below the cut score, which is worrying. This attribute implies the disposition to be eager to seek the best knowledge in a given context. Furthermore to be courageous about asking questions, being honest and objective about pursuing inquiry even if, and especially if, these findings do not support the preconceived option one might have (Facione *et al.* 1994). Truth-seeking nurses are willing to reconsider new information and to accept that there might not be a “right” or “wrong” answer for every situation. Truth-seeking nurses are also able to “stand the heat” in supporting patients’ decisions (Smith-Blair & Neighbors 2000). On the other hand, nurses with low Truth-seeking abilities are disposed not to re-evaluate new information and to base their nursing on how things have always been done. Low Truth-seeking scores have also been reported in other studies including graduate nurses (Profetto-McGrath *et al.* 2003, Smith-Blair & Neighbors 2000) as well as nurse educators (Profetto-McGrath *et al.* 2009), although the nurse educators reported scores above the cut value. As the attributes of Truth-seeking might mirror those of being a research user,
the low Truth-seeking scores reported for nurses might contribute to explaining why implementing EBP in nursing has a slower progress than expected.

High critical thinking values were more frequently reported among the research users than among the non-research users (III). This indication of critical thinking contributing to research use was confirmed by the finding that critical thinking dispositions were found to be a significant predictor for research use (III). With respect to research use, critical thinking total scores explained 11% of the variance, while four of the CCTDI subscale scores explained 14%. Both the Truth-seeking and the Inquisitiveness subscales were significant predictors for research use in the latter analysis. Even though these figures do not explain large amounts of variance, the explained variances are greater than the modest correlations between critical thinking and research use ($R^2=0.022-0.058$) that are reported by other authors (Cobban & Profetto-McGrath 2008, Profetto-McGrath et al. 2003, Profetto-McGrath et al. 2009).

Furthermore critical thinking total score was a prominent predictor for perception of competence (IV). This was the case for all the seven competence categories as well as for perception of overall competence. Possible relations between critical thinking and perception of competence have not been found reported. Critical thinking as such a prominent predictor for nurse competence, however, supports the idea that critical thinking constitutes an essential component of professional accountability and quality of nursing care (Scheffer & Rubenfeld 2000, Stone et al. 2001).

**Nurturing critical thinking**

Critical thinking was a prominent predictor for research use as well as for newly graduated nurses’ perception of competence (III, IV). Thus there is a reason to discuss how critical thinking dispositions may be developed through nursing education as well as in clinical practice. Critical thinking is a complex activity that requires education, time and commitment. Nurses who are engaged in nursing education, in more theoretical context as well as in clinical contexts, need to be critical thinkers themselves. Profetto-McGrath et al. (2009) report that nurse educators are in better position to promote critical thinking and research utilization among nursing students if their critical thinking abilities are well developed. Nurses in general and nurse educators in particular are role models for student nurses as well as for newly graduated nurses.

There is a need to evaluate the teaching strategies or, in other words, the learning strategies in nursing education. If argument skills are important elements to develop critical thinking, then we need to design learning activities that assist the formulation and analysis of coherent arguments (Daly 2001). Problem-based learning (PBL) has been proposed as an approach to develop critical thinking dispositions (Profetto-McGrath...
Furthermore, it has also been reported that the goal and methodology of PBL and EBP are so similar that they will easily be applied from a theoretical context to a clinical context (Lusardi et al. 2002). One of the requirements of PBL is that the teacher has the role of facilitator, a role that comprises not being an “expert” who has the “right” answers. Lusardi et al. (2002) underline the need for paying considerable attention to the development of facilitators, even more attention on that aspect than that of the development of the curriculum based on PBL.

Relationships between learning styles and critical thinking dispositions have also been studied. Suliman (2006) concludes that if learning is facilitated in accordance with the students’ learning style, their critical thinking abilities will develop. More than 3000 nurses graduate every year in Norway, nurses who as students have different experiences prior to nursing education. Some student nurses have education at college/university level before starting nursing education and some have various experiences from health care. Furthermore, some start their nursing education immediately after high school while others have considerable life experiences at the time of starting nursing education. These different experiences might call for different learning strategies. There is reason to ask whether nursing education has met these students as the different persons they are.

When the former students enter the nursing profession as graduate nurses, their critical thinking abilities need to be further developed. The importance of nurse colleagues as role models is documented in nurses’ socialization process (Bisholt 2009, Gerrish et al. 2008, Maben et al. 2006). The importance of a supportive environment for newly graduated nurses’ perception of competence is documented in this thesis. Dickerson (2005) has described some useful strategies for nurturing critical thinking in clinical practice. These imply, amongst other things, assessing one’s own critical thinking ability, reflection on one’s teaching style, being willing to change the teaching style, being open for challenges, providing time to reflect on learning and providing realistic feedback. She also underlines the need to look at oneself as a facilitator, not as a teacher (Dickerson 2005). These aspects are most valuable in clinical contexts as well as in nursing education.
Conclusions and implications

In conclusion the newly graduated nurses perceived their competence as good. The highest rated competence was related to basic nursing care while they rated themselves lowest on competence related to further development of nursing care. The frequency of using their competence had a major impact on the nurses' perception of competence. The majority of the newly graduated nurses were not research users, although they had a positive attitude towards research. Critical thinking was found to be a prominent predictor for research use as well as for perception of competence. A supportive environment was found important both for development of competence for newly graduated nurses and for use of research in clinical practice.

The recognition of critical thinking as an important predictor for research use and perception of competence is important information for nursing practice and nursing education. Nurse educators are role models for nursing students and nurses in clinical practice both with respect to critical thinking and research use. Nurse teachers are recommended to take the time needed to deeply discuss teaching and learning strategies in nursing education. Teachers nowadays are recommended to have a more facilitator-role than the old “strictly didactic teacher” role. There is a need to assess whether teaching strategies meet the requirements of critical thinking and EBP in nursing education. In other words: Does nursing education “walk the talk”?

Nursing students have various experiences when entering nursing education and they might have different learning styles. It is recommended to take into account the various experiences the nursing students have and facilitate learning strategies according to their learning styles.

Newly graduated nurses develop their competence through using their competence. Nurse leaders are recommended to facilitate newly graduated nurses’ competence development by means of facilitating the use of different competence categories where realistic and constructive feedback is critical. It is of utmost importance that nurses in general and nurse leaders in particular create a supportive environment where newly graduated nurses’ competence is recognized, valued and developed.
Future research

There is a need for more studies focused on newly graduated nurses’ competence, from both an educational and a clinical perspective. Critical thinking should be focused in studies from diverse perspectives, for example learning strategies to facilitate critical thinking disposition in nursing education and how nursing practice may facilitate development of critical thinking. Further studies including nursing students, newly graduated nurses and experienced nurses focused on validating the CCTDI in non-American contexts are recommended.

More studies on how nursing practice and how nurse education may facilitate research use in nurses’ daily practice are needed.

Studies contributing to research-based teaching strategies in nursing education are recommended. Nursing students’ health-care experience prior to nursing education and possible impacts of those on research use and nurse competence should be studied further.

Further development of the NCS, for example by means of confirmatory factor analyses, is recommended. The NCS is recommended used in further studies including newly graduated nurses as well as experienced nurses.
Acknowledgements

This thesis would not have been carried out without the support and help from various sources. My grateful thanks go to:

The nurses who have participated in the studies. Without you this research would not have been possible.

My principal supervisor, Professor Gun Nordström, and my supervisors Associate professor Inger Johansson and Doctor of philosophy Monica Björkström for guiding me through this process. Thank you for always being optimistic, and sharing your knowledge, your experience and your wisdom in an inspiring way. Excellent!

Gjøvik University College, for giving me this opportunity to work on my PhD. Thanks to my leaders for facilitating my learning process, and thanks to all my dear colleagues who in different ways have encouraged me on my way. My very special thanks go to Ingrid Landgraff Østlie with whom I share an office. Thanks for all the fruitful dialogs, and thank you for being a container for my frustrations on the way.

My fellow doctoral students during these years; Anna Josse Eklund, Anna Nordin, Anne Karin Helgesen, Anne Kjersti Myhrene Stefenak, Bente Thyli, Bente Weimand, Carina Bååth, Catarina Wallengren-Gustavson, Cecilia Olsson, Hege S Kletthagen, Ingrid Fromm, Kaisa Bjuresæter, Kristina Rosengren, Linda Kvist, Maria Larsson, Maria Henrisson, Mona Wentzel Persenius, Patrice Anderberg, Randi Ballangrud, Randi Tosterud, Reidun Hov, Vigdis Abrahamsen Grondahl and Øyfrid Larsen Moen. Thank you for all the lively and inspiring discussion and valuable criticism at seminars. Additionally special thanks to my fellow doctoral students from HIG; Hege, Randi B, Randi T, and Øyfrid for all the discussions on the way between Gjøvik and Karlstad!

Jari Appelgren for guiding me through statistical analysis.

Ian Watering for all the language revisions. Thank you also for inspiring and informative discussions on the English language.

My family, who have reminded me that there is a world outside my research. Thank you for being there - despite distances- all the time, encouraging me, but also giving me the option of discussing other themes than nurse competence and statistical analyses!
References


