ORIGINAL RESEARCH

What's going on in the clinical examination room?–An exploratory and comparative study of two types of clinical exams and their meaning for nursing students in the final year of the nursing education

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ABSTRACT

This study is an education experiment based on a comparative approach, where two clinical exams – a bedside exam and a written case study exam – are investigated simultaneously. The article explores what's going on in the two exams and how nursing students assess and experience them. Based on these findings, we discuss the types of logics, knowledge, and competencies the two exams enhance and limit, respectively. Data consists of a questionnaire survey with 104 students (56/48), observations of twelve exams (6/6), followed by two focus group interviews with nurse students. The analysis shows that the bedside exam enhances 'knowing-in-action', 'reflection-in-action', 'shows how' and 'does' by its focus on nursing actions. It is unpredictable and promotes 'logics of relational care, care production and care education'. The written case study exam enhances 'reflection-on-action', 'knows' and 'knows-how' by its focus on theoretically based reflections on nursing practice. It is predictable and enhances 'logic of care education'.

Key Words: Nurse education, Clinical exams, Types of knowledge, Competency, Logics, Reflection, Practice situation

1. INTRODUCTION

The modern healthcare system is characterized by increasing complexity, including increasing hyper-specialization, more and shorter hospital stays, and an increased prevalence of patients with chronic illness and multimorbidity. This place demands on nurses' competency since they deal with complex issues that are rarely definite and well-defined.[1] On the contrary, these problems are characterized by value conflicts, complexity, and unpredictability, which require qualified and reflective case-by-case decision-making by healthcare professionals.[2]

Therefore, the goal of the Bachelor of Science in Nursing today is for students to acquire knowledge, skills, and competencies where the ability to continuously develop professional and personal competency and justify and reflect on their own practice is central.[1] To achieve this, the program is designed as an alternating education with different types

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of exams, including clinical exams.

Forms of examination testing clinical competency have been discussed in healthcare education research for several decades.[3] There are several European research studies that investigate, describe, and compare nursing students' competence levels in different types of exams in the final year of study that emphasise different dimensions of nursing. For example, written case exams that emphasise students' theoretical knowledge,[4] various forms of 'in vitro' simulation exams, particularly the widely used Objective Structured Clinical Examination (OSCE) which measures the students' skills,[5,6] oral case-based group exams[7] and various 'in vivo' exams that take place bedside, in real environments, and emphasize the students' non-technical skills and competencies in communication and planning.[4,5] Since clinical examinations ranges from written assignments to bedside observations it shows that there are both theoretical and clinical elements going on simultaneously. According to Michael Eraut (2004) it is important to reflect on the linkage between learning processes, forms of examinations and assessment. He writes, "One of the oldest and most robust findings of educational research is that the assessment is the major influence on what gets learned".[8] To our knowledge, no studies have been conducted that compare the different types of knowledge and competency written case-based exams and bedside exams enhance and limit, respectively. It is important to gain deeper insight into this with a focus on clinical exams in the final year of the nursing degree because it is in the students' final placements they must learn – and show that they have learned - to be independent, professional, reasoned, and reflective in their nursing care in a complex healthcare system.[2]

The purpose of this study is to investigate what's going on in two different formats of clinical exams, how nursing students assess and experience them, and to discuss the types of logics, knowledge, and competencies the two exams enhance and limit, respectively.

2. Methods

In Denmark, the clinical part of nurses' education is concluded with a clinical examination which differs depending on the educational institutions' curricula.[9] The current study tests a new form of bedside exam (the intervention exam) and compares it to the existing written case-based exam form (the control exam). This is an education experiment that is methodologically inspired by intervention studies, where the effect of a given intervention is assessed.[10] It is important to emphasize that the aim is not to obtain context-free, causal, or objective knowledge about the relation between exam type and learning outcomes, but rather, nuanced, and multifaceted knowledge about these relations.

2.1 Design

This study is part of a larger education experiment investigating several aspects of the newly implemented exam format. This study is organised based on an explorative and comparative approach where the two exams are examined concurrently. Both exams test students after completing 20 weeks of clinical training corresponding to 30 European Credit Transfer System (ECTS) points, and the students are tested on the same learning outcomes.[11] As Table 1 shows, the exams are similar in progress, presence of educators and grade voting.[12] The exams are graded using the Danish 7-point grading scale, corresponding to the American grading scale (12/A, 10/B, 7/C, 4/D, 02/E, Fx/00, F/-3).[13]

As Table 1 shows, the differences between the exams are the written assignment, which is only present and central in the control exam, and the number of days between the practical and oral element which is none in the intervention group and a longer time in the control group.

Table 1. Overview of the progress of the intervention exam and the control exam

Exam/ Progress	Performance in clinic	Written reflection	Oral reflection	Finalisation
Intervention exam	*90 min* practical nursing care Present: clinical educator and nursing teacher		*20 min* oral reflection on the nursing care given immediately after the practical nursing care Present: clinical educator, nursing teacher Location: at clinical placement	Receive grade/ feedback/evaluation Present: clinical educator, nursing teacher
Control exam	*4 hours* nursing intervention/ collecting data Present: clinical educator	*2 days* writing assignment Present: 1 hour supervision with clinical educator	*30 min* oral defence consisting of 5 min presentation followed by 25 min discussion of the written assignment (1-2 weeks after the nursing intervention) Present: clinical educator, nursing teacher Location: at education building near hospital	Receive grade/feedback/ evaluation Present: clinical educator, nursing teacher

As part of the larger educational experiment, a questionnaire was carried out with the aim of uncovering different aspects of how students from both exams assessed the changes that had been made, including the way in which the clinical exam was held. The entire questionnaire consisted of a total of 61 items with one item being relevant to this study. The response to this question is included only in the current study and the remaining responses to the questionnaire were used for other research and evaluation purposes. The questionnaire was divided into several themes. Questions concerning the transition from student life to working life were developed based on national and international research literature,[14] while other questions were developed based on the different aspects of the larger educational experiment.

To investigate what is going on in the two types of clinical exams from the students' perspective, the overall questionnaire survey was carried out, as well as observations of twelve clinical exams followed by two focus group interviews with students from both groups.

2.2 Participants and recruitment

A total of 104 third-year nursing students participated in the larger educational experiment. They were in their final clinical placement at a highly specialized hospital. 56 of the students were placed in departments where the intervention exam was tested, and 48 students were placed in departments where the control exam was unchanged. The participants were recruited to the intervention exam through information meetings at the school where they volunteered to try the new exam. The participants in the unchanged control exam were recruited through information meetings when they started their clinical placement.

All participants were asked by email if they wanted to take part in the observational part of the study, and once 12 participants had consented to participate (6 from each exam) the 17 educators who were scheduled to conduct the relevant 12 exams were contacted. After the observations of the 12 exams, the students who had participated were invited to a follow-up focus group interview. 6 students (3 from each exam) consented to do the follow-up interview. The survey, observation, and interviews took place in May and June 2022.

2.3 Questionnaire study

The questionnaire was developed with the purpose of finding out how the students assessed two different final year programs. Included in this questionnaire was one question concerning the extent to which the two clinical exams tested students' clinical competencies. The students' answers to this question will be the focus of the further analysis in the current study. The questionnaire was investigator developed and was therefore not validated, but face validated by 5 students, who gave their feedback on e.g. clarity, comprehensibility, layout and appropriateness for the target group, before distribution of the survey.[15] The questionnaire was created and distributed via Research Electronic Data Capture (REDCap) which is a secure web application for building and managing online surveys and databases.[16] The full questionnaire took maximum 8 minutes to complete. To ensure a higher response rate, non-responders received reminders by e-mail after one and two weeks, and a phone call in the third week.[17] This also served to determine whether students wished to withdraw their consent to participation.

Students answered the questions using a 5-point Likert-type response scale varying from "To a very high degree" to "To a very low degree", including the option of being neutral. Likert response scales provide ordinal data which has the advantage that responses can be presented and analysed based on a predetermined ranking (17). Most of the non-respondents are from the control group and may have had different assessments than those who responded, which is weaknesses of the results stemming from the questionnaire. However, the reasonably large sample size and high response rate is an advantage.

2.4 Observation

Twelve observations were made of the oral parts of the clinical exams by four of the authors. There was one observer per exam. An observation guide directed the researchers' attention, focusing on what was said in the exam room and distinguishing between students' presentations, and questions and answers between students and examiners. Soon after, the field notes were systematically unfolded in three columns: 1) detailed descriptions of what was said in the situation, 2) immediate reflections on what was at stake or possible themes, and 3) thoughts on how the researcher affected, and was affected by the room.[18]

During the observations, the researchers were aware of their 'insider' position. To achieve validity, the observers had no prior knowledge of the participating students and departments. The four observers each observed a few exams using an observation guide, which counteracts subjectivity in the overall data as well as minimizing interrater reliability. For ethical reasons, a minimal participatory role was taken,[19] and the observers left the exam room with the students during the grade voting.

2.5 Focus group interview

After the observations, two focus group interviews were conducted, one with three students from the control group and

one with three students from the intervention group. Focus group interviews are appropriate as a supplementary method to observation because concentrated data can be created at a collective level about the participants' experiences with and perspectives on a given phenomenon – in this case, clinical exams. The participants could thus inspire each other, and the individual's statements were nuanced.[20,21]

Based on the initial analyses of exam observations, an interview guide was developed, and divided into research questions, operationalized questions, and follow-up questions, as shown in Table 2. The themes covered the exam process, the types of knowledge at stake, how clinical competencies were expressed, and the assessment of the performance. The interviews lasted approximately one hour each and took place in a meeting room at the hospital soon after the clinical exams. Each interview was attended by two researchers; one took on the role of a moderator while the other took on a more observational role.[22] The interviews were recorded and transcribed with anonymization of the participants, and the audio file was subsequently deleted.

Table 2. Example of questions from the interview guide

Research question	Operationalized question	Follow-up question
What types of knowledge dominate the clinical exams?	Please talk about the types of questions asked during the oral part of the exam	How was the focus divided between practice and theory?

When conducting focus group interviews, the researchers accommodated the obvious power relations in the room, since they are clinical teachers at the same hospital. The interview was scheduled after exams and evaluations so students did not have to worry about whether their participation could affect their exams.

A common criticism of focus group interviews is that participants influence each other, and consensus can quickly form around something that only one participant believes. To counteract this, the researchers asked directly if others experienced the same thing or had other examples.

2.6 Ethics

The project was approved by the Knowledge Centre for Data Reviews in the Capital Region of Denmark which handles the approval of development and research projects on behalf of the Danish Data Protection Agency. Project identification: J.NR. P-2021-482 and title: NEW.

All participants received written and oral information about their participation in the study which included their right to withdraw their consent at any time without consequences and appearing anonymously or pseudo-anonymously in the presentation of the results.

Half of the authors actively participated in the experiment with the intervention exam. Therefore, it was made explicit to the participants that the study did not favour one type of exam over the other but focused on what the two exams enhance and limit, respectively.

2.7 Analytic strategy

The study includes data from questionnaires, interviews, and field observations and therefore, various analytic strategies were applied.

The results from the questionnaire are presented in the form of descriptive statistics - contingency tables - to provide an overall view of the distribution of the responses between the two groups. This is supplemented with the analytical statistics Fisher exact.[23] Stata 17.0 was used as the data processing tool. The significance level was set at 5%.

The analysis of the observations and interviews was carried out at the same time as the analysis of the questionnaire. Following the observations, the researchers read the field notes separately and met for the initial analysis. Each field description was analysed with a focus on 1) what was talked about in the students' presentations, 2) what was asked and how it was answered in the examination, and 3) what was emphasized in the feedback.

The analysis of the transcribed interviews was first conducted by each researcher separately followed by a collaborative initial analysis inspired by Alvesson (2009),[24] focussing on getting from what is said to what is talked about in the interviews.[20] Several themes were identified and statements that related to a given theme were collected. Thus, the statements were decontextualized from their context in the interview and recontextualized in a thematic context in a circular process.[24]

2.8 Theory

To lift the empirical themes beyond the specific context, a theoretical analysis was conducted.[24] Three theoretical perspectives were chosen to conceptualize which forms of knowledge and competency the two exams enhance and limit, respectively.

2.8.1 *Logics in the clinical part of the education*

Through their studies of nursing students in clinical practice and inspired by Annemarie Mol's concept of The Logic of Care,[25] Sine Lehn-Christiansen and Mari Holen[21] identified three logics that influence students' competence development: 1) The logic of relational care which is rooted in the relationship between nursing and patient and the relational

aspects of nursing care, where students must learn to manage complex care situations and needs 2) the logic of care education which implies that students achieve the predefined learning objectives formulated in educational regulations, and 3) the logic of care production where organizational mechanisms govern the carrying out of care tasks and where nursing students are expected to be included as a work resource.[21] The concepts are used to identify which types of logic are most and least dominant in the two types of exams and how they call for different types of knowledge.

2.8.2 *Reflection and assessment of clinical competence*

In Donald A. Schön's (1983) descriptions of the reflective practitioner,[26,27] three processes are presented: 1) knowing-in-action which are actions carried spontaneously and intuitively based on experience, 2) reflection-in-action which involves competency for exploring and adjusting actions and behaviour in the present, and finally 3) reflection-on-action which occurs after the action and entail critically relating to the action and becoming wiser about future practice.[26–28] These processes are applied to conceptualize which forms of knowledge and reflection the two types of exams enhance and limit, respectively.

In his Framework for clinical assessment, George E. Miller (1990)[29] describes a hierarchical model consisting of a pyramid with four levels of development and assessment of students' clinical competency.[29] Assessment of cognition concerns knowledge and application of knowledge ('knows' and 'knows how') which is at the bottom of the pyramid. Assessment of more behavioural competency at the top of the pyramid involves assessment of competency under controlled conditions ('shows how') and assessment of performance ('does').[5]

3. Results

The results are presented separately: first, the response to the questionnaire is presented, and then, the analysis of the observations and interviews is presented.

3.1 Students' assessment of the two clinical exams

The total number of responses to the questionnaire was 83 out of 104, corresponding to a response rate of 90%. There were 9 non-responders in the intervention group and 12 non-responders in the control group. In relation to the one question about whether the students believed that the internal exam reflected their clinical competency, the distribution, and results of Fisher's exact test were as follows:

Table 3 shows that 18 (38%) students from the intervention group indicated that their clinical competency was assessed "to a very high degree" compared to only 5 (14%) students from the control group. Only a few students from each group (intervention: n = 3, 7%; control: n = 4, 11%) generally assessed that their competencies were tested "to a low degree" or "to a very low degree" but without significant differences.

Table 3. Assessment of the relation between internal exam and clinical competency

Question: To what degree did the internal exam test your clinical competency?		
Response scale	**Intervention exam (n = 47)**	**Control exam (n = 36)**
To a very high degree	18 (38%)	5 (14%)
To a high degree	18 (38%)	16 (44%)
Neutral	8 (17%)	11 (31%)
To a low degree	3 (7%)	3 (8%)
To a very low degree	0	1 (3%)

Notes. Results from Fisher's exact test: $p = .077$.

3.2 The oral element of the two different clinical exams

In the following, the focus will be on what happened in the oral part of the two types of exams. The analysis of the 12 observations and two focus group interviews showed that there were significant differences between the two types of exams. In the following, the empirical themes, "Predictable or unpredictable" and "The weighting between theory and 'the real world'" are presented.

3.2.1 *Predictable or unpredictable*

1) Control exam

The observations of the control group's exams showed that this exam was predictable because the parties involved seem certain of what was going to happen,

Clinical educator: *That's great. You mention Cullberg in the assignment and in your oral presentation. You say that the patient is experiencing a crisis. What considerations do you make about communication in your relationship with the patient?*

Student: *I try to be very open, welcoming and I think about how I present myself. I have mentioned Eide and Eide in the assignment. They talk about verbal and non-verbal communication. There are also many others who say something*

about that. I use non-verbal communication a lot (Field note, Control exam 2).

This fieldnote shows that the questions specifically asked about matters described in the written or oral presentation and the student was ready with elaborate answers that demonstrated general knowledge.

In the interview the students spontaneously talked about the exam as a predictable process. A student said,

"The written assignment is really nice because you can add those little nuggets . . . and you can kind of steer it in the direction of what you would like to talk about" (Focus group interview, Control group, student A).

Another student followed up,

"It was coherent, and she asked me about my assignment, even almost in order. So, I mean, it was very pleasant" (Focus group interview, Control group, student C).

As the quotes show, the students considered it a quality to be able to control and influence the content of both the oral and written presentation. Both the interview with the students in the control group and the observations of their exams showed that the framework and structure of the control exam allowed students to prepare for the oral exam. In the interview, it appeared that in the preparation of the written and oral presentations, they selected and adapted their nursing interventions to the learning objectives. On the preparation for the oral presentation, a student said:

"I think there was a lot to get around considering the semester description . . . So I really just thought I had to make sure to refer to the relevant theory and then rely on the examiners to follow up on some of the things in the subsequent minutes" (Focus group interview, Control group, student B).

The other students agreed,

"It's one of our learning outcomes and we have to include it. And it just seemed a bit like something that needed to be checked off and I just thought that you could have spent five minutes on something more relevant to the patient . . . it would have been more coherent" (Focus group interview, Control group, student B)

The above quote suggests that the students in the control group, despite being able to make the exam situation predictable by structuring and adapting their written and oral participation felt that not all exam criteria were relevant to their patients' treatment trajectory. The focus on 'checking off' the learning objectives and fulfilling the oral requirements of the exam affected their experience, so that relevant elements from the nursing interventions the first, clinical part of the exam process receded to the background during the oral defence.

2) Intervention exam

By contrast, the field observations of the exams in the intervention group showed that the practice situations preceding the oral element were unpredictable. The following excerpt illustrates a situation where something unexpected happened,

Clinical examiner asks: *You had a plan for the patient. How did it go?*

Student replies: *At first it went well. . . Then the blood tests came and suddenly it went fast. In terms of clinical leadership, you have to adjust and prioritize tasks, but when you're not used to things moving so quickly then. . . I had to prioritize a-gas and blood tests over various other things.*

Clinical nurse educator: *What was useful to bring to the ward round?*

Student: *The diuresis and fluids during the night and the vitals that I managed to take so they were ready.*

Clinical nurse educator: *Why did you think that?*

Student: *These are indicators for detection and good to be able to tell the doctor. And the patient got dizzy. . .*

Clinical nurse educator: *Yes. . . Tracking in relation to, for example, what?*

Student: *Yes, in relation to thinking about bleeding, for example, and the low blood pressure.* (Field note, exam 1)

The field note shows that the student had been faced with a situation that developed into a critical situation during the clinical part of the exam, which is why the student had to reprioritize and act quickly on the patient's symptoms. In the interview, the student said:

"I was in a situation I had never been in before [. . .]. It was a very strange situation when [patient trajectories] usually go pretty well according to plan." (Intervention group, student E).

Here, the student explains how the test is conducted according to the clinical practice, where planned nursing interventions risk having to be changed dramatically. This unpredictability and changed opportunity to act independently seemingly makes it difficult for students to be assessed because they do not know what is expected of them.

However, several students emphasized that their knowledge of the patient's treatment trajectory and workflows in the wards provides good opportunities to control the situation in other ways and prepare possible nursing interventions, even if they do not always know the specific patient or situation in advance. For example, a student said:

"[. . .]in the two wards we've been on. There you can better plan in advance and the treatment trajectory that come up are very similar [. . .] but when you have gone through some treatment trajectory, you do have an idea of what is going on, what usually happens. Although you may not know the

patient completely [. . .]" (Intervention group, Student F).

Here the student talks about how in an unpredictable clinical practice, where you do not know exactly what is going to happen, there is still a certain kind of predictability in relation to knowledge of the practice as it usually is. The intervention exam can thus be said to give the students the opportunity to show what they know about common practice and their role in it, and how they, based on this knowledge, improvise in the various situations that occur.

3.2.2 *The weighting between theory and 'the real world'*

1) Control exam

Both types of exams aim to test the clinical competencies of the students, while the standardized and general learning objectives were the formal framework for the exams. The analysis of the observations of the control exams showed that the nursing interventions, which are the basis of the written case-based parts were rarely discussed. Here is an example of a typical exam dialogue,

Clinical examiner: *You write in the assignment that you work from the perspective of Family-Centred Care. First, I would like to hear about the theoretical approach and then how it is expressed. [. . .]*
Student: *It means involving the patient and family in the care. There is a focus on relationships and communication. There are three different types. One where you are levelling with each other as family and nurse. One where there is collaboration. This is the most common. Where the nurse and family manage the process through collaboration. The last one I can't quite remember [. . .]* (Field note, control exam 3)

In this excerpt, the student explains a theoretical concept that she has used in her written presentation. Several observations of control exams showed that students were asked about concepts and conditions that were described in the written presentation of the practical situation and they answered these with theoretical concepts. This was also the student's experience,

"[. . .] I also had a pain problem, okay, but "how do you treat pain in children?" You know, more of the theory I had used in my assignment [. . .] It wasn't so much the intervention itself, but it was more the theory behind it" (Control group, student B).

It appears that it is "the theory behind" that is in focus here, which is not experienced as a problem by the students, because they expected this from the exam. However, it did appear that this writing of nursing can lead to challenges during the exam itself. A student described the following example with the male patient she had written about,

"[. . .] he [the patient] didn't want to bother the staff, but it was as if she [the examiner] understood it as [. . .] him having dementia. And then she just very much followed that direction [. . .]" (Control group, student A).

The student describes a misunderstanding during her exam. One of the examiners attributes a diagnosis to the patient that was not present. The example illustrated that misunderstandings can arise because the oral element is based on two parts: a nursing intervention and a written description thereof – especially when the examiner has not witnessed what happened during the nursing intervention. This had an impact on the student's experience of the exam process, which the student described as "*less coherent*." (Control group, student A).

2) Intervention exam

The analysis of the observations of the intervention exams showed an almost opposite focus. The students were primarily asked about what happened while they were carrying out nursing. The field note below is an example of this,
The examiner from the school asks: . . . *How would you assess the patient's resources?*
The student answers: *What can she do herself, what relations does she have, how is she habitually compared to now. She really wants to do it herself, and I consider that a strong recourse. She wants to go through this.*
Clinical examiner: *OK, good resources. Did you activate them?*
Student: *I tried to stand in the background – let her get dressed herself. Yesterday I helped her walk more, today I let her do more herself. I activated what she can do herself. A small sub-goal can be motivating to get through. I asked about her relatives who come every day.* (Field note, Intervention exam 2).

As the example illustrates, the examiners' questions were characterized by being situation-specific and relying on the nursing care the student and the examiners took part in, which the students agreed was positive. In the interview a student said,

"You were allowed to act independently in a room . . . you were allowed to make clinical decisions and be able to articulate your considerations . . . Instead of simply writing what you would do. But I think standing in front of a patient has more impact when you have to make a decision . . . I think it's been really cool" (Focus group interview, Intervention group, student D).

As the quote illustrates, the opportunity to act independently in an authentic space and be assessed for the nursing care provided mattered more to the student. Although the questions asked in the oral part were predominantly about the

nursing care carried out, knowledge of a more theoretical and general nature was also requested, as seen in the example here,

Clinical examiner: *What bleeding observations can be done?*
Student: *Other than alteration in the flush of the face, mouth, nails, and palms due to reduced blood flow . . . I can look for dizziness and maybe pain. I hadn't given her the painkiller and suddenly she was about to fall over* (Field note intervention exam 1).

The question insinuates a theoretical or general approach to bleeding observations because the phrasing is 'observations' in plural and 'can be done'. In other words, general and universally applicable. The question was in this case answered based on the specific patient situation.

Although the observations showed that the focus was predominantly on situational and specific nursing in the oral part of the intervention exam, the interview revealed that the students still experienced the exam room as theoretically controlled. Several students emphasized a difference between what happens in practice and the focus of the educational institution, and how this difference can be difficult to navigate during the exam. A student said,

"It's also difficult because what are the consequences if you do it exactly by the book and the patient is then delayed in their treatment . . . we are dealing with living people. It's not just some clinical trial with a dummy in a room . . . people are really invested in this and carry their feelings with them" (Intervention group, student D).

The quote shows that the student felt a special responsibility to ensure that patients also feel seen and prioritized in a fast-paced clinical environment, and that complex issues can quickly arise that require action that does not always follow what is written in books and guidelines. Referring to this point, the student also notes that *"in everyday life, things just roll on different wheels"* (Intervention group, student D).

In summary, the empirical analysis of students' assessment and experience with the two types of exams is shown in Table 4.

Table 4. Overview of similarities and differences between the two exams

Similarities in the two exams	**Differences between the two exams**	
	Intervention exam	**Control exam**
There are no statistically significant differences between students' responses to the association between the clinical exam and clinical competency (p = .077)	38% indicated that their clinical competency was assessed "to a very high degree"	14% indicated that their clinical competency was assessed "to a very high degree"
	Unpredictable Focus on the specific nursing practice Practice-directed	Predictable Focus on general theoretical terminology Directed by learning objective

4. Discussion

4.1 The control exam: educational logic and theoretical knowledge in focus

Even though the structure of the control exam contains both clinical, written, and oral elements, the actual practice situation is pushed into the background. In the perspective of Moll's concepts of logics of care, the control exam room can be said to be dominated by the logic of care education,[21] which is characterized by the clinical aspect being pushed into the background and the high value of being able to account for one's knowledge and reflect using theory. The logic of care education also involves the students expecting the exam to progress in a certain way and patients mostly being referred to as cases during the oral part of the exam. Therefore, the students have limited opportunities to show that they can act and reflect on several levels in relation to the situation they have been in. Perhaps this is also indicated in the questionnaire responses since 11% of the students in the control exam responded that the exam tested their clinical competency "to a low degree" or "to a very low degree" and 31% responded "Neutral" to the question. However, the control exam creates the opportunity for students to retrospectively reflect on their actions, both in writing and orally, using theoretical concepts and making suggestions on how practice can be developed. This type of reflection leans on Schön's (1983) concept of reflection-on-action where the action performed is considered and reflected upon retrospectively, and new understandings of the action are explored.[26]

In considering Miller's (1990) framework for clinical assessment it appears that the control exam predominantly presents the students with the opportunity to show their clinical competency within 'knows' and 'knows how', since the practice situation where the student 'shows' or 'does' nursing seem disconnected, and the examiner did not participate in the nursing intervention/clinical element of the exam.[29] Hence, the control exam provided limited opportunities for students to show how they make clinical decisions in specific practice

situations and reflect on their actions while doing so. This means that the processes Schön (1983) describes as knowing-in-action and reflection-in-action, where the more intuitive actions are carried out and where students reflect and adjust their actions and behaviour in unpredictable practice situations, become almost impossible to recall in the exam room.

4.2 The intervention exam: everyday practice and nursing care in 'the here and now'

When students in the intervention group describe the complex and unpredictable everyday life where "everyday life roles" and it is "living people" they are dealing with, they refer to the logic of relational care, where the relational aspect of nursing care is in focus, but at the same time they also refer to the logic of care production, where care is provided in a qualified, cost-effective, and standardized way.[21] The intervention exam attempts to embrace the students' everyday life by placing the exam in the clinic and focussing on the students' clinical performance of nursing care in specific patient situations. According to Miller's (1990) framework it could be suggested that the student's competency in shows how and does[29] contribute to the overall assessment in the intervention exam. This opportunity may even be reflected in the questionnaire responses where more than 70% of the intervention group responded that their clinical competency was assessed " To a high degree" or "To a very high degree" in the exam. During the clinical part of the intervention exam, the students reflect out loud and involve the examiners in their thoughts and considerations, both in their relationship with patients and relatives, but also in their collaboration with nurses and interprofessional partners. Here, Schön's (1983) concept of knowing-in-action can be seen as the knowledge that is implicit in the students' actions and that allows them to demonstrate the quality of the care, they provide.[26] At the same time, it also becomes clear that reflection-in-action occurs when the students in the intervention exam describe how everyday life is unpredictable when they have to use their knowledge to adjust their actions and care, for example in relation to the patient's current condition or the organizational framework.

As the analysis shows, the students are faced with the dilemma of having to demonstrate their skills and theoretical knowledge in a clinical exam in a complex clinical reality where guidelines are not always followed to the letter, and where they feel a responsibility to meet the needs of patients and make everyday life run smoothly. This can be explained by the fact that there are several overlapping care logics at play, which makes it challenging for students to understand what is expected of them. They express that it is a difficult transition from the clinical part to the oral part of the exam, where they are expected to justify their nursing care, and where the logic of care education is clearly dominant. Relating their nursing care to theory shortley after completing the clinical part of the exam affects the students' reflection. It stays on a specific level, with references to the patient process and the specific actions the students have just taken, without much theoretical underpinning, which is the basis for reflection-on-action. Thus, the intervention exam does not create opportunities for the students to prepare and think the situation through to such an extent that they can theoretically justify and reflect on their nursing care (see Table 5).

Table 5. Overview of logics, reflection processes and competency in the two exams

	Control exam	**Intervention exam**
Dominant logics in the exam	A single logic is dominant The logic of relational care and the logic of care production are present, but the logic of care education is the most dominant - The practice situation is distant and has been adapted to written format according to the exam criteria and learning objectives. The patient is a case.	Overlapping logics are dominant The logic of relational care and the logic of care production - Practice-oriented rationale: feel responsible for patients' needs and make daily work run smoothly. The logic of care education - Education-oriented rationale: learning objectives controlling in the oral element
Dominant reflection processes in the exam	Reflection-on-action - Reference to theory but specific, situational 'in-action'-elements are difficult to recall	Knowing-in-action Reflection-in-action - Specific and situated reflections without much reference to theory
Competency assessed in the exam	Knows Knows how - Examiners assess based on written and oral performance	Shows how Does - Examiners assess competency based on the clinical nursing care given

4.3 Clinical exams in nurse education

The two exams create different opportunities and limitations for students to demonstrate independence, professionalism and reasoned reflective nursing care in clinical practice. The strength of the control exam is its focus on students' ability to theoretically argue for nursing, which some studies find important because it supports students to reflect deeply and think outside the box.[4] The strength of the intervention exam is its focus on students' ability to do nursing in an unpredictable and complex practice context, which other studies find is particularly important to support the ability to form relationships and collaboration.[5]

The exam should be chosen depending on the preferred outcome.[5] Today, several exams during nursing education are theoretical,[30] where the logic of care education focuses on students' demonstration of theoretically based knows and knows how in reflection-on-action. Therefore, it is arguably an advantage to implement an exam during the educational process that has the character of the intervention exam, where the logic of relational care and the logic of care production focus on the students shows how and does through knowing-in-action and reflection-in-action as it unfolds in a complex clinical practice. Nursing students should learn complex problem-solving which occurs within a context characterized as dynamic and ambiguous[2] and competencies within professions should not only be understood as skills and knowledge but should also include becoming a member of the professional group and becoming a thoughtful, independent, and responsible professional with competencies the intervention exam makes it possible to unfold.[31]

However, the analysis suggests a potential for developing a clinical exam with transparency in terms of which logic is at play to accomodate students' expectations and provide the opportunity for them to demonstrate both their ability to act appropriately in practical situations and argue theoretically. Both are important – especially because the exam is co-constituting what is learned.[8]

4.4 Strength and limitations

Answers to one question from a questionnaire, observations of the exams, and focus group interviews were used, creating nuanced knowledge about what's going on in the two exams including how nursing students assess and experience them. However, it is a weakness that the research is carried out the first time the invention exam was tested, where both students and examinators are unfamiliar with the format. Furthermore, it is a possible bias, that half of the researchers were engaged in the development of the intervention exam. To counter this, and to gain transparency and credibility, all authors, including a researcher from another institution, participated in the selection of quotes and key field notes, thematization and empirical analysis after data collection.

It is a strength that the theoretical perspectives were chosen after the empirical analysis process because the theory did not deductively guide the empirical analysis but conceptualized the empirical themes. The chosen theories have different epistemological starting points and thus complement each other. While Lehn-Christiansen and Holen's theory focuses on the institutional context for learning in clinical practice, Schön and Miller present a more individually focused understanding of this – thus giving nuanced knowledge about the types of logics, knowledge, and competencies the two exams enhance and limit, respectively.

5. Conclusion

The study shows what's going on in a bedside exam and a written case study exam, how nursing students assess and experience the exams, and the types of logics, knowledge, and competencies the two exams enhance and limit respectively.

The control exam enhance reflection-on-action, knows and knows how by its focus on theoretically based reflections on, and argumentation for, nursing practice at a general level. Students experience the control exam as predictable and assess that it tests their clinical competency to a high degree but that it is directed by the learning outcomes thus limiting the practice situation. This exam format promotes the logic of care education and limits the logic of relational care and the logic of care production.

The bedside exam enhances knowing-in-action, reflection-in-action, shows how and does by its focus on specific nursing actions in interaction with patients, their close relations and other healthcare professionals in a complex practice. Students find this exam format unpredictable and believe that it tests their clinical competency to a very high degree but find it difficult that the exam changes mode in the oral element, where learning objectives demands theoretical argumentation. This exam format promotes both the logic of relational care, the logic of care production and the logic of care education, where the latter is somewhat weakened compared to the control exam.

Since the way we organize clinical exams influences what students find important to gain competency in, there is a potential for developing a future clinical exam form where nursing students both can show how to act adequately in a complex, unpredictable and changing practice, and at the same time reflect on practice and argue theoretically for their nursing care.

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