Case Study Tutorial with Guided Reasoning:
Developing Self Evaluation of Critical Thinking and Clinical Reasoning Skills

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Professor Walter Paans collaborated on the Dutch translation of the Health Sciences Reasoning Test (HSRT) used widely to assess critical thinking skills in health science students and practitioners. Here, he and his colleagues use case studies to train their students in the skills of analysis and metacognitive reflection.

Introduction

We title this lesson: “Critical thinking and clinical reasoning: the Case of Mrs. A.” It is intended for first or second year nursing students in a Bachelor degree program here at Hanze University but we think it would be well received by health science students anywhere. We teach this case study exercise in a small seminar class of twelve students. In order for students to benefit maximally from the case, we ask them to read ahead and to prepare themselves for this session by acquiring basic knowledge in three areas: logical reasoning (deductive and inductive reasoning, deductive abduction, and the common fallacies); the nursing process and reporting of diagnoses; and diabetes mellitus, type 1.
The learning objectives

Students completing this session will be able to:

- Analyze and interpret the clinical case
- Write accurate diagnoses
- Explain the thinking process underpinning the diagnoses being made
- Critically reflect on their personal diagnostic reasoning, analyzing and evaluating the quality of their reasoning skills
- Identify areas of personal development to improve diagnostic reasoning

How we teach this lesson

The case study supposes that a nurse conducts a patient assessment interview using Gordon’s framework (Gordon, 1994). Gordon’s Functional Health Patterns Framework has eleven subject areas directing the collection of patient data about common patterns of behavior that contribute to health, quality of life and the achievement of human potential. The framework is similar to others used in patient intake interviews to guide the clinician to conduct a comprehensive assessment. We prepare copies in advance for each of the students of what appears to be a completed and transcribed interview. In this case example, the interview has been conducted with a client named ‘Mrs. A.’ who has diabetes mellitus, type 1. Gordon’s eleven patterns can be found as the lay-out of a script of the interview.

The interview is displayed over the next few pages as Figure 1: “Interview with Mrs. A.”

Figure 1 “Interview with Mrs. A”

1. Health perception/health management

   Can you tell me how you are doing?
   - Reasonably well under the circumstances.

   Reasonably well under the circumstances?
   - Yes, I want to go home as soon as I can. There is plenty of work for me to do, and there's no one to help me do it.

   Do you know why you were admitted?
   - Yes, apparently I fell asleep and the people at the workshop weren't able to wake me. They know I am a diabetic, so they are quick to think it's got something to do with that.

   Can you tell me what I can do for you?
   - Yes, you can ask if my new glasses have already arrived. I've got poor eyesight, you know. It's gone worse in recent years.

   Is there anything else I can do for you?
   - No, I don’t think so. I’ll give the garage a call later on, to make sure that they take care of things.

   Do you ever feel down or depressed?
   - No, not really. Well, I’m on my own, you know. I live on the premises of the garage; there are plenty of people I can talk to. But at night, you’re on your own again, aren’t you. And after a marriage of twenty years, that’s not always easy. And then there’s the divorce. Most contacts are about work only.

   Are you in touch with your GP or with a diabetes nurse?
   - No, I take care of everything myself; I can cope. Although sometimes I’m a bit careless.

   What about your therapy management (compliance)?
   - Determining my blood sugar level, injecting the insulin, I do it myself; admittedly not always at the correct time. And I take blood samples, which isn’t something I enjoy. Sometimes I inject insulin without first determining the blood sugar level. I just inject the same amount as the days before.

   Does that go well?
   - More or less the same; I am less accurate because I don't consider it all that important. It's always the same anyway. If it doesn't go well, I eat a bit more or inject a bit more insulin. I go by my feeling.

2. Nutritional/metabolic

   How about eating and drinking?
   - I eat and drink healthy, not too much, and not too little; I stick to my diet. The wife of one of my employees cooks for me; I pay her for it. And I eat at the garage canteen. Not always in time, I admit.
regulate it with the insulin. I don’t lose weight and I don’t put on weight. I just don’t take the time to eat. And when I do eat, I’m usually on my own …

Do you drink alcohol?
- No, actually I never drink. Except for yesterday. I was sitting at the desk and I found a bottle of blackcurrant gin. I used to drink it at the end of the afternoon. Just one glass before dinner. Yesterday I thought: “I’ll have a couple”. So, I fell asleep… I’m not into drugs or anything like that. I don’t smoke either.

3. Elimination
Do you have any problems with the bowels? Do you have to pass water often?
- No problems; nothing special.

4. Activity/exercise pattern
How about your physical appearance?
- I do everything myself; I don’t need any help. Sometimes when I feel listless and tired it takes me more time to take care of things. I have the laundry done every two weeks. I don’t mind the odd spot or other. Nobody’s bothered anyway. Actually, I don’t always see it.

Do you perspire a lot?
- No, I don’t think so.

Do you practise a sport? How about regular physical exercise?
- I always enjoyed diving in the Dutch Antilles. I don’t do it anymore. I can hardly see under water. I like to read. I can read reasonably well with extra reading glasses. I get plenty of exercise at work.

5. Sleep/rest
Do you enjoy a good night’s sleep?
- I sleep enough. Go to bed in time. I make sure that I have finished work at 7. Sometimes I feel tired and listless in between. It annoys me. I’m also annoyed by small things. I’ll be yawning by the end of the afternoon.

How long have you been bothered by tiredness?
- Since a couple of weeks

6. Cognitive/perceptual
What can you say about your eyesight?
- Yes, can you ask if my new glasses have arrived? I don’t see well, you know. It’s grown worse in recent years. I’m worried about my eyesight; I’m afraid that it'll get worse and I won't be able to see. And it also scared me that they couldn’t wake me. Suppose they hadn’t found me … On the other hand, who cares?

Do you have any small wounds, infections? And if yes, do they hurt?
- A year ago, I had a superficial burn after an accident at work. It took a long time to heal. The skin was also inflamed for a while. It’s better now. I just didn’t realise my left foot was so close to that gas flame. An employee quickly pulled me away. I have a few small wounds on my feet, they heal slowly; they feel a bit awkward.

7. Self-perception/self-concept
How did things used to be as far as your illness was concerned? / What about your medical history?
- I’ve known about my diabetes since I was twelve. It sometimes bothered me when I couldn’t control it. Things were different in those days. Many visits to the GP, a long time in the waiting room and still not feeling well. And you weren’t allowed to eat the things you liked. Generally speaking, I can handle it better now, although lately I tend to neglect it sometimes. Although I’m aware of that. I’m never really ill and there’s nothing that makes me visit the doctor.

How do you cope with your illness?
- I more or less take care of everything myself. No problem. Perhaps sometimes I’m a bit careless.

Are you properly informed about diabetes?
- I believe I am; after all these years, you think you should know about it. You know what you are supposed to do, but you don’t always do it.

8. Roles/relationship
Can they get along without you at work?
- Sure, for a short time; I have good employees; things at the garage will run their course. It’s a family business. Until recently, I used to run things with my husband. But now I am on my own. Sometimes things get busy, because many financial things need to be done. And I like to lend a hand with the sorting work.

You are on your own?
- Yes, I’m in a divorce procedure. My husband couldn’t stand working in the garage any longer and liked to live in the city... It’s a bit of a long-drawn procedure; but I’d prefer not to say much about it. But, well, alone is still alone, and sometimes I think: ‘why am I doing it?’

**Do you have any social contacts?**
- Plenty, every day; staff and customers. My son is in Aruba, I only see him about three times a year. Pity. I really miss him, especially at times like these. Apart from that, nobody actually. My staff see me as a good boss, I think, although sometimes I can be rather curt and irritated. More so than in the past, though. It’s not easy to get to know new people when you have to run your own business.

**Do you worry about the business?**
- No, economically things are reasonably stable. We have to work hard. Everyone is pulling their weight.

9. Sexuality/reproductive

**Are there any problems, sexually?**
- I miss my husband, from a relational point of view; sexually it’s less important. It was more important to my husband. Our marriage had lost much of its excitement in that area; I didn’t really mind.

10. Coping/stress tolerance

**Do you feel any stress?**
- No, I don’t feel any stress. Sometimes it’s very busy at work but that’s a pleasant activity. I can easily handle the work. At least, if I have the energy.

11. Value/belief

**Do you have a special belief or religious conviction we should take account of?**
- No, I don’t.

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**Preconditions**

For this assignment you will need a study room for a period of three hours and a (student) colleague with whom you get along well. The room should have at least one large table or two small tables and two chairs. Have pen and paper at the ready. You will also be highly inclined to test your diagnostic reasoning in order to improve your nursing care skills.

You should have a case, an assignments guide and an anamnesis interview conducted using Gordon’s framework. The interview provides the case data you will need for the assignments.

**Method**

First read assignments 1 to 5, the case and the script before you start to answer the questions asked in the assignments. Assignment 1 (1a to 1e) is carried out individually, without consulting your colleague (45 minutes). The remaining assignments (2 to 5) are carried with your colleague (45 minutes). This is followed by the plenary discussion afterwards (60 minutes).

For the purpose of this assignment, imagine the following: your colleague has conducted an anamnesis interview with a patient. However, just before your colleague is about to write down the diagnoses, he is called away to resuscitate another patient. You come to see the patient and discover your colleague’s notes. Use the notes that your colleague has written down (in this instance the case with the script) to analyze the case. Since you do not want the patient to have to discuss his case history all over again, confine yourself to the information you have.

The aim of the assignment is for you to use the knowledge you have to analyze the case with a colleague and determine the appropriate diagnoses. You will also analyze what your own diagnostic reasoning skills are and identify areas of personal development that may help you improve your diagnostic skills in your own clinical practice. The starting point is to combine logical reasoning with background information on how to make diagnoses.

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**Figure 2: Instructions for this case study lesson**

In this small seminar session, we begin the lesson by explaining that this is a four part exercise that will be completed over several hours. The lesson involves the analysis of a case history that will be partly dealt with individually and
partly in pairs. To help the lesson unfold we have divided the clinical reasoning activities into five sections, and we prepare in advance some instructions to guide the students to work thoughtfully through each to complete the lesson. These instructions are shown sequentially in Figures 2 through 5. While some of the instructions can be delivered orally, we’ve included them in written form here. Some of the reasoning exercises are done individually, some in small groups and some in the full seminar group.

As we typically have 12 students in the group, we will have six pairs of students. This case study exercise asks students to consider information gathered in an assessment interview. We also explain that there will be time afterwards for the case to be discussed with the teacher and with the full group. During this discussion, the teacher will put critical questions to the students. The teacher will, as it were, act as a catalyst to facilitate the discussion in a Socratic dialogue with the students. The idea is that in the discussion the diagnoses that are being made are substantiated through the students’ responses to this questioning.

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**Background**

Profile: woman; age: 60 years. Admitted to hospital yesterday afternoon, internal medicine ward. At the moment, just after breakfast, out of bed, waiting for an interview with the nurse.

Profession: director-owner of a garage in the region. Works long hours. Tries to take one day a week off but this is not always possible due to pressure of work and demanding customers. Sometimes also lends a hand in the workshop for light sorting work.

Home situation: is in the middle of a divorce procedure, which has been dragging on for a long time. Lives alone in an apartment on the garage premises.

Children: 1 grown-up son, no grandchildren. The son lives on Aruba, the Netherlands Antilles.

Hobbies: reading regional novels or romantic books, diving.

**History**

Diabetes patient (type 1) since the age of 12. It took years for the blood sugar level to stabilise and the proper medication to be prescribed. From her fiftieth, the blood sugar level has been stable. The patient herself believes that she can live with diabetes. She wears glasses. Without glasses she sees only outlines.

Two months ago, in the workshop, she suffered slight burns on her left foot without feeling anything. Fortunately, an employee intervened in time.

**Current situation**

Yesterday Mrs. A. was urgently admitted to hospital after an employee had found her sleeping. He was unable to wake her. The ambulance staff found that she was unconscious and smelled of alcohol.

Today she is calm and clear.

**Additional information**

Patient’s appearance: patient’s clothes are normally tidy but now she looks untidy: buttons are missing, spots on shawl, shoelaces are undone.

Medication used: Insulin (administered with insulin pin twice a day). She controls the dose herself on the basis of the blood sugar level. She admits that she has been rather careless with this recently; yesterday afternoon she did not inject any insulin because she had fallen asleep after drinking three glasses of blackcurrant gin in a short time (something she normally never does).

Appointments with GP: blood sugar checks somewhat neglected recently.

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*Figure 3: The Case of Mrs. A, a patient known to have diabetes*
Work individually to respond to the following questions:

Making diagnoses

1. Using the case and the script, analyse the diagnoses relevant to nursing and write them down as accurately as possible.

1a- Underpin each diagnosis you have made with argumentation;
Write down in just a few words why you believe it to be a diagnosis.

1b- Classify each diagnosis as a ‘potential diagnoses’ or an ‘actual diagnoses.’

1c- For each actual diagnosis, indicate how certain you are about the diagnosis made, using the following symbols:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>++</td>
<td>very certain</td>
</tr>
<tr>
<td>+</td>
<td>certain</td>
</tr>
<tr>
<td>+/-</td>
<td>reasonably certain</td>
</tr>
<tr>
<td>-</td>
<td>uncertain</td>
</tr>
<tr>
<td>- -</td>
<td>very uncertain</td>
</tr>
</tbody>
</table>

Critically reason your choice.

1d- If the case and the script offer insufficient information for you to be certain to very certain about each of these actual diagnoses, what would you do to become more certain about the diagnosis. Write down the answer in a few words.

1e- On the basis of the script, give a value judgement about the quality of the interview with Mrs. A., using the following symbols:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>++</td>
<td>(very well),</td>
</tr>
<tr>
<td>+</td>
<td>(well),</td>
</tr>
<tr>
<td>+/-</td>
<td>(reasonably well)</td>
</tr>
<tr>
<td>-</td>
<td>(moderate)</td>
</tr>
<tr>
<td>- -</td>
<td>(poor)</td>
</tr>
</tbody>
</table>

Critically reason your choice.

Figure 4. Individual analysis of the Case of Mrs. A

The important aspect of this lesson in terms of improving critical thinking skills is the careful questioning in the assignments guide (Figures 4 through 6). Here students are asked to think through the case and the interview, analyze and evaluate their own thinking processes (Figures 4 and 7), comparison with a colleague’s thinking process (Figure 5), engage in collaborative critical thinking to reach consensus on the diagnoses (Figure 6), and evaluate the logical strength of the thinking process through the identification of fallacies (Figure 7).

The assignments guide the critical thinking process, step by step. In each case the students are asked to draw inferences (make diagnoses) based on their assessment of the case data and then to evaluate those inferences. We often ask the students to provide a quality rating or some other type of categorical rating using a 4 or 5 point scale. Sometimes these are peer evaluations and sometimes they are self-evaluations. This rating provides a point for later discussion, but it is not the completion of the reasoning process. In addition they are asked many times to provide the bases for these clinical judgements and ratings. We use a phrase in Dutch that would be translated “Critically reason your choice,” which is the same as asking them to explain their chosen response. We expect them to be fair-minded and thorough in their critique of self and colleague.
2. Exchange of information.
Give the answers with elaboration to the questions 1a to 1e) to your colleague and receive from your colleague his/her elaboration (critique). Carefully read the elaboration of your colleague, make notes, and indicate what things are not clear. First discuss what was not clear. Then write down with your colleague the answers to the following questions.

2a- Where do your colleague’s answers (1 to 1e) differ from your own answers? Give your view on your colleague’s interpretation. Indicate if, compared to your own interpretation, your colleague’s interpretation was more correct or less correct in arriving at the diagnoses.

2b- If there are differences: What according to both of you are the reasons underlying these differences? If there are significant differences in the diagnoses made by more nurses who have had a conversation with the same patient, we use the term inter-assessor variation. Write down examples of inter-assessor variation that arose during your discussion.

2c- Could inter-assessor variation also have any advantages? (For example, multidisciplinary consultation). Does inter-assessor have any disadvantages for the patient? If not, why not, if yes, why? Substantiate your opinion.

2d- What, in your opinion, are the possibilities to reduce the inter-assessor variation?

2e- Give a mark for the work of your colleague, using the following symbols:
   ++ (very good)
   + (good)
   +/- (reasonable)
   – (moderate)
   - - (poor)

This question will also be discussed during the plenary meeting afterwards. Try to be as critical as possible and to substantiate your opinion as carefully as possible.

3. Try to reach a consensus on the diagnoses made

3a- Write down the consensus diagnoses

3b- Write down on what points you reached a consensus and why this was so. (Also write down any differences of opinion that arose during the discussion).

Figure 5. Comparative Analyses of the Case of Mrs. A.
4. Analysis of the diagnostic reasoning

By completing assignments 1, 2 and 3 you have tried to identify as best you can the diagnosis of the patient. One form of reasoning begins with a major theory, generalization, fact, or premise that generates specific details and predictions. This is reasoning from the universal to the particular; that what is true of a class of things is true of each member of that class. It is called deductive because “Deductive reasoning” can be defined as follows: if the facts in the premises are true, then the conclusion must be true. However, we sometimes assume that generalizations are true when they might not be (Wilkinson, 2007).

Give on the basis of the consensus diagnoses two examples of deductive abduction by indicating:

1.  
   - knowledge rule:..............................
   - data:.................................
   - conclusion:..............................

2.  
   - knowledge rule:..............................
   - data:.................................
   - conclusion:..............................

4a- In the theory an explanation was given of “inductive reasoning.”

On the basis of the consensus diagnoses, give two examples of inductive reasoning. Motivate why your example is a case of inductive reasoning.

4b- Analyze the notes that you and your colleague wrote doing the above exercises, for evidence of logical fallacies. If you find evidence that you have committed one of these fallacies, which fallacy is it? Motivate why this is a fallacy.

4c- List a number of examples of the straw man fallacy. Describe any experiences of the straw man fallacy that resulted from the elaboration of the case.

4d- Assess the extent to which you use fallacies in conversations with fellow students, using the following symbols:

   ++ never  
   + rarely  
   +/- sometimes  
   - often  
   - - always

Motivate your choice. If your score is other than: +++, indicate why you use the fallacy. Describe briefly the disadvantages it may have for your patients in the clinical practice if you are not aware of your fallacious thinking.

4e- Earlier inventories show that nurses identify a lack of substantive knowledge and lack of time as the two main reasons for a fallacy to occur when diagnosing in practice. Do you agree with this? Why? Why not? Motivate your answer. Are there any other influencing factors?
5 Evaluation
- Award yourself a mark from 1 to 10 about the quality of the diagnoses you have made and the arguments you have used.
- Also award a mark to your colleague for the diagnoses he or she has made and the arguments used.
- Give a mark for the consensus diagnoses.

Is there a difference between the three marks? Make a note of the reasons why there are, or why there are not.

5a. Given the lesson’s learning objectives, how meaningful did you find the assignments?
Use the following symbols in your answer:
++ very meaningful
+ meaningful
- not meaningful enough
-- completely useless

Motivate your opinion.

5b. To end with the adage: “Look before you leap”
Answer or give your opinion on the following statement:

“A nurse who is expected to identify the problems of a patient in preparing to provide nursing care owes it to the patient to develop diagnostic reasoning skills and should be aware of his or her own potential to commit fallacies.”

++ agree strongly
+ agree
- disagree
-- disagree strongly

Critically reason your opinion.

Figure 7: Final self evaluation

How we evaluate the lesson
All students are asked to make notes during assignments 1 to 5. That includes writing down their individually found answers to each question and the results of discussions with their fellow student (in pairs). These notes are handed in to the teacher together with their (individually) written summary of the plenary discussion after assignment 5. In this summary, the student are asked to analyse if (and if so in what way) their answers to the questions in assignments 1 through 5 have changed as a result of the plenary discussion.

All students receive written feedback from the teacher and we’ve worked to make our feedback consistent across all the members of the teaching professor group. We’ve developed our consensus list of diagnoses which we have included here and which we use to check the conclusions students reach about the case (See Figure 8). We also examine their comments carefully for evidence of their meeting our learning objectives for critical reasoning.
Figure 8: Answer key: Correct nursing diagnoses in diagnostic labels in the aforementioned case:

| Diagnoses (actual physical): | 1) Tiredness. |
|                             | 2) Health negligence OR Ineffective therapy management; |
| Diagnosis (actual psycho-social): | Social isolation. |
| Diagnosis (potential physical): | Risk of injury in event of emotional disturbances, deteriorated eyesight and hypoglycaemia. |
| Diagnosis (potential psycho-social): | Anticipating grief; coping with divorce. Missing loved ones. |

Student feedback on this lesson

Students find this case-oriented, guided critical reasoning method, enjoyable to use. Nevertheless, generally spoken, it is not easy for the most of them. Nurses need conceptual understanding of the reasoning process itself. This tutorial balances conceptual and practical aspects, and that is what students like the most about this method. In a short time students have the experience that critical reasoning is the heart of nursing. Students like to participate in this tutorial because they see directly the progress they make.

One of the students noted down in an evaluation: “Now I can see that there is a connection between rather boring theories about critical reasoning, deduction and induction and what you can do with it when you can use and implement these theories in everyday practice on the ward.”

Another student claimed: “It is sometimes frustrating because the truth is not always what you intuitively think it is. It was one of my traps in thinking I wasn’t aware of. I now experienced that reasoning skills are important. I need these skills before I can note down accurate diagnoses and interventions.”

Another student wrote this note: “Seeking the truth is one of the most important habits. And, I thought, I was good at truth-seeking. Now I’ve learned that in many cases I can look further than I did before. I think I have to, because it benefits the patient in many ways.”

Literature / References:


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