# Bachelorarbeit

# Critical Thinking in the Diagnostic Process of Nursing

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28. März. 2015 Eleonore Arrer eh.

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# Abstract

**Background:** Critical thinking is vital in every step of the nursing process. It represents a skill and at the same time an ability, because it is a type of strategy that can be learned and acquired. Critical thinking is especially important in the nursing process, where data is interpreted, categorized and processed. Furthermore, it is a thought process, where different elements are applied, for example logical thinking, reflectivity or prioritizing. By thinking critically a nurse can attain a nursing diagnosis that is accurate and specific for the patient's needs. The nursing interventions are therefore more precise and effective and improved health and nursing quality is the result.

**Aim:** The aim of this thesis is to point out why the application of critical thinking in nursing is of great importance. Additionally, the most vital elements when using this thinking strategy should be emphasized.

**Method:** The thorough literature search took place from October 2014 until January 1015 and was conducted in different databases, libraries and search engines. English and German sources were included and the publication dates were set to not be older than ten years. Furthermore, the respective studies were then chosen based on a fitting and adequate title and abstract und evaluated critically.

**Results:** The six studies in this thesis underline the importance of critical thinking in nursing care and point out that it improves the precision and correctness of nursing diagnoses. By comparing the studies with a preceding study it became apparent that not all elements of critical thinking have the same significance and some are applied more often than others. Nevertheless, it is important for nurses to master all aspects of this thinking strategy, so that treatment is more effective.

**Conclusion:** It is vital that these elements and the steps of this strategy are taught and applied in nursing practice. Critical thinking can be practiced by implementing it in education and training so that it becomes a natural part of the nursing process. The overall aim should be that every nurse can apply critical thinking in everyday working life. As a result, health care becomes more efficient and nursing diagnoses are better adjusted to the patients.

# Zusammenfassung

**Hintergrund:** Kritisches Denken kommt in jedem Bereich und Schritt des Pflegeprozesses zum Einsatz. Es ist nicht nur eine essentielle Fähigkeit sondern gleichzeitig eine Fertigkeit, denn diese Denkstrategie wird zum Teil auch erlernt und angeeignet. Speziell im diagnostischen Pflegeprozess, wo Daten interpretiert, kategorisiert und verarbeitet werden, kommt diese Strategie zum Einsatz. Es ist ein Denkvorgang, bei dem man verschiedene Elemente appliziert, beispielsweise logisches Denken, Reflexivität und Priorisierung. Durch kritisches Denken gelangt man zu einer Pflegediagnose, welche dem Patienten oder der Patientin exakt zugeschnitten ist. Dies resultiert in präziseren und effektiveren Pflegeinterventionen und eine verbesserte Gesundheit und Pflegequalität ist das Ergebnis.

**Ziel:** Ziel dieser Arbeit ist es aufzuzeigen, weshalb die Anwendung von kritischem Denken in der Pflege von essentieller Bedeutung ist. Zusätzlich dazu, sollen die wichtigsten Elemente betont werden, die bei dem Einsatz dieser Strategie eine entscheidende Rolle spielen.

**Methode:** Für die umfassende Literatursuche wurden im Zeitraum von Oktober 2014 bis Januar 2015 unterschiedliche Datenbanken und Suchmaschinen herangezogen, sowie mehrere Bibliotheken aufgesucht. Es wurden neben deutschen, auch englische Quellen miteinbezogen, welche nicht älter als zehn Jahre alt waren. Die jeweiligen Studien wurden anschließend anhand eines passenden Titels und Abstracts ausgewählt und mit dem jeweiligen Bewertungsbogen kritisch bewertet.

**Ergebnisse:** Die sechs verwendeten Studien unterstreichen die Wichtigkeit des kritischen Denkens in der Krankenpflege und belegen, dass es die Exaktheit und Richtigkeit von Pflegediagnosen forciert. Durch die Gegenüberstellung einer vorangegangen Studie mit der aktuelleren Forschung wurde ersichtlich, dass nicht alle Elemente denselben Stellenwert haben, manche öfter zum Einsatz kommen als andere. Dennoch ist es wichtig, dass Pflegepersonen alle Aspekte beherrschen, um möglichst effektiv behandeln zu können.

**Schlussfolgerung:** Es ist von großer Bedeutung, dass die Elemente und die Anwendung von kritischem Denken gelehrt und in der Pflegepraxis angewandt wird. Durch Schulungen und in der Ausbildung, kann man kritisches Denken trainieren, damit es ein selbstverständlicher Teil des Pflegeprozesses wird. Das Ziel sollte sein, dass jede Pflegeperson kritisches Denken beherrscht und im Berufsalltag anwendet. Die Gesundheitsversorgung wird dadurch effizienter und die Pflegediagnosen sind schlussendlich besser auf die Patienten und Patientinnen angepasst.

# 1. Introduction

The way people think is often not objective but biased and incomplete, because it is not always learned or disciplined. Inferior thinking, without reflection or caution, can have a negative impact on certain situations. It can even lead to prejudice and misinformation. When excellence of thought is the goal and when thoughts are analyzed and evaluated, this is described as critical thinking (Elder & Paul 2007; Heaslip & Paul 1995).
Critical thinking is especially vital in the field of nursing, because it is an important skill, not only when determining a nursing diagnosis, but also in every step of the nursing process (Lunney 2009; Lunney 2003b). It is associated with a certain nursing intelligence, and nursing care can continue to improve when it is applied (Lunney 2009). Nurses should use this ability by analyzing, synthesizing and evaluating information gained via interaction or observation in order to commence with a plan of action. Furthermore, certain skills such as thinking independently, being self- confident, courageous and fair and showing humility should be developed. This way nursing practice is more effective and secure (Papathanasiou et al. 2014).
In order for nurses to achieve a higher level of critical thinking it is necessary to practice it. This can be done through case studies, because the skills learned in theory can be developed further by applying them in nursing practice (Lunney 2009).

## 1.1 Defining critical thinking

It is difficult however, to precisely describe what critical thinking really entails, especially when there are many different definitions, several from the fields of philosophy and education. Lunney (2003b) states that there are older views on the topic that are included in the more modern views, but that the modern views put more emphasis on subjective rather than objective thought processes, which she describes as a positive development.

Paul (1990) represents an older and philosophical view on the topic. He states, that knowledge is something that is interconnected with thought. Without thinking, specifically

critical thinking, there is no possibility to gain knowledge. He defines critical thinking to be a form of logical reasoning. It is self-directed and disciplined thinking and represents perfectionism of thought processes.

He differentiates between a weaker form of critical thinking and a stronger form. Critical thinking is weaker if it does not include all persons involved and it is stronger, when more relevant information of different people is taken into account. As we commence to think critically he cites certain mind skills, similar to Papathanasiou et al. (2014), such as being humble, persistent or reasonable, that gradually develop. A weak critical thinker is not able to develop these skills fully (Paul 1990).

As another traditional view on critical thinking Ennis names this definition: *"Critical thinking is reasonable reflective thinking focused on deciding what to believe or do*." (Ennis 1993, p. 180)
He also states that thinking critically means to assess statements correctly. Furthermore, he mentions that this ability also contains creative aspects such as finding alternatives, coming up with definitions and hypotheses and planning experiments (Ennis 1993).

Facione (1990) has a slightly different approach on the topic. He states that critical thinking is not a synonym for good thinking but rather a universal phenomenon, an intentional assessment, explaining thoughts and ideas on which the assessment is based. It is a useful means to inspect and investigate. According to him, to ideally think critically means to question things, strive for information, be open, honest and fair, be careful when judging and be precise, organized and concentrated. In order to acquire these characteristics education is necessary, with a focus on expanding and disciplining these competencies.

Scheffer and Rubenfeld, two experts on critical thinking, conducted a Delphi study in the year 2000, where they came up with new views on the topic and focused on the nursing aspect. Over 50 nurses, all experts on the topic of critical thinking, participated in this study and 17 characteristics of critical thinking were identified.
They defined ten habits of the mind and seven cognitive skills that characterized critical thinking in nursing (Scheffer & Rubenfeld 2000).

**Habits of the mind**

- confidence: being confident of one's capability to reason
- contextual perspective: to include the entire situation without letting anything out
- creativity: being imaginative and inventive

- flexibility: to readjust and revise one's concepts and actions
- inquisitiveness: to be curious and anxious to know more and to discover different options
- intellectual integrity: to be in search of the truth even if it does not match one's own beliefs
- intuition: the feeling of knowing without applying logic
- open-mindedness: the receptivity to different things without prejudice
- perseverance: courage to go after a goal and to face difficulties
- reflection: to think about one's own thoughts and to strive for better comprehension (Scheffer & Rubenfeld 2000, as cited in Scheffer & Rubenfeld 2006)

**Cognitive skills**

- analyzing: to take something complete and separate it into pieces in order to understand their connection to each other
- applying standards: deciding on something based on certain criteria
- discriminating: discovering disparities or parallels and differentiating categories
- information seeking: looking for relevant data and retrieving knowledge from it
- logical reasoning: deciding on something based on proof
- predicting: having an idea and contemplating the aftereffect
- transforming knowledge: modifying approaches or ideas into something else (Scheffer & Rubenfeld 2000, as cited in Scheffer & Rubenfeld 2006)

More recent studies use these 17 characteristics as a basis for further results. Scheffer and Rubenfeld (2000) also obtained the following definition of critical thinking in their

study. In comparison to other definitions of the topic, they issued one that is specifically concerned with nursing and not only the philosophical point of view.

*"Critical thinking in nursing is an essential component of professional accountability and quality nursing care. Critical thinkers in nursing exhibit these habits of the mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the cognitive skills of analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting, and transforming knowledge."* (Scheffer & Rubenfeld 2000, as cited in Scheffer & Rubenfeld 2006, p.15)

To summarize the information above, there are different ideas and definitions of critical thinking, there are older and newer views (Lunney 2009; Lunney 2003b), there are several aspects of it, such as a philosophical aspect (Facione 1990; Paul 1990; Ennis 1993) or a nursing aspect and it involves certain skills or characteristics that can be learned and acquired (Papathanasiou et al. 2014; Lunney 2003c; Scheffer & Rubenfeld 2000). If these skills are applied in nursing, it results in safer nursing practice and improved health care. This is why it is a relevant topic for nurses and nursing education (Papathanasiou et al. 2014).

Another important factor of critical thinking is, that it is likely to improve the accuracy of nurses' diagnoses and therefore contribute to positive impact on patient health (Lunney 2003b). This is especially vital in nursing and will be described in detail in the following paragraphs.

## 1.2 Defining the nursing process

To understand nursing diagnoses and the diagnostic process one must first know the steps of the nursing process. According to the American Nurses Association (2015) it consists of five steps that are explained below. It represents the center of nursing and it links all different types of nurses together to enable them to provide the best care focused on the patient's individual needs.

1. Assessment: Information is collected from a patient and analyzed and it includes physiological, psychological, social factors, etc.

2. **Diagnosis: The nurse clinically and critically judges a patient's health condition and derives the appropriate nursing diagnosis by doing so. The diagnosis is essential for the care plan.**
3. Planning: Long- and short-term goals for the patient to work towards are targeted by the nurse based on the proceeding steps.
4. Implementation: In this step the nurse actually delivers patient care in agreement with the nursing plan.
5. Evaluation: The entire care plan as well as the goals set for the patient need to be assessed regularly and if necessary, corrected.
   (American Nurses Association 2015)

The assessment phase representing the first step of the process is vital, because it influences the other following phases. If the information is not gathered thoroughly, the nursing diagnoses will not be accurate nor efficient. The assessment phase as well as the diagnosis phase are strongly connected and one must often go back to the prior stage to gather more data (Alfaro-LeFevre, 2013).

## 1.3 Defining the nursing diagnosis

A nursing diagnosis is formulated by critically judging a patient concerning his or her state of health and his or her response to this state. Each diagnosis is clearly labeled and defined but it is not enough to just be able to name the specific label. It is also necessary that the nurse is informed about the definitions of the diagnoses applied most often. Additionally, certain indicators, such as characteristics or factors, need to be known. A nurse can observe these characteristics in form of symptoms. Factors that influence and have a connection with the nursing diagnosis can often be found in the patient's medical or personal history. Risk factors that are relevant for risk diagnoses have the effect of increasing a patient's susceptibility (NANDA International 2015; Herdman 2012).
Nursing diagnoses today are usually classified in health care environments but not enough attention is paid to the fact that they are often not accurate. In order to accurately interpret patient data nurses need to have strong thinking abilities and intelligence. Thinking critically improves the validity and the accuracy of nursing diagnosis and even if a person does not have highly developed thinking abilities, they can be acquired. Low accuracy on the

other hand leads to negative patient outcomes as mentioned earlier (Lunney 2003b; Lunney 2003c). According to Schrems (2008), the accuracy of a diagnosis or intervention is based on its effectiveness; if a nursing intervention has the intended result it is also effective.

## 1.4 Defining the diagnostic process

The diagnostic process is the stage, where the collected data is organized, phenomena, observations and perceptions are sorted, arranged and combined. It is of great importance that all of the nursing diagnoses that come into question are reviewed by thinking critically to ensure their accuracy. Viewing the situation from the patient's perspective, finding out if his or her problems are related to psychological, physiological, cognitive or social factors and setting priorities is essential in this phase (Stefanoni & Alig 2009).
The nursing diagnoses are then formulated by the nurse, who assesses the patient's situation, his or her problems, risk factors and resources. To recall the prior statement, the diagnostic process continues on through the entire nursing process, because the validity of the diagnoses can change and they need to be revised (Stefanoni & Alig 2009).

## 1.5 Combining critical thinking and the diagnostic process

The nursing process forms the bases of all nursing care (American Nurses Association 2015). It begins with the assessment phase, where critical thinking is vital in order to gather the correct and most important information, essential for the diagnostic process and the diagnostic accuracy (Alfaro-LeFevre 2013; Lunney 2003b). The diagnostic process is the technique of combining, associating, reviewing and perceiving priorities. Within it the nursing diagnoses are constructed by not judging too quickly, incorporating all perspectives and thinking critically (Stefanoni & Alig 2009).

## 1.6 Relevance for research and practice

Even though a lot is known about the positive impact critical thinking has on nursing, specifically on the diagnostic process, it is still not very present in German nursing programs and curricula (Müller-Staub 2006).
Müller-Staub (2006) states that especially in German literature, in comparison to English literature, only little information can be found concerning this topic. Additionally, it does not

seem to be general knowledge that nursing diagnoses are a form of clinical judgment, possibly because a lot of literature concerning clinical decision making has not been translated into German yet. Understanding human reactions to health-related problems and social factors is part of professional nursing. Therefore, critical thinking and knowledge about nursing diagnoses and interventions is of great importance. Furthermore, it ensures the quality of nursing care and the professional responsibility, as a study from Lunney in 1989 pointed out.

## 1.7 Aim and research questions

The aim of this thesis is to point out why the application of critical thinking in nursing is of great importance. Additionally, the most vital elements that play a role when using this skill or ability should be emphasized. The following research questions could therefore be extracted:

- What is the importance of critical thinking in nursing?
- What are crucial elements when applying critical thinking in the diagnostic process of nursing?

## 2. Methods

In order to find relevant literature concerning this topic and to answer the research questions above, a literary search was conducted during the months of October 2014 and February 2015. The databases CINAHL and PubMed were drawn on, different search engines such as Google or Bing were used and the Medical University Library of Graz was consulted. Additionally, a hand search was done in the reference lists of the included articles so that more relevant studies could be found.

Both German and English sources, that were not older than 10 years, were included. Many relevant studies, papers and books on critical thinking however, were conducted and published in the 1990s and the beginning of 2000, which is why they were drawn upon for the introduction.

The following keywords were applied to specify the search: critical thinking, nursing diagnos*, nursing process and diagnostic process. The different keywords were combined by using the Boolean Operators AND and OR. If the title and abstract were found to be relevant for the topic, the full text was read. The inclusion or exclusion of the respective studies was then decided upon based on their contents.
After screening the titles and abstracts 17 studies were chosen from CINAHL and Pubmed for further reviewing. The process of the literature search on these two databases can be seen in the figure below.

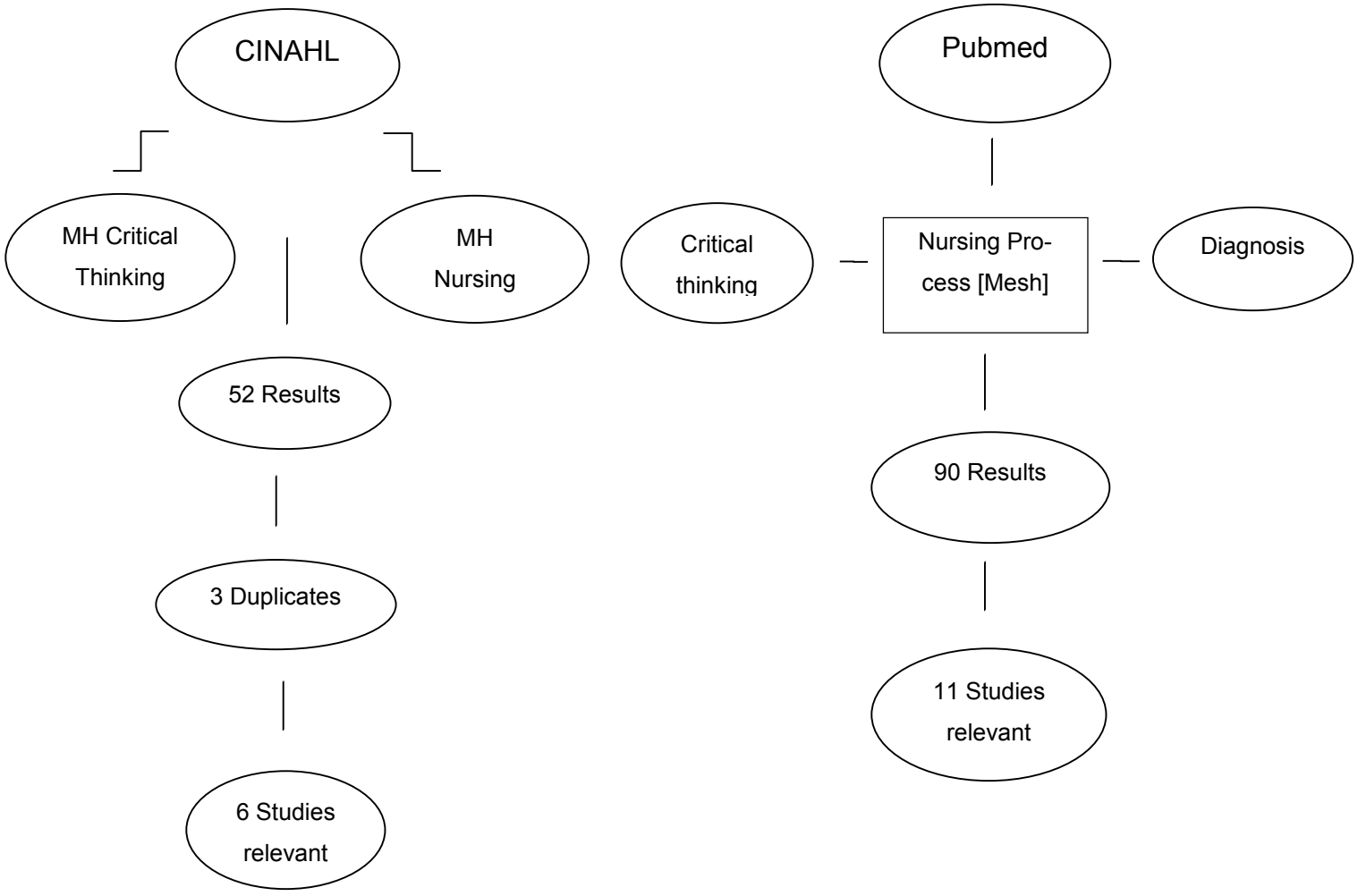



*Figure 1: Flow chart visualizing the literature search in CINAHL and Pubmed*

The studies were consequently read in full-text and then analyzed critically applying different critical evaluation sheets, depending on the type of study. Finally, six studies were chosen for this thesis in order to answer the research questions. These studies and their results will be introduced in the following chapters.

# 3. Results

The six studies, which the results were derived from for this thesis, are represented in Table 1 below. The studies were made up of two case studies, a systematic review and three qualitative studies.

Table 1: Six studies used for this thesis

| Topic | Country | Publication | Study design | Results |
|---|---|---|---|---|
| CT & accuracy of nursing diagnoses | USA | 2010 | Case study | 2 high accuracy diagnoses<br>11 characteristics of CT |
| Clinical reasoning & CT | Brazil | 2010 | Systematic review | 12 strategies to improve CT |
| Promoting CT through case studies | Germany | 2006 | Case study | improved accuracy of diagnoses<br>interventions more effective<br>problems more patient – centered |
| CT inidicators & attributes | Taiwan | 2013 | Two-round Delphi study | 37 indicators of CT<br>10 attributes of critical thinkers |
| CT skill in diagnostic process | Brazil | 2013 | exploratory, descripite study | 9 CT skills |
| Nursing educators ideas on CT | New Zealand | 2004 | interpretative, descpriptive study | central aspect of CT: rational, logical thinking, new feminine aspects |

## 3.1 Critical thinking and accuracy of nursing diagnoses

This case study tries to demonstrate how critical thinking, when used in the diagnostic process of nursing, results in more accurate nursing diagnoses (Lunney 2010). The seven cognitive skills and the ten habits of mind, the essential characteristics of critical thinking derived from the study mentioned in the introduction by Scheffer and Rubenfeld (2000),

are used as a foundation for this investigation. By drawing from a case study of a woman that suffers from heart failure, the 17 characteristics are implemented in the diagnostic process. Since it is not yet known, which precise thinking skills are most needed for which clinical situation, all of the cognitive skills and habits of mind should be applied by nurses. Mistakes in the diagnostic process appear when thinking strategies that should have been used to solve the problem, are not used (Lunney 2010).

There are two hypotheses that are important in this article. The first one states that nurses, just like all humans, have very different levels of critical thinking competencies. As a result, teachers around the world try to boost the critical thinking development of their students. The second hypothesis asserts that thinking critically can be improved when practiced by applying certain concepts such as meta-cognition, the act of thinking about thinking, for instance (Lunney 2010).

**Methods and Data Collection**

The study was divided into three phases, because in each stage the nurse could filter out more detailed information on the patient. In the first phase of the case study the patient Mrs. RP, a 61- year old, overweight female suffering from type two diabetes and heart failure is exemplified. A nurse that does not apply critical thinking comes to the conclusion that “Decreased Cardiac Output”, “Altered Nutrition”, “Anxiety related to Hospitalization” and “Deficient Knowledge” are the relevant nursing diagnoses. It is argued that the first diagnosis will not give us any additional information aside of the data the medical one already provides. “Altered Nutrition” is possibly not helpful for the nursing plan but for when the patient is at home. The remaining two diagnoses are also not accurate, because there is no sufficient information to conclude this. In order two successfully find the appropriate diagnoses the nurse should apply the cognitive skill “information seeking” and the habit of mind “open-mindedness” to gather more information (Lunney 2010).

In the second phase Mrs. RP speaks more of her personal life and of the fact that she used to be a nurse herself. By using routine thinking the nurse might exclude the diagnosis “Deficient Knowledge”, deciding that Mrs. RP knows all about heart failure having previously worked as a nurse. This is how important data can be lost, when a person judges too quickly. Mrs. RP was a delivery nurse and probably was not exposed to people with heart failure often. For this judgment, critical thinking skills such as “contextual perspective” or

"information seeking" and "analyzing" are vital to select the correct diagnosis (Lunney 2010).

In the third phase of the case study Mrs. RP expresses being frustrated, upset and worried about her state of health. The nurse uses interpersonal communication by listening carefully to the patient. It is impossible to know what a person feels unless they talk about it. After the new data is collected the cognitive skill of "analyzing" is applied to bundle it. The skills "logical reasoning" and "predicting" help the nurse decide that Mrs. RP is ready to improve the management of her own health ("logical reasoning") and that she will profit from any actions aimed to improve her lifestyle. Later on in the process, after having asked more questions and used skills such as "perseverance" and "logical reasoning" to coax more information out of Mrs. RP, the second diagnosis of "Activity Intolerance" is selected. When Mrs. RP is ready to leave the hospital her state of health has improved and she is confident concerning her health-management (Lunney 2010).

**Results and Conclusions**

The results of this study were, that even though not all of the 17 critical thinking skills were used, two diagnoses of high accuracy could be chosen that would then represent the foundation for the nursing interventions following. The nurse in the case study could optimize her thinking skills by repeatedly practicing meta-cognition and could therefore help the affected patient. This is why this study promotes teachers to include these concepts in their classes, as well as writing a journal. Thinking processes should be written down in this journal when working in a clinical setting. In conclusion, these exercises improve self-reflection concerning clinical scenarios and will aid students in their future career (Lunney 2010).

## 3.2 Clinical reasoning and critical thinking

In this systematic review literature concerning critical thinking and clinical reasoning was inspected and evaluated in order to provide an overview on the two subjects (Cerullo & Cruz 2010).

To reason, similarly to thinking critically, means to organize and reflect on ones ideas, thinking processes and experiences, so that a conclusion can be achieved. Clinical rea-

soning in nursing refers to nurses judging and deciding on a patient's situation, what his or her priority problems are and what interventions need to be planned (Banning 2008).

**Methods and Data Collection**

The search for information was done on the databases PubMed, CINAHL, Scielo and Lilacs in 2008. No limitation was set for the publication date. Articles were read in Spanish, Portuguese and English, of which 25 were chosen for this review (Cerullo & Cruz 2010).
The authors found in their search that the terms clinical reasoning and critical thinking are often described as relating to the same concept, however they do not agree with this perspective. They state that critical thinking is a process involving strategies that are important for clinical reasoning to develop. By analyzing literature from a time span of over 20 years nearly 200 characteristics of critical thinking were discovered (Turner 2005, as cited in Cerullo & Cruz 2010). Cerullo and Cruz (2010) also comment that the critical thinking strategy is not yet fully developed in nursing, that there is no existing universal model and more research is necessary. The authors cite two studies that they find very helpful in understanding the concept, a study from Margaret Lunney (2003a) concerning the accuracy of nurses' diagnoses comparable to the one from 2009 and the study from Scheffer and Rubenfeld (2000) described in the introduction (Cerullo & Cruz 2010).

**Results and Conclusions**

After comparing the different results of several studies the researchers come up with several ideas applicable to improving critical thinking- some of them are:

- self-reflection and building a connection with patients
- ensuring a workplace that encourages nurses to discuss issues
- to think about thinking, like in the model of Scheffer and Rubenfeld concerning the 17 characteristics
- acknowledge alternative options
- analyzing if evidence is really credible
- using intuitiveness

- accepting that clinical judgments can have more than one meaning (Crowe & O'Malley 2006; Hynes & Bennett 2004; Lunney 2003a; Lauterbach & Becker 1996, as cited in Cerullo & Cruz 2010).

The following points extracted from four different studies represent strategies for educators to use to improve critical thinking skills in students or clinicians:

- analyzing case studies or scenarios in clinical settings
- applying problem based learning in classes
- teaching techniques that allow students to be creative and ask questions
- enforcing communication and dialogue with others
- promoting nurses to take part in the decision-making-process (Crowe & O'Malley 2006; Hynes & Bennett 2004; Simpson & Courtney 2002; Lunney 2001, as cited in Cerullo & Cruz 2010).

Furthermore, certain limitations for critical thinking to evolve in nursing are: difficult relationships between nurses or physicians and nurses, applying routine nursing diagnoses that are not accurate, problems at work, not listening to each other and demanding too much time. What is additionally interesting is that the researchers also find studies that criticize the usage of critical thinking, saying that it does not promote or improve nursing, because it lessons creativity as well as communication and is not structured enough. The authors of this article distance themselves from this view, stating that it is too severe and that critical thinking alone does not decrease interactions between people (Cerullo & Cruz 2010).

Cerullo and Cruz (2010) conclude that improving thinking strategies is challenging for everyone working in the health sector, because they require continuous practice. The institutions offering such education should base their training on the know-how, background and exposure of their trainees. They also decide that investing more in nurses' education is important. Furthermore, the results of the education should be assessed concerning cognitive development.

## 3.3 Promoting critical thinking through case studies

This study describes how group case studies in educational institutions can be conducted and how certain methods to improve critical thinking can be applied. The aim was to improve these thinking skills involved in clinical judgments and the study offers some insight into the first results (Müller-Staub & Stuker-Studer 2006).

As mentioned earlier, case studies offer the possibility to practice critical decision making in order to promote nurses' critical thinking (Lunney 2003c, 2001, as cited in Müller-Staub & Stuker-Studer 2006).

**Methods and Data Collection**

Participants had the opportunity to experience real patient situations in a clinical setting and could therefore integrate the experienced directly into the decision making process. The method used, was further developed and applied and evaluated in different educational nursing settings before introducing it. Difficult situations for nurses from practice were analyzed, nursing diagnoses were formulated and interventions chosen based on this method. The groups for the case studies consisted of up to 15 people and the sessions took place in 1, 5 days over a time period of 1, 5 years, which all together amounted to ten case study sessions. The organization of the case studies was conducted by qualified professionals. The learning effects of the participants were evaluated orally and in writing and the progress they made was assessed by using a questionnaire, which included six qualitative, open questions. All in all 72 hand written assessments, collected over five years and with a response rate of 100%, were implemented in this study and analyzed (Müller-Staub & Stuker-Studer 2006).
To conclude this, the participants had to analyze nursing problems, reflect on their critical thinking skills and apply divergent and convergent thinking. By doing so, they could practice the diagnostic process. Furthermore, the goal was for them to differentiate between nursing diagnoses, to choose interventions according to the diagnoses, to clearly describe nursing scenarios and to improve communication strategies (Müller-Staub & Stuker-Studer 2006).

## Results and Conclusions

In the preliminary phase of the study every participant stated a scenario in nursing and described the exact problem of the patient in order for thinking processes to be stimulated. After that the group decided on a case they found to be relevant for nursing practice. In the first phase the scenario was presented by one person and everyone had the opportunity to state his feelings, thoughts and ideas. Then the group had to pay attention to certain clues, like a patient expressing fear that might have more meaning to them. If a special meaning is assigned to a certain hint, expression or symptom, depends on the knowledge and the experience of the nurse, otherwise he or she might ignore it. With the help of the group's associations the person presenting the case could draw focus to the most vital information. This strategy also illustrates the diagnostic process that has a similar approach. The aim of this phase was to promote a lot of associations so that the patient's situation could be understood. Additionally, the usage of divergent thinking, the discovery of factors important for finding possible nursing diagnoses and the recognition of important and relevant hints were taught (Müller-Staub & Stuker-Studer 2006).

In phase two the aim was to focus on the priority problem of the patient and to connect it with possible nursing goals and interventions. Participants applied their knowledge on nursing diagnoses so that they could think of many possible ones, configure more hypotheses and then use convergent thinking. Hypothetical nursing diagnoses were then decided upon by the case presenter and additionally validated by drawing on theoretical and practical knowledge. The groups also had to discuss certain questions referring to the exact definition of nursing diagnoses, factors that might affect the patient in this example, symptoms the patient showed and nursing goals and interventions that should be prioritized. At the end the groups stated their answers and conclusions that were then compared together. The person presenting the case had the final decision to make on what nursing diagnoses and interventions were to have priority (Müller-Staub & Stuker-Studer 2006).

Müller-Staub and Stuker-Studer (2006) discuss that in phase two nursing diagnoses, goals and interventions were connected with each other, which also emphasized that nursing diagnostics are the foundation for correct nursing interventions. For participants it was easier to understand the diagnoses if they were justified by interventions and they could practice connecting practical experience with theory. Ultimately, the case study ended with a meta-perspective, where the gained results were reflected upon. Additionally, the case study was discussed and reviewed again to find out if it was helpful in that nursing scenar-

io. Furthermore, the retrospective evaluation could be seen as a communicative validation (Müller-Staub & Stuker-Studer 2006).
The communicative validation proved that the case studies were helpful for the participants and close to practice. The groups perceived the issues of the patient in a patient centered way, nursing diagnoses were asserted accurately and individually and the nursing interventions were adequately adjusted to the patient concerned. Additionally, nursing tasks were perceived to be more specific, precise and were more clearly described. Distinguishing between relationships, communication and respectful interaction of the nurse and patient could also be done more easily (Müller-Staub & Stuker-Studer 2006).

## 3.4 Critical thinking indicators and critical thinker attributes

In this two- round Delphi study, the aim was to identify and discover the characteristics of thinking critically and the indicators of critical thinking concerning nurses. The authors wanted to focus on how critical thinking is used in clinical nursing practice, because they wanted to emphasize that knowing about these indicators could help develop instruments to evaluate the critical thinking skills of nursing students. Additionally, they also hoped the results of this study would aid the advancement of teaching methods. Therefore, critical thinking and its usage in clinical nursing could be encouraged. As a result, the study wanted to find out identifying indicators of efficient application of critical thinking and what characteristics critical thinkers have in nursing (Chao et al. 2013).

### Methods and Data Collection

The study was carried out from September 2009 until August 2010 and was divided into two stages. The first stage of the procedure involved reviewing literature concerned with indicators of critical thinking. Certain keywords were applied for this search and full-text papers were screened in a Chinese database and in CINAHL. The publication date for the articles was set for 19 years, from 1990 until 2009, in order to gain enough information. Through this process, the researchers were able to extract 21 indicators of critical thinking from literature. These indicators revealed that critical thinking was important and evident in

every step of the nursing process. Additionally, the researchers could also discover seven attributes that critical thinkers in the nursing field possess (Chao et al. 2013).

In the next step of the first stage, four groups were chosen to validate, enhance and further develop the 21 critical thinking indicators and seven attributes. These focus groups included six nursing teachers that had experience in clinical nursing and were either from the medical and surgical, psychiatric, obstetric and gynecological and pediatric or from the community health nursing area. The researchers wanted the indicators to represent critical thinking in nursing practice, which is why these experts from clinical environments were questioned and included in the study. To collect the data needed in this stage, the six teachers were invited to share their thoughts on the indicators of thinking critically and on the specific attributes critical thinkers should possess. The gathered information underwent a recording and a transcription within 48 hours. Furthermore, the four groups also validated the transcribed data. The reactions they had were needed to develop a questionnaire connected to the different characteristics (Chao et al. 2013).

The second stage involved an adapted two-round Delphi study so that the accuracy and the relevance of the different characteristics acquired in the first stage, could be ascertained. Participants were chosen from the same fields of nursing to form expert groups. All in all, six nurses from the faculty, ten people from hospital administration, six chief nurses, three people from the nursing personnel and five practical nursing teachers, amounting to thirty nursing experts, took part in the Delphi study (Chao et al. 2013).

The experts assessed the different elements from the questionnaire of the focus groups separately and gave points for each one, depending on its relevance by using a 5-point Likert scale. By doing so, the thirty experts could rate the relevance of each element and if necessary or wanted, add information or ideas in the empty spaces given. Elements with a certain amount of points were kept for the second round of the Delphi study, where they were again evaluated by the same experts. SPSS 17.0 was used to determine the descriptive statistics and to find out the relevance and accuracy of every single element. Additionally, every person taking part in the study had to approve of his or her participation in writing and there was an institutional review board present that also had to state their consent. As a conclusion, these experts of the second stage were able to describe 37 indicators of critical thinking and ten attributes of critical thinkers (Chao et al. 2013).

## Results and Conclusions

After the literature review, each indicator was put into one of five categories depending on the relevance, associated with the nursing process. Eight indicators connected to analyzing and interpreting information, were selected for the assessment stage. Three indicators connected to integrating clinical data and making hypotheses concerning the origin of a problem, were chosen for the diagnosis stage. Another three indicators connected to strategies focused on problem-solving, were put in the planning stage and the three indicators concerned with implementing the problem-solving strategies, were referred to the implementation stage. The four last indicators connected to the assessment of results, were selected for the evaluation stage of the nursing process. Altogether 21 indicators could be derived from the literature. The seven attributes of critical thinking were also discovered in this phase (Chao et al. 2013).

Later when the focus groups got involved, some new indicators and attributes were suggested being added specifically for the clinical setting. Furthermore, in the second phase the clinical experts adjusted the characteristics even more, during the two-rounded Delphi study. Since the average rating for each element was over the minimal score in the first round, no elements were excluded. Therefore, 36 elements included in all different stages of the nursing process could be derived. 15 indicators were important for the assessment, five for the diagnosis, five for planning, five for implementing and six indicators for the evaluation stage (Chao et al. 2013).

None the less, ten elements were reevaluated in round two, because according to the experts they were not accurate enough and could not convey an exact interpretation. Additionally, one element was enclosed in the assessment stage to undermine that critical thinking is also based on the individual needs of patients and that applying the right assessment method is important. In conclusion, the finished tool contained 37 indicators (Chao et al. 2013). The elements and their position in the nursing process and can be viewed in Table 2.

*Table 2: Indicators of critical thinking in the nursing process (own portrayal based on Chao et al. 2013)*

| **Round II modified by expert group** |
|---|
| **Assessment phase** |
| **1. Professional knowledge & skills** |
| 1.1 Comprehend nursing & expert knowledge |
| 1.2 Use theoretical knowledge (like anatomy or physiology,ect.) |
| 1.3 Understanding and assessment of cases |
| 1.4 Possess relevant clinical experience |
| 1.5. Actively strive for knowledge and ask questions |
| 1.6 Apply accurate assessment methods to collect data |
| **2. Anlyze information clearly and correctly** |
| 2.1 Make sure data is accurate |
| 2.2 Classify data systematically and logically |
| 2.3 Compare information from different perspectives |
| 2.4 Think of all reasons related to patient's issue |
| 2.5. Confirm or dispute the credibility of data |
| **3. Interpretation** |
| 3.1 Formulate the clinical case clearly |
| 3.2 Consider different possibilities |
| 3.3 Define the essence of data based on theoretical knowledge |
| 3.4 Comprehend every step of every phase |
| 3.5 Extract a conclusion for the patient's problem |

| **Diagnosis phase** |
|---|
| 1. Expectations & preliminary presumptions |
| 1.1 Assume possible problem causes |
| 1.2 Discuss and consult with team |
| 1.3 Integrate clinical information and knowledge |
| 1.4 Cite conclusions clearly and fully |
| 1.5 State informed opinions |
| **Planning phase** |
| 1. Reasoning, explaining and predicting the purpose |
| 1.1 Suggest strategy for problem resolving |
| 1.2 Resolution strategy should be realistic and appropriate |
| 1.3 Plan resolution logically |
| 1.4 Examine if strategy fits problem |
| 1.5 Predict possible goal |

| **Implementation phase** |
|---|
| 1. Implementation by plan |
| 1.1 State relationships between intervention and problem |
| 1.2 Identify and collect important resources |
| 1.3 Deliver planned intervention |
| 1.4 Recognize and control interruption during implementation |
| 1.5 Record implementation and patient response |
| **Evaluation phase** |
| 1. Self-assessment and record |
| 1.1 Recognize errors |
| 1.2 Nursing record should be clear and structured |
| 1.3 Examine effect and anticipated goal |
| 1.4 Examine result based on clinical data |
| 1.5 Discuss with team and gain opinions of others |
| 1.6 Comprehend patient situation and self-reflection and correct errors |

The seven attributes of critical thinkers in nursing from the literature review were expanded into ten by the focus groups. Furthermore, the experts reassessed the attributes in the two rounds of the Delphi study concerning their appropriateness in clinical nursing practice. The final attributes are listed in Table 3 (Chao et al. 2013).

*Table 3: Attributes of critical thinkers in nursing practice (Own portrayal based on Chao et al. 2013)*

| **Round I & II modified by expert group** |
|---|
| |
| 1. Has an open mind |
| 2. Pursues truth actively |
| 3. Shows patience and confidence |
| 4. Engages in self-reflection |
| 5. Demonstrates courage to acknowledge and correct errors |
| 6. Shows a neural perspective |
| 7. Possesses keen observation skills |
| 8. Accepts criticism |
| 9. Shows good communication skills |
| 10. Accurately documents findings and actions |

The authors of the study concluded, that practicing nurses have difficulties implementing critical thinking skills to help solve patient's health problems and therefore, need to make thinking critically a priority. To implement these skills in nursing they need to be educated, but they state that there are not many suitable instruments for measuring critical thinking in nursing students. Nevertheless, this study could develop an instrument that might help with identifying the challenges students face when applying clinical problem solving. Furthermore, the indicators for critical thinking described in this study are relevant and essential in nursing practice and this might not only aid students but also experienced nurses who are active in the field. The study also found out that one attribute was not yet fully mentioned in other studies, the characteristic of displaying favorable communication skills (Chao et al. 2013).

## 3.5 Skills of critical thinking in the diagnostic process of nursing

The aim of this qualitative study was to determine the critical thinking skills used in the diagnostic process of nursing and to help nursing students improve their application technique. The researchers decided on this topic, because students often have difficulties when applying critical thinking resulting in the over-usage of taxonomies. For that reason, the individual needs of the patient can be lost and the quality of care lessens. Additionally, the researchers also stated that nursing students struggle with these skills, because of lack of training and gaps in teaching the diagnostic process (Bittencourt & Crossetti 2013).

### Methods and Data Collection

This exploratory, descriptive study used a qualitative approach to gain relevant information. Seven nursing students from the Federal University of Paraíba in Brazil were chosen to participate in this study. Criteria for inclusion were: current enrollment in a nursing program, signature of agreement to participate and attending the 9$^{th}$ semester in their nursing studies. Students from the 9$^{th}$ semester were chosen, because they already had had certain experience in clinical nursing through several medical internships and had already applied the diagnostic process in nursing practice previously (Bittencourt & Crossetti 2013).

A clinical case was unraveled and the seven students had to identify the priority problem, additionally to other subjective information. Furthermore, the extracted data was interpreted and classified to gain several nursing diagnoses. After that the students had to prioritize one diagnosis, self-reflect on what critical thinking skills they had applied in the process and why they had applied them. They also had to think of other elements they found important for the diagnostic process. As soon as the critical thinking skills were determined, the seven students judged the relevance of those skills when choosing a nursing diagnosis (Bittencourt & Crossetti 2013).

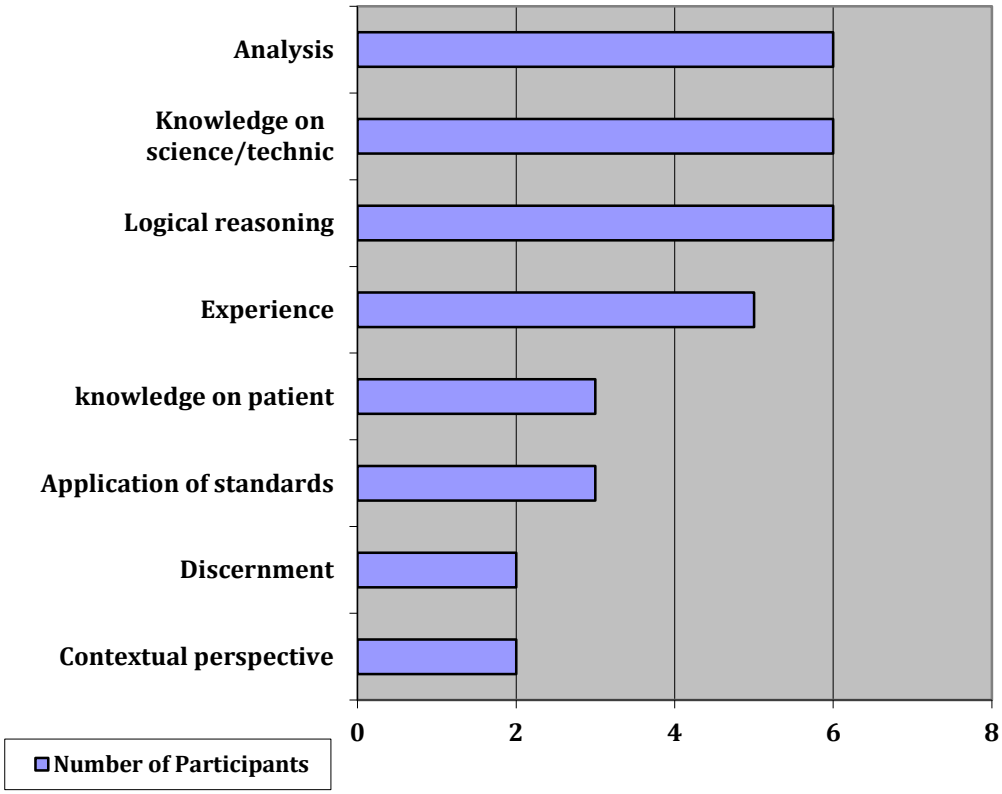
When the data collection process was completed, the characteristics of thinking critically were analyzed descriptively and sorted depending on their frequency. Furthermore, the justifications of the students concerning the elements of critical thinking, were assessed in a concept analysis strategy. The gathered data was then used to spark discussions in focus groups relevant to the topic and to develop a model concerned with the theory of critical thinking in the diagnostic process of nursing. Additionally, the researchers handed in their project to an ethics committee (Bittencourt & Crossetti 2013).

**Results and Conclusions**

From the seven students that took part, six mentioned that they found analysis, knowledge about science and technologies and logical reasoning to be most relevant when searching an accurate nursing diagnosis. Five of the participants stated experience in the clinical field to be essential and three referred to information on the patient and the usage of standards. Only two nursing students cited contextual perspective abilities and general understanding to be vital skills of critical thinking (Bittencourt & Crossetti 2013).

The frequency of the skills described by the participants based on the diagnostic process can be viewed in Figure 2 below.

*Figure 2: Frequency of critical thinking skills cited by participants (Own portrayal based on Bittencourt & Crossetti 2013).*




The participants mentioned that they found analysis so important, because it assesses the patient in detail, through observation or looking into his clinical history. Vital signs and symptoms are grouped and prioritized, and health issues can be discovered quickly. Additionally, they found it vital for critical thinking to have knowledge on science and technology, helpful for understanding pathology or physiology, and therefore, illnesses and their related symptoms. Connecting patient's problems and symptoms, defining them and comparing them with literature are traits essential for the diagnostic nursing process. The application of logical reasoning was essential in evaluating objective and subjective information and also for connecting the gathered data with the patient's health problem. Therefore, logical reasoning can aid in organizing the data, prioritizing and lastly identify the accurate nursing diagnosis (Bittencourt & Crossetti 2013).

The second characteristic of critical thinking mentioned most often by the students, clinical experience, helps nurses gain important knowledge from their work in the hospital. As perceived by the participants, clinical experience is also vital when prioritizing nursing diagnoses, because of being in certain comparable clinical situations. This means, that data from a new case resembling something one has once seen or experienced in practice is more easily categorized. Furthermore, the students found the skill of seeking information con-

cerning the patient so important, not only their medical history but also their social background, because it is fundamental for the diagnostic process. Concerning the usage of standards, the students stated that this involves evaluating clinical data according to literature and classifying it dependent on standards. The skills cited the least, were contextual perspective abilities, for allowing an analysis of proof, and general understanding, for enabling contemplation on clinical practice. These characteristics are also helpful for choosing precise nursing diagnoses (Bittencourt & Crossetti 2013).

According to these results, the researchers acknowledged the critical thinking skills to be interdependent and they could discover a connection between the skills and the diagnostic process of nursing. It seems that the participants used specific skills for each stage of the process, helping them to identify the priority diagnosis. Additionally, they found out that students often showed difficulties, when trying to decide on the most accurate diagnosis. But in the end, the participants were able to select the priority one, based on the patient's health problems. These results also highlight that following a strategy helping to cultivate critical thinking is necessary in nursing education and practice (Bittencourt & Crossetti 2013).

One approach the researchers suggest for developing these skills, is for the nurse to ask questions, such as:

- Has enough data been found to judge a clinical situation?
- What proof has been obtained to legitimize this nursing diagnosis?
- Are there factors that determine the diagnosis?
- What outcomes can be achieved by setting interventions depending on these nursing diagnoses?

  (Bittencourt & Crossetti 2013)

This type of questioning can aid the development of cognitive skills necessary for critical thinking and can help the student as well as the novice nurse, broaden their knowledge and expand it depending on what they experienced in practice. In addition the questions can spur the nurse's comprehension of the patient's responses to the health problem, while focusing on gaining positive results. The case studies also play an important role, because they help develop conceptual maps, which promote the improvement of logical reasoning. Furthermore, the researchers stated that these case studies allow visualizing

certain concepts and phenomena that are relevant in the clinical setting (Bittencourt & Crossetti 2013).

## 3.6 Nursing educators' ideas on critical thinking

This qualitative study tried to find out the way nursing educators think about critical thinking applied in nursing to judge clinical situations. The aim was to obtain comprehension of these conceptions. The researcher found this topic to be relevant, because in New Zealand critical thinking is important for education programs in nursing, but even so a minimum amount of literature has been published on it (Walthew 2004).

### Methods & Data Collection

In order to gain insight into the thought processes of educators, the ideas were analyzed from an inside perspective of the participants by applying constructivism as a criterion in guiding this research (Walthew 2004). As stated by Guba and Lincoln (1994, as cited in Walthew 2004), constructivism has the viewpoint that common phenomena are various and created, instead of separate and concrete, relying on the individual's comprehension of the construct.

In the study itself, a descriptive, interpretive approach was applied, because it was found to be the most suited design to understand nurse educator's thoughts on critical thinking, their social background and which effects this had on their teaching and how this influences their conceptions. The sample consisted of twelve nursing teachers that agreed to take part, ten women and two men. These educators taught both practice and theory in a Nursing Science Bachelor's program and had at least ten years of experience in teaching. Additionally, they all had worked in different health care institutions in senior positions before their current employment (Walthew 2004).

The data collection took place by holding separate, semi-structured interviews carried out by the researcher for one hour. This assessment method was chosen, because it was believed to be the best option for providing relevant information if the teachers could explain their thoughts and ideas freely. Furthermore, the participants stated their opinions concerning the work of nursing students thought to demonstrate critical thinking. They chose the work themselves and the students were asked for their consent beforehand. Students

often write about important and difficult health topics, which is why their work was drawn on to discover critical thinking concepts. It included examples of clinical practice, essays concerned with implementing theory into practice and extracts of journals (Walthew 2004). Certain questions inquired in the interview were for instance:

- In your own opinion, what do you think critical thinking really means?
- Are there elements in this student's work that make you believe the student is using critical thinking skills?
- Could you observe anything the student applied in clinical practice that made you think he was thinking critically?
  (Walthew 2004)

The interviews were then recorded on an audiotape and transcribed and analyzed for patterns in the next step. Themes that emerged were then written down, including excerpts from the gained information that emphasized the text. To ensure confidentiality, pseudonyms were applied (Walthew 2004).

**Results and Conclusions**

From the twelve nursing educators all of them saw logical thinking as the key concept of thinking critically when making decisions in nursing. They further described this concept to include the collection of data, recognizing links, connecting theory with practice, assessing a situation, bringing forth arguments and finding solutions for a problem. Furthermore, the educators emphasized that a holistic approach of a clinical situation was vital before deciding what to do. They continued on by stating that data needed to be collected from many different sources so that it could be analyzed and a possible solution decided upon. Additionally, the nursing teachers mentioned the implementation of knowledge played a role and that students had to connect and develop their ideas and be aware of things, skills important for making accurate nursing diagnosis. Students, who do not have a lot of experience in the clinical area yet, sometimes show difficulties in linking their thoughts and connecting theory with practice, one participant stated. Often this skill develops with the increase of knowledge through experience (Walthew 2004).
Concerning the topic of solving problems, many nursing teachers associated the nursing process with critical thinking. They found the two to be closely related. On the other hand

some participants disagreed with this opinion, arguing that the nursing process follows a strict schema and is very linear, which does not allow creativity – being an essential characteristic of critical thinking. Furthermore, the educators found a certain attitude or disposition and curiosity absolutely fundamental for thinking critically. Also this mental process often does not take place willingly but rather without notice. For one teacher critical thinking becomes part of who they are and it is applied throughout their entire life. Another teacher stated that it is also a process focused on taking action, for why analyze or assess something when there is no plan to continue with a form of action. And lastly one participant mentioned that in nursing a specific way of critical thinking is necessary for this discipline that differentiates itself from other forms. All of the results derived from the different statements of the educators are connected to cognitive, reasonable thinking and are representative of the traditional perception (Walthew 2004).

Some of the nursing teachers also added certain feminine aspects to thinking critically, such as female instinct or intuition, feelings like caring and circumstantial awareness. Concerning intuition, one participant stated that one cannot always relay upon it, because it might also be associated to habit. If intuition is applied, it must always be examined critically. Additionally, several educators stated that all of our thinking is subjective to a certain extent, since it is affected by our personal knowledge and experience. Furthermore, our past experiences always have an influence on the clinical decision making process. Another fact that was also quite interesting, is that every participant mentioned the importance to put critical thinking into context in order to make appropriate nursing decisions. Many educators also stated how vital it is for being a good critical thinker, to recognize the patient's needs, to hear his or her voice and to show that someone cares about them (Walthew 2004).

To sum up the results above, the participants of the study described their feelings and ideas on critical thinking very clearly. They defined it to be a difficult process including cognitive thoughts and logic, reflecting traditional ideas. Additionally, they also considered critical thinking to be connected with female attributes and to be particularly important for listening to others and understanding their beliefs and perspectives (Walthew 2004).

Similar to studies mentioned before, the researcher criticizes that there are no standard tools to adequately measure critical thinking, and that this would be important, because it is connected to clinical decision making and judging nursing situations. Furthermore, since there is no clearly stated definition for critical thinking in nursing, it is difficult for nursing teachers to assess their student's abilities or to take part in an academic discussion con

cerned with the topic. Nevertheless, this study represents implications for nurses also in different settings, because even though the sample was small and based on the conception of twelve educators, all nurse have certain common experiences that apply to all of them (Walthew 2004).

# 4. Conclusion

According to the literature and to the six studies described in the previous chapters, critical thinking could definitely be proven to be essential for nursing, especially for the diagnostic process. Its importance was underlined by several researchers and pointed out in their studies. They proved that critical thinking can lead to high accuracy nursing diagnoses that are more exact and precisely adjusted to the patient's individual needs, priority problems and resources. As a result, the nursing interventions are more effective and the quality of the nursing care rises. Therefore, the overall patient outcome and our general health care system improves by using this strategy.
Additionally, the several results in the studies drew attention to the fact, that different elements are crucial for applying critical thinking. Furthermore, they also emphasized how these elements can be acquired and trained in nursing education. Therefore, the two research questions, concerning the importance of critical thinking and the vital elements for its application, could be answered.
In the following paragraphs the research questions will be addressed in detail and discussed and answered with the results from the six studies.

## 4.1 Importance of critical thinking

To sum up the different results concerning the importance of this thinking strategy and to draw attention to the first research question, Lunney (2010) found out in her case study that by applying some of the 17 critical thinking skills from Scheffer and Rubenfeld (2000), nurses can achieve more accurate nursing diagnosis, resulting in better suited nursing interventions and overall in an improved health outcome for the patient. Bittencourt and Crossetti (2013) came to a similar conclusion in their study that critical thinking can aid in organizing and prioritizing data and therefore in identifying the correct nursing diagnosis. Müller-Staub & Stuker- Studer (2006) also came to the result that the diagnoses chosen were more accurate, when critical thinking was applied and that the interventions were therefore more adequately adjusted to the patient. Additionally, they discovered that the nursing tasks were more specific and clearly described after the usage of critical thinking.

Furthermore, the interaction with the patient, concerning communication, respect and the relationship with the nurse, could be distinguished more easily by applying critical thinking. Critical thinking was also mentioned to be vital for recognizing what the patient really needs most, to listen to the patient's voice and for the nurse to express caring (Walthew 2004).

## 4.2 Crucial elements of critical thinking application

Concerning the second research question, many elements could be derived from the previous studies that play a role when applying critical thinking, some perhaps more than others. All of them are somewhat connected to the 17 skills explained by Scheffer and Rubenfeld (2000), which is why they will be set in comparison to them.
Lunney (2010) wanted to discover, which critical thinking skills are essential in the diagnostic process. Of the seven cognitive skills by Scheffer and Rubenfeld (2000), six were applied in her case study and of the ten habits of the mind, five came to use. The final eleven characteristics evident in Lunney's study are cited below.

**Cognitive skills:**
information seeking
applying standards
analyzing
predicting
logical reasoning
discriminating
(Lunney 2010; Scheffer & Rubenfeld 2000)

**Habits of the mind:**
perseverance
contextual perspective
flexibility
open-mindedness
intellectual integrity

Yet, she did note that even though not all 17 skills were used, all of them should be mastered in order to take the best course of action in other clinical situations and she did not emphasize the importance of one skill over another (Lunney 2010).

Cerullo and Cruz (2010) derive the following characteristics that can be compared to Scheffer and Rubenfeld (2000) from their literature review: self-reflection, analysis of evidence, intuitiveness, creativity and asking questions ("inquisitiveness").
Four out of the ten attributes of critical thinkers discovered by Chao et al. (2013) were identical or similar to Scheffer and Rubenfeld (2000): a critical thinker has an open mind, pursues the truth ("intellectual integrity"), shows confidence, engages in self-reflection and possesses keen observation skills ("information seeking"). The 37 indicators of critical thinking included the rest of the 17 skills, accept they did not clearly contain the aspects of "application of standards", "discriminating" and "creativity".
The study from Bittencourt and Crossetti (2013) came to the result that six out of seven participants found analysis, knowledge about science and technologies and logical reasoning to be the most relevant critical thinking skills. Other characteristics cited were: gaining experience in the clinical field, finding information on the patient, the application of standards, possessing contextual perspective abilities and general understanding of a situation. The first three aspects also coincide with cognitive skills from Scheffer and Rubenfeld (2000) and so do the characteristics of "finding information" and "applying standards".
The contextual perspective abilities are also listed as one of the ten habits of the mind.
In addition, the research from Walthew (2004) in New Zealand discovered that all of the nursing educators found logical thinking (cognitive skill) to be the key concept of thinking critically and when making decisions in nursing. The participants described that this key idea contained all of the other skills important for critical thinking, such as data collection, recognition of links, connecting theory and practice, assessing a situation, bringing forth arguments, analyzing and finding solutions for a problem (cognitive skills). Furthermore, they found it fundamental to apply curiosity and to put critical thinking into context (habits of the mind). Lastly, also certain female components were mentioned by the participants. This was a new and very interesting aspect on critical thinking, because the researcher could discover that certain skills such as intuition, associated with feelings like caring and circumstantial awareness, are specifically applied by females in nursing care (Walthew 2004). Scheffer and Rubenfeld (2000) did not point out intuition to be a skill confined specifically to females but rather stated it to be a generally important habit of the mind.
Taking all these characteristics and results into account, it can be said that some critical thinking skills seem to be more dominant in the nursing process than others.

On the one hand, the cognitive skills of logical reasoning, information seeking and analyzing seem to be more frequently used then discriminating or transforming knowledge. On the other hand the habits of the mind, such as reflection, intuition or contextual perspective were more present in the older and previous results than confidence or flexibility.

# 5. Discussion

The importance of critical thinking for nursing care and how it is applied could be pointed out in this thesis. Therefore, it can be stated that it is vital for nurses to implement this thinking strategy in everyday nursing care and that it should be integrated, not only in clinical nursing practice but also in the education of nursing students. Possibilities of an implementation of critical thinking in nursing education and its relevance for nursing research will be described in the next paragraphs.

## 5.1 Implications for research and practice

What is interesting is that that critical thinking can be improved by selecting appropriate teaching methods, because several studies prove that such measures concluded in higher thinking capability (Chau et al. 2001; Girot 2000; Greenwood 2000; Howenstein et al. 1996, as cited in Müller-Staub 2006). Additionally, a study from Girot (2000) discovered that when analyzing the development of critical thinking in nursing science students and in non-academic students, nurses with an academic education achieved better results concerning decision making processes (Girot 2000, as cited Müller-Staub 2006). This would imply that a higher level of education in nursing has a beneficial effect on the critical thinking capabilities.

Several of the six studies described earlier mentioned different strategies for critical thinking to improve, not only in nursing students but also in nurses already active in a clinical setting.

Lunney (2010) concludes in her study that when using case studies, nurses can optimize their critical thinking skills by applying meta-cognition. Furthermore, she mentions that writing a journal about past experiences and thought processes also has a similar function. Self-reflection concerning clinical scenarios is practiced, which can help students later on in their nursing careers. This is why she encourages teachers to include these concepts in their classes. Cerullo and Cruz (2010) argue that improving thinking skills represents difficulties for everyone working in nursing, because they require repeated practice and a lot of

training. To improve critical thinking, they suggest discussing real cases of patients from clinical practice, similar to case studies. They also emphasize that nursing education programs should adapt their training according to the know-how, background and experience of their trainees and should offer opportunities to apply the learnt strategies. Furthermore, the results of the education should be assessed, concerning the cognitive development of the participants. Additionally, Müller-Staub and Stuker-Studer (2006) mentioned in their study that nursing students understood the diagnosis more easily, when it was justified by interventions, and it was also helpful for their thinking skills to connect past experience with theory. Communicative- validation was perceived to be close to practice and the meta-cognition at the end of the case study also aided self-reflection and the retrospective evaluation.

Chao et al. (2013) mentioned similarly that the education of the critical thinking skills represents a challenge, because of the lack of suitable assessment instruments. This is an important implication and suggestion for research. The goal is to construct and develop a unified and comprehensive method to evaluate critical thinking skills in nursing students and novice nurses. Bittencourt and Crossetti (2013) emphasized that asking questions, as well as using case studies, can aid the development of cognitive skills. In addition, this type of questioning can improve the nurse's comprehension of the patient's priority health problem.

## 5.2 Strengths and weaknesses of the studies

Concerning the separate studies, each one had different strengths and weaknesses. Lunney (2010) described a very thorough and in-depth case study yet there was only one nurse that participated. In future case studies on the topic it would be better to include more than one nurse. The bibliographic literature search of the systematic review of Cerullo and Cruz (2010) was conducted in 2008. It would be interesting to conduct a new systematic review on critical thinking that also includes German literature. What was a strength in this study, was the fact that the researchers scanned many different databases, read abstracts in several languages and could therefore provide vital and broad spread information on clinical reasoning and critical thinking. Müller-Staub and Stuker-Studer (2006) were able to point out the relevance of case studies and how they can be imple-

mented in nursing education. Furthermore, the results of the learning effect of nurses were evaluated in written and oral form, which lead to high credibility. The exact characteristics of the participants were not described, which would have been interesting to draw more conclusions (Bachelor students, clinical experience...).

Chao et al. (2013) were able to derive 37 indicators of critical thinking that are necessary in nursing, which might be very helpful for nursing education as they provide a certain guideline. Nevertheless, the focus groups chosen in phase one of the study did not represent the most adequate sample for qualitative research.

In the next study by Bittencourt and Crossetti (2013) several critical thinking skills could be discovered and were linked to an improved outcome of the diagnostic process. The seven students chosen, possessed adequate criteria, which resulted in very clear, meaningful results, yet they were all from the same university and probably new each other, which might have biased the results. Finally, the last study from Walthew (2004) had a very different approach compared to the others, because it analyzed the way nursing teachers think about critical thinking. A strength was that it offered a very new view on the topic concerning how women specifically think critically. However, the author emphasized that the gained results cannot be generalized and that more research is necessary with larger samples.

## 5.3 Limitations of the thesis

One limitation of this thesis is that it is difficult to completely compare the individual studies with each other, since there is no single definition of what critical thinking really is. For that reason, researchers have different takes and aspects on the subject. It would be important for nursing education and practice to have a unified definition. Additionally, there is no clear or global method to evaluate critical thinking skills of nursing students or clinical nurses, which makes it a challenging task to do so, especially if a comparison should be made. Furthermore, it can be stated that the samples of the studies used were often quite small, indicating that more research in additional nursing schools or health care institutions is necessary.

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