ORIGINAL RESEARCH

Self-directed learning in nursing education-What do the students do to learn nursing? Student perspective

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ABSTRACT

This article reports on a Danish research project investigating nursing students' initiatives to learn nursing. There is an international focus on nursing students' competencies to learn Self-Directed so that they can continue to develop their nursing competencies to provide patient-centered care and meet the demands of the ever-developing healthcare system. The aim was to investigate nursing students' learning initiatives to learn nursing and to realize learning areas in which further support is required to develop students' Self-Directed Learning ability. A phenomenological-hermeneutic approach was taken. The participants comprised a class of nursing students, who we followed throughout their 3.5-year Bachelor's Degree Programme in Nursing. The data were generated by narrative interviews and a survey about students' learning initiatives. Three themes emerged: learning by preparing, learning by writing, and learning in interaction. Most students initiated learning activities based on their learning abilities, their life circumstances, and the learning resources available. The Self-Directed Learning ability varied among students, and a few needed external motivations and more supervision than they got to achieve competencies to learn self-directed. This study provides knowledge about nursing students' self-directed learning initiatives and uncovers some areas to consider when planning to facilitate the development of Self-Directed Learning among nursing students. Faculty may consider how to allow more time for supervision and how to encourage nursing students' motivation to develop Self-Directed Learning ability, so Self-Directed Learning ability can increase among all nursing students.

Key Words: Self-directed learning, Nurse education, Student perspective, Qualitative research, Narrative interviews

1. INTRODUCTION

The Danish Bachelor's Degree Programme of Nursing[1] complies with the European Qualifications Framework,[2] which includes knowledge, skills, responsibility and autonomy. Responsibility and autonomy are described as the ability of the learner to apply knowledge and skills autonomously and with responsibility. Thus, achieving competence to learn self-directed is crucial to becoming a nurse. Self-Directed Learning (SDL) competencies enable nurses to life-long learning to render high-quality nursing in the ever-developing healthcare system.[3] At a Danish University College, we wanted to investigate how responsibility and autonomy emerged among students, and which SDL initiatives they took to learn nursing competencies.

Background

There is an international focus on nursing students' level of SDL[4] and on the factors that can improve nursing students' SDL competencies.[5] Knowles[6] saw adult learners as independent and experienced learners, who had internal incentives and curiosity to learn. He described SDL as a process, in which learners take the initiative, with or without the

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help of others, to diagnose their learning needs, set learning goals, identify human and material resources for learning, choose appropriate learning strategies, and evaluate learning outcomes achieved.[6,7] Even though nursing students are often between 20 and 40 years of age, lecturers need to bear in mind that students' level of ability to manage SDL varies,[8–10] and there seems to be no relation between the ability to manage SDL and semester level.[11] For these reasons, previous studies suggest[4,8,12–14] that lecturers should facilitate nursing students' learning of SDL competencies.

Several studies have described different strategies to facilitate nursing students' SDL: Yeo and Jang[15] found that working with self-directed problem-solving in a web-based virtual simulation activated students' metacognition and that they learned from failure, became aware of their learning needs and achieved a more holistic understanding of nursing. Kang, Hong, and Lee[16] found that, after virtual simulation, students significantly improved their ability to gather resources for learning, and scored high for improved assessment skills. Agea et al.[17] facilitated learning in high-fidelity simulation rooms mediated by problem-based learning, peer learning, and SDL. After the simulation, the students responded that they achieved deeper knowledge, that they were more active and motivated in the cooperation, that they felt responsible for their learning, and considered the facilitators to play a secondary motivating role.

Huang et al.[12] found that SDL ability and critical thinking ability affected nursing students' problem-solving ability positively, and the association of learning engagement with problem-solving ability was influenced by the mediating effects of SDL ability and critical thinking ability. Hwang and Oh[18] found that the direct and positive effect of SDL on problem-solving ability was statistically significant. Millanzi, Herman, and Hussein[19] found that nursing students scored significantly higher on SDL ability after a course that included problem-based pedagogy. Wang et al.[20] found a statistically significant improvement in students' SDL, self-management, and ability to cooperate after cooperation in a small heterogeneous group. Rezaee and Mosalanejad[21] used a strategy with cases and problem-based learning and increased the students' SDL significantly.

Noh and Kim[22] provided evidence that an SDL programme using a mix of online and offline coaching improved nursing students' SDL competency. Shin et al.[23] concluded that self-directed learning is a method to significantly improve nursing students' competency in physical assessment during clinical practice. Oh, Huh, and Kim[24] validated the effect of learning contracts and found that students scored higher for SDL ability, problem-solving skills, and communication skills.

Other studies investigated the relationship between SDL and a series of other core competencies that have an impact on learning. Berdida[25] combined academic motivation and resilience and found that, the higher the level of resilience and academic motivation was, the higher the level of SDL ability among nursing students. Adib et al.[26] investigated academic motivation and found a significant positive relationship between SDL and academic motivation. Jin and Ji[9] found positive correlations between metacognition, SDL, and critical thinking. Arkan, Avdal, and Sari[11] examined the relationship between students' fundamental appraisal of themselves and how ready they were for SDL. They found that students with high levels of internal appraisal were more ready for SDL. A study by Lee, Kim, and Chae[14] indicated that the professional nursing values of undergraduate nursing students could be reinforced by implementing a self-directed learning strategy. Ojekou and Okanlawon[27] evaluated nursing students' readiness for SDL and their learning outcome of a 6-week course using SDL strategies. They discovered that a higher level of readiness for SDL resulted in a significantly higher level of learning outcome.

As we found no research focusing on nursing students' initiatives to take responsibility to learn nursing, this study aims to investigate nursing students' initiatives to take responsibility for their learning process and to discover learning areas, in which further support is required to develop students' SDL competencies in the Bachelor's Degree Programme of Nursing.

2. METHODS

We applied a phenomenological-hermeneutic approach,[28,29] as we previously found the interpretation of narrative interviews with nursing students appropriate to create knowledge about students perspective.[30–32] Thus, also appropriate for creating knowledge about the students' initiatives to learn and to discover areas for further support to develop students' SDL competencies. Data were generated by following a class (n = 47) during the Bachelor's Degree Programme of Nursing, from September 2019 to January 2023. In Semester 1, the students were introduced to the research study and guided to reflect on their learning styles, learning experiences, and how they could take responsibility for their learning process. In each of the seven semesters, there are both theory courses and weeks in clinical placements. Each time there was a shift from theory to practice, we emphasized the importance of reflecting on one's own learning needs and planning how to achieve the objectives of the semester.

After the first year, eight students volunteered to participate

in a narrative interview, carried out by the first author. One interview was an individual face-to-face interview. Due to the COVID-19 pandemic of 2020, seven of the students were interviewed online in two focus groups, while sitting apart each at their computer with the camera on. At all three interviews every single student was asked: "Please, tell me about your initiatives to learn nursing". The purpose of asking the students at the focus-group interviews the same question one by one was to minimize the difference between individual and focus-group interviews. Based on students' learning initiatives (SLI) mentioned in these interviews, in SurveyXact, we created a SLI survey with 42 learning initiatives to learn nursing. SurveyXact is an online survey programme, which has been made accessible by Aarhus University, Denmark. Blank lines were included, where students could add learning activities not mentioned in the survey. Aiming to get an impression of the most common initiatives, to find out if there were learning activities not mentioned in the survey, and to uncover whether there were activities which needed more facilitation the survey was distributed to the whole class. To the survey questions, the students could anonymously respond with: often, sometimes, seldom, or never. In their final year on the programme, we wanted to interview the eight students again, to follow up on the first interviews and identify any development in how they directed their learning process. Two students were omitted, due to a change of campus and leave. Six students were interviewed for a second time, and one student was interviewed for the first time. So, seven narrative individual interviews were carried out by the first author. The students were asked: "Please, tell me about your initiatives to learn nursing now".

Data from the SLI survey was analysed by SurveyXact. The interviews were recorded and transcribed verbatim. The transcribed interviews were interpreted on three levels, following Ricoeur's interpretation theory.[28,29] At first, the texts were read and re-read by the authors separately, followed by a discussion to reach a consensus on the holistic impressions of the texts. After the structural analysis, the emergence of themes was discussed until consensus. Finally, the themes were critically interpreted and discussed with previous research and theory.

Ethics

By way of introduction, the Head of the School of Nursing agreed to carry out the project, and the students were informed about the project. All interviewees were given written and oral information before the interview, including the assurance of anonymity, confidentiality, and the possibility to withdraw participation without any adverse consequences for their education. The students volunteered to participate, and they were anonymized with new names by the first author, as she had no other relations with the interviewees than to interview them. The other authors were involved with the students as supervisors. As no personally sensitive data were needed for the project, and there was no health risk to the participating students, there was no requirement for notification to the National Committee on Health Research Ethics.[33] The project was carried out according to the Ethical Guidelines for Nursing Research in the Nordic Countries[34] and the Danish Code of Conduct for Research Integrity.[35]

3. FINDINGS

3.1 Results of the SLI survey

Table 1 shows the class (n = 22) responses to the survey about the students' learning initiatives (SLI).

Demographics: Of the responding students (n= 22), there were two men and 20 women. Mean age 24 years [21-31 years]. Below, the percentage of responses on the SLI survey forms part of the thematic analyses, where relevant.

The naive reading of the narrative interviews after the first and third year, respectively, gave the impression that students took the initiative to apply learning activities based on their learning abilities, their lives, and some of the available learning resources. After the structural analyses, three themes emerged: learning by preparing, learning by writing, and learning in interaction. Below, each theme is developed further, and the quotations are condensed to clarify the meaning. There are quotations from both the first and third years of the education.

3.2 Learning by preparing

Students experienced learning by preparing in both theoretical and clinical courses in several individual ways, and Table 2 illustrates the structural analysis that led to this theme.

Cath (year 1) prepared by reading the syllabus and writing notes before the lectures. In the lectures, she asked questions to probe her understanding of the current subject. This was because she experienced that putting into words what has to be learned was the best way to remain concentrated and learn during the lectures. Bera (year 1) didn't prepare unless the class was going to discuss a text as the starting point of the lesson, as she related: "I learn very fast, and if the lecturer presents a theory, I already had read I will be bored. I only read afterward, if there are parts of the subject, I don't understand". Of the students who responded to the SLI survey, 36% often and 59% occasionally read before the lectures. In contrast, 18% often and 41% occasionally read after the lessons. Apart from Bera's explanation as to why she did not read beforehand, other students explained that there was often a large number of pages to read from day to day, so they were unable to read it all before the lectures.

Table 1. Class responses to the SLI survey

No.	Learning initiative carried out	Often %	Occasionally %	Seldom %	Never %
1	Listening during the lectures	77	18	5	0
2	Actively participating in the lectures	36	55	14	0
3	Running/moving while listening to online learning tools using headphones	9	27	50	23
4	Reading before the lectures	36	59	9	0
5	Reading after the lectures	18	41	32	9
6	Highlighting parts of the text	18	45	23	14
7	Writing notes	50	45	5	0
8	Reading/re-reading the lecturer's notes	55	27	18	0
9	Delving deeper into a text about a specific subject	23	41	36	0
10	Asking questions to the lecturer	27	64	9	5
11	Asking another student to explain	36	64	0	0
12	Talking about learning subjects with someone outside the University College	50	45	5	0
13	Explaining or presenting a subject to others	32	45	23	0
14	Peer learning in the study group	50	36	14	0
15	Peer learning outside the study group	27	27	45	0
16	Exercising skills - hands-on practice	55	41	5	0
17	Mutual oral reflection	41	50	9	0
18	Written reflection	5	59	36	0
19	Linking theory to practice in theory and practice	59	32	14	0
20	Learning by gaming	9	9	45	36
21	Quizzing to learn	9	32	36	27
22	Drawing - i.e. anatomy & physiology	27	36	32	5
23	Answering study questions	23	50	32	0
24	Asking for feedback from the lecturer	23	64	14	0
25	Asking for peer feedback	0	36	59	9
26	Asking for feedback from the preceptor	27	64	9	0
27	Giving peer feedback	5	45	50	0
28	Beginning to learn by my preferred learning style	27	45	27	5
29	Challenging myself to learn in a different way than the preferred one	9	32	55	5
30	Observing how to do skills	55	36	9	0
31	Asking for a demonstration of how to do skills	50	50	0	0
32	Picture a situation or intervention for yourself	14	68	18	0
33	Asking for supervision from a peer	14	50	36	0
34	Asking for supervision from a lecturer	32	64	9	0
35	Asking for supervision from a preceptor	18	64	23	0
36	Planning - Forming a general view of what has to be learned, and by when	55	41	5	0
37	Learning by e-learning tools: videos	23	50	27	0
38	Learning by e-learning tools: PowerPoint presentations with speech	14	41	36	14
39	Learning by e-learning tools: PowerPoint presentations without speech	32	45	27	0
40	Listening to podcasts	9	36	36	18
41	Learning by heart	14	55	32	5
42	Cutting down on socializing	0	36	45	18

Table 2. Illustration of the analysis – Theme: Learning by preparing

What is said? **Quotations - units of meaning**	**What is talked about?** **Units of significance**	**Theme** **subthemes**
I read the syllabus and make notes before lessons. I try to participate actively in the lessons, as the more I put it into words the better I understand (Cath, year 1)	How and why to prepare and learn before lectures	Learning by preparing Reading & writing notes beforehand
I don't read but I come to the lessons. If I don't understand, I read afterward (Bera, year 1)	No preparation but reading difficult parts afterward to understand	Reading afterwards
I need to make notes. I spent a lot of time writing notes. Sometimes I couldn't make head or tail of it (Lis, year 1)	Focused more on making notes than reading the syllabus while preparing	Writing notes
I became better at also noting the references, so now I benefit from my notes. It was not a waste of time (Kitt, year 3)	Ended up benefitting from her notes when writing assignments	Writing notes
Often, I run and listen to audiobooks or videos with speech (Kate, year 1)	She can't sit still to learn, so she runs while listening to online learning tools	Listening while running
I draw to understand. I put the drawings on my refrigerator and when guests ask what it is, I try to explain to them (Kate, year 1)	Drawing and explaining as initiatives to learn	Drawing and explaining
I listen to podcasts and look at animations as a supplement to reading, as it helps me to remember (Mike, year 3*)*	Learning mediated by online learning tools	Using online learning tools

Of the respondents, 50% often and 45% occasionally wrote notes. In the first year, students wrote notes to remember what they read. Lis (year 1) responded that she felt she needed to make notes and spent a lot of time writing notes. When she focused too much to note every point, her notes got too comprehensive and she lost the impression of the essential message of the text. In the beginning, Kitt (year 3) also had difficulties prioritizing and limiting what to note. Still, after a while, she benefitted greatly from her notes, both in clinical placements and when doing assignments, as she remembered to have notes about all the subjects and was able to find them and their references again. The students organized their notes in the digital note-taking app, Microsoft OneNote, and agreed that adding references was very fruitful when they wanted to return to their notes again. Of the responding students, 9% often and 27% occasionally moved while preparing. For instance, Kate (year 1) didn't let dyslexia stop her from learning. She used to run when listening to audiobooks or videos with speech. When she returned from her run, she would make drawings of the subject and benefit from explaining the drawings to others. Drawings seemed often to be a meaningful way of learning (often: 27% and occasionally: 36%), while 32% often and 45% occasionally took the initiative to explain to others to learn. Another creative way to prepare was presented by Nina (year 1), who made quizzes about learning subjects, as 9% of students often did. Kate (year 1) played games about nursing, as 9% of students often did. Mike (year 1) used sticky notes on which he would write a text about the anatomy and physiology of the heart until he had learned it by heart. Of the students, 14% often and 55% occasionally strived to learn by heart. Mike (year 3) said that he listened to podcasts and looked at animations as a supplement to reading, as it helped him to remember. Table 1. shows that students prepared often or occasionally by employing a range of online learning tools (no. 37- 40) primarily made available by the lecturers. Thereby, students benefitted from using the tools again and again, until they remembered and understood.

The students' wide range of initiatives to prepare in accordance with their learning experiences and abilities indicates that students took responsibility for identifying learning resources and choosing learning strategies, which are important elements in SDL. In the interviews, when asked directly about their study intensity in general, they estimated that their efforts to learn were on a level from average to high – especially high before exams. So, when 36% of the students occasionally cut down on socializing in eagerness to learn, it might be due to the exams.

3.3 Learning by writing

From the beginning, some students knew that they learned by writing. Still, a number of students needed more time to realize that writing could be used as a learning strategy. Table 3 is an illustration of the structural analysis that led to this theme.

Bera (year 1) found it irritating to write reflections, as she felt it was a slow process. Still, she was aware that her difficulty explaining a subject clearly in writing was because she had an insufficient understanding and a need to delve into the subject again and learn more. Thus, she identified learning needs mediated by writing. This is a very important part

of self-directed learning, as it is important to be aware of what you don't know to be able to seek and acquire more learning. Kitt (year 1) is one of the 5% of students who often reflected in writing. She wrote about her experiences systematically, to reflect and learn the practice in a nursing home. She linked theory to practice like 59% of the other students, as it kept her in a learning process. Like 36% of the responding students, Gina (year 3) didn't write much, as she had a feeling that she learned more by oral reflections. Nevertheless, when there was an assignment as an external motivation, Gina admitted to learning a lot by writing, as it led to linking theory to practice. Nina (year 3) just wrote her experiences straightforwardly, and added her reflections, to learn. She also saw her written reflections on practice as a preparation for a joint oral reflection with another nurse student and their preceptor. Re-reading former written text after joint reflection led to additional reflections. In the first year, Lis wrote because the preceptors asked her to. During the learning process, she discovered that writing mediated her learning; therefore, later, Lis reflected by writing every week. The written reflections also became a comprehensive preparation for the exam, which made the exam less stressful. During the first-year interview, Ann said that she had benefitted from a written individual study plan, especially when she and the preceptor went over the objectives to identify, what Ann needed to practice more and what she had achieved. After her last clinical placement, Ann (year 3) said that she didn't write an individual study plan, as she was not sure about what her objectives should be. So, even in the third year, Ann still needed supervision to write an individual plan, based on the semester objectives. Unlike Ann, Lis (year 3) began her 10 weeks in clinical placement by writing her study plan following the semester objectives and how to achieve them. She found it helpful to have a check on reaching the objectives. The difference between Ann's and Lis' approaches may be due to Lis' awareness of learning mediated by writing, and what her objectives were.

Table 3. Illustration of the analysis – Theme: Learning by writing

What is said? **Quotations - units of meaning**	**What is talked about?** **Units of significance**	**Theme** **subthemes**
It is irritating, as it is such a slow process. However, writing is very smart, because: Hey! Do you understand it? Then I must read again to understand more. I learned a lot from it (Bera, year 1)	Identifying learning needs as being unable to explain a subject clearly in writing and deepen her understanding by re-reading	Learning by writing
Weekly, I wrote about nursing home residents, their symptoms, and my reflections. It worked fine (Kitt, year 1)	Learning to nurse in a nursing home, mediated by written reflections	Written reflections
I don't write much, as I benefit more from oral reflections or if I am going to present a subject to others. I have a love-hate relationship with writing assignments. It is painful. I don't want to admit it but I learn a lot from writing (Gina, year 3)	Having an ambivalent approach to writing. Need an external motivation to write.	An ambivalent approach to writing
I just wrote what I experienced – just how the case was. Then I added my reflections. When I returned to it after joint reflection, I added more reflections to the text (Nina, year 3)	Returning to former written text leads to further reflections	Combination of written and oral reflection
In the beginning, I wrote at the request of the preceptors. Now I do it for myself. Weekly, two pages of written reflections. It is a huge preparation – and makes the examination very pleasant (Lis, 3 years)	Becoming aware of written reflections as a learning strategy and preparation for the examination	Written reflections as preparation
I didn't write my study plan, as I didn't know what my objectives should be (Ann, year 3)	A need for supervision to write a study plan	No written plan
I wrote my study plan according to the objectives and how to achieve them. It was helpful to have a check on reaching the objectives (Lis, year 3)	Writing a study plan to study purposefully	Written plan

Maybe, the 36% of students who seldom reflected by writing also needed supervision or external motivation. The writing process could be considered painful and slow, as it often uncovered learning needs, and led to deeper reflections and understanding. Still, 55% of the students often made an overview of what had to be learned and when, and that should include recognizing learning needs, setting goals, and choosing learning resources and strategies, all of which are important elements of SDL.

3.4 Learning in interaction

This theme concerns students' initiatives to learn in interactions between peers, between students and preceptor or lecturer, or in interactions with patients. Table 4 is an illustration of the structural analysis that led to this theme.

Table 4. Illustration of the analysis – Theme: Learning in interaction

What is said? **Quotations - units of meaning**	**What is talked about?** **Units of significance**	**Theme** **subthemes**
I was absent from campus and, even though I read the syllabus from day to day, I couldn't catch up. I asked my study group for an update, and they helped me a lot. It was great (Ann, year 1)	A study group helping a member after two weeks' absence	Learning in interaction
Before the exam, we rehearsed by explaining subjects to each other and reading each other's writings. I learned a lot (Nina, year 1)	Peer learning in a study group	Peer-learning
One member needed a lot of help with the technical language. Often, she didn't show up. She didn't contribute much. In the beginning, we helped her (Bera, year 1)	Peer learning in study groups has limits	Study group and supervisor interactions
The dialogue in class allows for reflections you didn't think of before, and when a lecturer facilitates the discussion about a difficult text, you get answers that promote your understanding at a higher level (Lis, year 3)	Participating in lectures and discussions to understand on a higher level	Class–lecturer interactions
I have to force myself to ask questions in the lectures. Still, it makes me remember and learn better (Kitt, year 3)	To overcome the fear of asking questions in large groups	Student–lecturer interaction
I learn best when I relate theory to practice in practice. Then I remember the lectures and now, I understand what you're talking about (Gina, 3 years)	Learning in interaction with patients and preceptors in practice	Patient–student–preceptor interactions
I feel secure, if I observe once, being guided and checked once (Mike, year 1)	Learning in interaction with a preceptor in practice	Student-preceptor interaction
I don't carry out tasks before reading about them. Recently, a patient needed a change of stoma bandage. I had the time but no experience. Quickly, I read the instructions on how to change a stoma bandage. Then, I changed the bandage. It went well, as the patient was able to guide me (Nina, year 3)	To challenge the preferred learning style in interaction with a patient and balancing between helping the patient and a fear of harming the patient.	Patient-student interaction
To remember, I wrote cases and related to theory. In dialogue with my preceptor, we added more theory. It was really helpful (Mike, year 3)	Reflection with the preceptor	Student-preceptor interaction

Ann (year 1) had been absent from campus for two weeks, and even though she read the syllabus from day to day, she couldn't catch up. She asked her study group for an update and was very grateful, as they helped her to understand the difficult parts of the syllabus. Ann (year 1) said: "In my study group, there are members with very different attitudes. Actually, it has worked very well and resulted in several aspects of a case in our work". In Nina's (year 1) study group, the members helped each other prepare for the exam. They rehearsed explaining subjects to each other, read each other's writings, and learned a lot. These study groups were well run and showed that peers can benefit from helping each other to learn, even when they have different approaches to learning. Listening to each other's explanations, reading written texts, and giving peer feedback can be a very fruitful way of learning when the students feel secure about it. Unfortunately, there are groups where the cooperation between peers leads to difficulties. Bera (year 1) said that, in her study group, one student needed a lot of help to use technical language and other issues. Often, she was absent and didn't contribute to the cooperation that they had promised each other in their group contract. In the beginning, the group thought she may be having a tough time. So, the group helped her. However, after a while, the group members lost patience. As they were reluctant to discuss the neglected contract in the group, they asked for help from a supervisor.

Listening during the lectures was the most often used initiative to learn, by 77% of the students. Besides, like 36% of students, Lis (year 3) strived to participate in dialogues in class. She explained that it allowed for reflections that she hadn't thought of before. When the lecturer facilitated a discussion about a difficult text, she got answers that promoted her understanding at a higher level. Lis experienced the interactions between students in the class and the lecturer as a way of unfolding her reflections and understanding of a text. Kitt (year 3) prefers dialogues in smaller groups. Still, she forced herself to ask questions at the lectures, as it made her remember and learn better. Even though 64% of the

students responded that they occasionally asked the lecturer, students often felt more comfortable asking in small groups, rather than in large classes.

Hands-on practice in clinical placements was preferred by 55% of students. Mike (year 1) asked for cooperation with the preceptor when learning nursing competencies, as he felt secure when he got a chance to observe it once, was guided, and then his work checked once. Of the students, 50% often asked for demonstration or guidance, before they acted. It is often rooted in a fear of harming the patient. Even though there is learning potential in making mistakes, these ethical considerations should be taken seriously, to protect the patients. Patient security was also a part of the considerations when Nina (year 3) didn't want to carry out tasks before reading about them. However, in an acute situation, she challenged herself to help a patient and changed a stoma bandage without much preparation and no experience. Luckily, it went well because she did a quick preparation and interacted with the patient. The students seemed reluctant to challenge themselves to learn in a way that was different from their preferred one. Only 9% had the courage often to challenge themselves with new ways of learning. At the end of the third year, Mike continued to benefit from dialogue with the preceptor. He wrote about patient care and related to theory, firstly, by himself and, secondly, in interaction with the preceptor. Gina (year 3) also learned a lot when she related theory to practice in practice, as she recalled the lectures and, looking at the patient, she understood what the lecturer and the preceptor had been talking about.

Although some students preferred to delve into theory by themselves, learning in interaction was an often-chosen strategy among the students' learning initiatives. Thus, 50% of students often learned from peers in their study group. This is important, as, according to Knowles (6), one of the characteristics of SDL is that learners mutually give and receive help among themselves. Conversely, it can be a tough challenge for a supervisor to get study groups to collaborate again after a conflict, as several factors may have an impact on cooperation. One factor could be that some of the group members need more supervision to learn how to direct their learning. In those cases, students had to ask for supervision, as the alternative might be less learning in the study group, as 14% of the students responded. Also, learning in interaction with patients, preceptors, and lecturers was valued by the students.

4. DISCUSSION

4.1 Learning by preparing

In this article, students' wide range of initiatives to prepare depending on their learning experiences and abilities, indicate that students took responsibility to identify learning needs and resources, and chose learning strategies, all of which are important elements in SDL. Concerning setting goals and self-assessment, the students responded that 41% occasionally, and 55% often formed a general view of what had to be learned, and by when. That implies some sort of goal-setting. So, it seemed that the majority of the students did plan their learning process. However, as former research has also concluded, students' level of ability to manage SDL was variable,[8–10] and was not related to semester level.[11] Therefore, students who seldom plan their learning process could benefit from supervision on how to set one's objectives and how to do self-assessment. Knowles[6] proposed the development of a competency model to support students in self-assessment of their competencies. Bondy[36] developed a five-point scale for the evaluation of nursing clinical performance, to support nursing students and preceptors in identifying current competence levels and to identify needs for further development. Biggs and Collis' Structure of Observed Learning Outcomes (SOLO-taxonomy) from 1982 is generic and evidence-based. It provides a language for metacognitive reflection.[37] The main reason to encourage students to undertake self-and peer assessment is to improve student learning and development,[37–39] as the strategy facilitates metacognition.

Furthermore, given that some students related, that they were unable to read many pages before a lecture, lecturers might consider ways to maintain the standards while giving less weighty reading material or teach students how to prioritize the source material. Alternatively, it might be worth lengthening the Danish Bachelor's Degree Programme of Nursing by half a year, to four years, which is the length of the programme in Iceland, Portugal, and Spain.[8,40] According to Dreier, we need to remember that students have to cope with living a complex everyday life as a whole. They need to make their life hang together, taking into account their diverse activities and commitments in many social contexts and relations.[41] Students must take care of their children and keep up other important commitments as a part of their everyday life, alongside their learning process. Lecturers should strive to plan teaching and the whole programme, in such a way that students have space and time to prepare sufficiently and thereby achieve SDL competencies.

4.2 Learning by writing

The findings of the current study indicate that students who, from the start of their programme, were aware of learning through writing benefitted from this strategy throughout the whole programme, including at exam times. The reasons for this were that, when they couldn't explain a subject in writing,

they thereby identified their learning needs. They could return to previously written reflections, add further reflections, and reach a deeper level of reflection. Klein and Boscolo[42] stated that the effects of writing are reliable and that writing to learn is a self-regulated activity that is dependent on the goals and strategies of the writer. Both cognitive processes directed towards task content, and self-regulated processes directed towards the writer's cognition contribute significantly to learning. So, writing an individual study plan that is based on the current semester objectives and how to achieve them, allows a student to study purposively, achieve metacognition in their learning process, and assess progress on reaching the objectives. All these elements are important elements of SDL. Research also suggests that the knowledge created while writing can contribute to stimulating thinking, decision-making in practice, and the formation of professional identity.[42,43] According to Bolton and Delderfield,[38] the power of reflective writing is that we write to learn about ourselves and our practice. The difference between writing about an event and just pondering about it is that reflective writing both creates a distance to what happened and creates a closer connection to it, in such a way that emotions, forgotten thoughts, and experiences emerge again. During the writing process, these can be interpreted, structured, and illuminated, which leads to an extended understanding. Therefore, in the current study, 36% of students who responded that they seldom reflected in writing risk having a more superficial understanding. They may need external motivation, such as a request from the preceptor or an assignment before they write and relate theory to experiences in practice. Needing external motivation can be seen as a lack of SDL ability. This suggests that there is a need for further supervision and facilitation of learning SDL competencies. Noh and Kim[22] provided evidence that an SDL-based programme that employed a mix of online and offline coaching improved SDL competency. Thus, students reluctant to reflect in writing may benefit from such a mix of online and offline guidance.

4.3 Learning in interacting

The current study indicates that learning in interaction was an often-chosen learning strategy among the students, and, in well-run study groups, where students feel secure, peers benefit a lot from helping each other to learn, even when they have different approaches to learning. This is underpinned by Knowles,[6] who stated that SDL can flourish when students see one another as mutually helpful human beings with resources to share. Unfortunately, that is not the case in all study groups. So, the question is how to allow students to see one another as helpful co-learners with resources to share. Knowles recommended relationship-building to get to know fellow learners, to explore which resources they could contribute to the cooperation, and what help they wanted. Liu et al.[44] identified elements of a team process, such as spontaneous communication, helping behaviour, and constructive controversy. Students need to relate to each other in spontaneous communication and help each other with the task. They need to learn to take the time to openly discuss conflicting ideas until they are resolved. So, group members who are reluctant to discuss a neglected group contract openly among themselves are right to seek supervision, as they have a learning need. Research suggests that conflicts seem inevitable, and may even catalyse a team's innovative potential, and experiences of solving a controversy constructively may prevent future destructive team conflicts.[44] Still, when there is one group member who doesn't contribute to the cooperation, it is likely to cause controversy. Team-based learning[45] is a learner-centered, evidence-based instructional strategy, where students with different approaches to learning are grouped in small teams of five to seven students. Before cooperating about a subject, the team members are guided to prepare through individual tests before a joint test in the team. Then the lecturer circulates to the teams and asks them to delve deeper into questions that they didn't answer correctly. Finally, the lecturer goes through the aspects of the content that the students are still struggling with. Then the teams are ready to cooperate on a challenge, where they have to use their new knowledge. The learners are mutually responsible for preparing before lectures and for contributing to the learning outcome.[45,46] The current study revealed that some students needed external motivation to act. Maybe a team-based learning strategy can work as external motivation so that these students jointly take the initiative to undertake the learning activity. Revealed was also, that some students needed more supervision than they got, to relate to each other, to understand the strength in helping each other to learn, and how to cooperate in a study group. Team-based learning provides scaffolding and feedback as early as the preparation phase, and, according to Branson et al.,[46] it has been used successfully in nursing education. A need for continuous guidance among nursing students was also found by Wong et al.[5] They found that strategies involving independent learning, such as problem-based learning in small groups were effective in enhancing students' SDL ability, as long as adequate and continuous guidance to meet the different levels of SDL ability was provided by the lecturers.

The current study found that students are aware of mutual reflection as a way to advance learning – both when it is a reflection in the interaction between peers, between students and lecturer or preceptor, and between students and patients. Mutual reflection is a fruitful choice, as Jaastad et al.[47] found that reflection in groups grounded in caring

theory facilitated students' development of a language for caring in nursing and assimilation of caring theory. Also, according to Ricoeur,[8] reflection is connected to the process of understanding and development of identity. So, reflection on the dialectical relationship between caring theory and practice provides a foundation for becoming a professional caring nurse and for practical reasoning in nursing practice. This contributes to an explanation as to why the students in the current study looked forward to learning in clinical placements, and that they experienced a greater understanding of the dialectical relationship between theory and practice. This is further underscored by Ekebergh and Lindberg,[48] who clarified how learning and caring in clinical practice are intertwined. A reflection that facilitates the convergence of general professional knowledge and the patient's narrative is the pivot of interaction between the patient, nursing student, and supervisor. In the encounter with the patient, the student must both be aware of their preconceptions and remain open-minded while listening to the patient's experience of the situation, which is loaded with values from the patient's lifeworld. This is to reflect on how to carry out patient-centered nursing in the current situation. When students autonomously direct their learning process towards achieving competencies to render patient-centered nursing the aim for nursing education seems to be attained[49,50] and a basis for life-long development of nursing competencies is established.

Limitations of this study are that data were derived from students at only one campus. Only half of the class volunteered to respond to the SLI survey, which can be seen as a weakness. However, no students added further learning activities to the survey, so the 42 activities seemed to be suitable. The interviews resulted in 105 typed pages with varied data about SLI, and data from the survey and the interviews complemented each other. Finally, our findings harmonize with previous international research, which also found that students' SDL abilities vary[8–10] and are not related to semester level.[11]

5. Conclusion and implications

This study provides knowledge about nursing students' self-directed learning initiatives. During the bachelor's degree programme, most students identify their learning needs and choose learning activities suitable to their learning abilities. They were creative enough to make use of their own and others' resources and to combine several e-learning tools in their learning process while taking into consideration the demands of their current life situation. The finding that 55% often and 41% occasionally formed a general plan for their learning process supports the assumption that students had made reflections on the goals that were to be reached.

However, a few students needed external motivation to take the initiative to start learning activities. Of the students, 9% seldom read the comprehensive syllabus before lectures, and one reason given was that they needed to manage their complex lives.

A learning potential was found, in that 36% of the students seldom reflected in writing and thereby risked having a more superficial understanding of the learning material.

Interacting in study groups is fruitful for most students. Nevertheless, this study also uncovered learning needs concerning SDL, when students didn't contribute to the cooperation and didn't take responsibility for discussing conflicting ideas to reach a consensus.

There is a learning potential in encouraging students to undertake peer- and self-assessment and to challenge themselves to broaden their learning potential.

Our findings uncover some aspects that are useful to take into consideration when planning lectures and curricula that have the aim of facilitating SDL. Faculty may consider:
• Could team-based learning be a useful strategy to promote motivation and to give the extra feedback and guidance that some students seem to need to delve deeper into the subjects, reflect in writing, and make a plan for their learning process?
• The implementation of an evaluation tool, such as Bondy's Criteria for Clinical Evaluation, or SOLO-taxonomy, to support students' evaluation of their own and their peers' learning outcomes, as self-assessment is the final element in SDL.
• Whether it is possible to maintain a high standard in the educational programme with less weighty reading material or teach students how to prioritize the content. Alternatively, it might be worth arguing for a four-year bachelor's degree programme in nursing, to give students more time to deepen their understanding of the content.

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Authors contributions

Kirsten Nielsen contributed as the project leader to the conception and design of the study, acquisition of data, three-level analysis and interpretation of data, drafting the article, revising it critically for important intellectual content, and final approval of the version to be submitted. She is the corresponding author.
Julie Marie Dahl Petersen contributed to the three-level analyses, interpretation of data, and final approval of the article to be submitted.

Karen Schjøtz Vejrup contributed to the three-level analyses, interpretation of data, and final approval of the article to be submitted.

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