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The sense of a patient: An ethnographic multi-site field study exploring the influence of manikins on nursing students' learning

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ABSTRACT

The purpose of this ethnographic study was to gain insight into the influence of full-body human-like manikins on nursing students' learning. The research question that guided the study was: How do the presence and use of human-like manikins influence nursing students' learning? Data were collected during 15 educational sessions, using different manikins for various activities. Applying cultural-historical activity theory, this study explored the use of manikins as a mediated activity.

The study's main result was the interplay of five categories. In the first category, manikin as an object, manikins were used to teach and learn technical skills. In the second category, manikin as a subject, manikins were used to teach and learn to perform those skills with care. The third category, the interplay, illustrates how these two approaches were present in all sessions. Category four, the individual learning space, provided students with a feeling of working with a patient. Category five, the collective learning space, awarded collaborative and reflexive learning opportunities.

We concluded from this study that manikins may introduce students to the balance between the technical and interpersonal aspects of nursing practice. Being aware of how manikins influence learning, educators can make more targeted use of manikins and support lower-grade nursing students in their learning process and professional development.

1. Introduction

Simulation-based activities are prominent and appreciated educational methods that contribute to the acquirement of many qualifications required in nursing practice, such as cardiopulmonary resuscitation (Ackerman, 2009) and medication administration (Fusco et al., 2021). The simulation field covers a complex range of methods, where the use of full-sized human-like simulators with varying technological features is prominent. In educational practice, the simulator, or manikin, represents the patient (Cooper & Taqueti, 2004; Lioce et al., 2020). The most advanced manikins can respond with a wide range of reactions, and different parameters can be monitored. Medium-range manikins have fewer responses and afford fewer options. The simplest manikins may have no technological features and are commonly used for practising technical skills. This study focuses on all kinds of full-body manikins and their impact on nursing students' learning, regardless of technological level, excluding body parts, such as arms to practice injections or skin pads to learn suturing. Fig. 1 shows nursing students training vital skills with a medium-range manikin.

Comprehensive, systematic reviews mirror what nursing students learn from manikin-simulated activities. Several studies postulate that deploying manikins in simulations enhances the acquisition of theoretical knowledge and supports students in developing critical thinking and clinical judgement competencies (Cant & Cooper, 2010; Lapkin et al., 2012). Furthermore, it is reported to improve internalisation of psychomotor skills (Kim et al., 2016; Shin et al., 2015) and strengthen self-confidence and self-efficacy (Cant & Cooper, 2010, 2017; Labrague, et al., 2019). Levett-Jones et al. (2019) found immersive simulations with manikins, superior to other methods in enhancing empathy for vulnerable patients. In other words, using manikins as educational tools in simulations supports nursing students in developing essential qualifications.

However, much of this empirical knowledge originates from evaluative studies in which technologically advanced manikins that can imitate human features are assigned a name and a medical history and used in scenario-based high-fidelity activities. Consequently, we possess a lesser understanding of what employing simpler manikins means. There is also limited knowledge of how manikins' looks influence participants. For

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Fig. 1. Nursing students training vital skills with a medium-range manikin.

example, the limited use of manikins with dark skin tones influences dark-skinned participants' possibilities to identify with the patient represented by the manikin and their feeling of belonging in the learning environment (Graham & Atz, 2015; Graham et al., 2018).

To summarise, we have limited insight into how manikins themselves contribute to learning. The current status of knowledge may underestimate hidden possibilities that the use of less technologically advanced manikins is invested with. To make more efficient and targeted use of manikins, a broader insight into the significance of manikins in nursing students' learning is needed.

1.1. Manikins' influence on learning

Investigations into the nature of manikins provide insight into the core using manikins in nursing education: they seem to have inherent multi-sidedness. Hopwood et al. (2016) explained that manikins consist of a technical, clinical, and human body, and depending on the situation, students turn to one or more of these natures. Ireland (2017) described the manikin as a hybrid of technology and human sides, present as both a physical object and symbolical as a human. It is noteworthy that manikins' multiple natures may contribute to the development of a professional identity, as it allows students to act and think as if they were nurses treating patients (Ashley & Stamp, 2014; Berragan, 2014; McNiesh, 2015; Handeland, Prinz, Ekra, & Fossum, 2021). Similarly, nursing students approach a manikin as a doll and patient, stimulating technical and caring skills simultaneously (Handeland, Prinz, Ekra, & Fossum, 2021). Since a manikin's simulated form resembles reality, it may inculcate experiences that provide an understanding of reality. Hence, nursing students retain their experiences with manikins, which may significantly impact their learning (Dunnington, 2014).

Manikins influence the social learning environment in education. Anderson and Nelson (2015) concluded that manikin simulations could provide an environment for developing therapeutic communication skills. Lavoie et al. (2020) investigated simulation-based activities in various health professional educations, highlighting how manikins support authentic interactions and communication, creating an interactional authenticity. The study indicates that manikins' meaning for learning is connected to how users perceive them. Advanced manikins in realistic scenarios are not synonymous with high-fidelity or realism. What is more relevant is to what degree the participants experience the situation as authentic (Bland et al., 2014; Dieckmann et al., 2007; Lavoie & Clarke, 2017).

Against this backdrop, it seems decisive to learn how manikins are understood and used. Helle and Säljöe (2012) called for a shift from evaluative research to investigative research on learning mechanisms when technological tools are used in health education. Moreover, Dunnington (2014) demanded a more contextual application of high-fidelity simulations beyond the instrumental and technical aspects. Concerning the use of manikins in nursing education, we find these calls relevant.

1.2. Theoretical framework

Social constructionism supports our work, as the results cannot be viewed as fixed or static but coloured by both the researchers' and the participants' interactions and the researchers' analytic process (Alvesson & Sköldberg, 2018). Specifically, we draw on cultural-historical activity theory (CHAT) to explore how the use of manikins influences nursing students' learning. CHAT descends from Vygotsky's sociocultural tradition, commonly used to investigate educational practice and learning. Among others, Leontjev and Engeström developed Vygotsky's ideas into the contemporary activity theory (Engeström, 2001; Roth & Lee, 2007; Säljö, 2010; Sannino & Engeström, 2018). While the Vygotskian tradition emphasises how individual actions are mediated and evolve in a specific cultural and historical context, CHAT recognises collective activity systems as the focal point of analysis.

CHAT understands activity systems as patterns of meaningful individual actions that form a specific and shared target: the object of activity (Engeström, 2001, 2011; Sannino & Engeström, 2018). Activity systems occur as communities of multitudes of norms, meanings, traditions, and interests that shape the actors' behaviours; they are multivoiced (Engeström, 2001). Activity systems continually constitute and reproduce cultures, and in most cases, multiple cultures exist within one system (Claxton, 2002; Kumar, 2019; Kumpulainen & Renshaw, 2007). Since learning and education occur in a specific cultural context, a learning culture mirrors the system's conceptions of what knowledge is, what learners should learn, and how they learn (Kumar, 2019). In other words, the learning culture affects how we organise education.

Knowledge and learning are inseparable in CHAT. Knowledge arises and develops among people through activities directed towards the object of activity, while learning is the distribution of knowledge in the process. Learning is a dynamic process of interactional patterns mediated by culturally developed tools: mediators of knowledge. Mediators shape how people think and act and link individuals' minds to the social world (Engeström, 2001; Sannino & Engeström, 2018; Wells & Claxton, 2002).

Inner tensions and contradictions occur in all activity systems. Such contradictions may become sources of development and innovation that, in the succeeding step, initiate a change in the object of activity (Engeström, 2011; Sannino & Engeström, 2018). When actors direct their activity towards a new object, the activity system transforms. Engeström (2001) depicts this change as expansive learning, which implies an augmentation of the system's possibilities and potential. While research on nursing education in the context of CHAT is limited, Berragan (2013) outlines two activity systems of educational nursing activity and clinical healthcare practice, suggesting that simulation learning can initiate expansive learning that bridges the two systems.

1.3. Purpose

The purpose of this ethnographic study was to gain new insight into the influence of human-like manikins on nursing students' learning. The following research question guided this study: *How do the presence and use of human-like manikins influence nursing students' learning?*

2. Methods and design

An ethnographic multi-site field study based on the frameworks proposed by Hammersley and Atkinson (2019) and Madden (2017) was conducted. These frameworks understand ethnography as systematic and participative investigations into peoples' lives and activities. Ethnography is appropriate for capturing and understanding the meaning of everyday practices and activities, such as education (Pole & Morrison, 2003; Reeves et al., 2013), and is suitable and complementary

to CHAT (Kumpulainen & Renshaw, 2007). Combining data collection methods is common while investigating the topic from several perspectives and eliciting relevant data. In this study, observations and interviews were used. The categories were generated from the interpretation of data (Hammersley & Atkinson, 2019). We used the Standards for Reporting Qualitative Research (SRQR; O'Brien et al. 2014) since it is suitable for various qualitative studies and not limited to interviews.

2.1. Field and participants

Following Madden (2017), we view the field as a social and mental construct that can be shared across similar sites; the field is more of a situation than a physical place. Thirteen university colleges and universities in Norway provide a three-year bachelor's degree in nursing (Norwegian Nurses Organisation, 2021) and were eligible for inclusion. However, we contacted eight of these institutions due to a long distance for data collection. The inclusion criterion was that a full-body manikin, of any type, was used in an educational activity during the students' first semester. In addition, we searched for variations in how different manikins were used in various learning activities. Three of the eight universities representing four campuses (A-D) met the inclusion criterion, and the relevant institutional boards approved participation. Together, these four campuses constituted our field.

A purposive sampling strategy was used to select participants (Etikan, 2016). The teachers responsible for the relevant courses were contacted and they gave their consent for participation. Most of these teachers were experienced educators and simulation facilitators. First-year students were recruited because we sought to capture their initial and early actions, reactions, and experiences with manikins. We wanted them to have limited experiences with both patients and manikins prior to the study. Consequently, the data collection was performed before the students' first placement in nursing homes. Written information about the study and invitations to participate were provided to the students before they gave their consent to participate. Participants for interviews were recruited during the observations.

The four campuses had different skill training facilities and equipment. There were variations in the room sizes, from small single-bed rooms to ward units with 11 beds. However, the similarity in equipment and interiors was striking. All the facilities were designed to imitate a realistic hospital context. Learning activities varied from skill training to scenario-simulation. The manikins ranged from advanced simulators to simple ones. At campuses A, B, and C, the students worked in groups of two to four when practising basic clinical skills. At Campus A, the groups used manikins freely when they were available. At Campus B, students moved between workstations. At campuses A and B, the teachers walked between groups. At Campus C, the groups shifted between three workstations, with one teacher positioned at each station. At campus D, the students worked in groups of three to six and applied basic assessment skills in a patient scenario, with one teacher facilitating and voicing the manikin. Here, a debriefing session was used after every session. **Table 1** provides an overview of these sessions.

2.2. Data collection

The first author collected data during 15 educational sessions from mid-September to late November 2019. Data collection was set from the start and bound to the timeframe and the location of each session. We optimised continuity as questions and topics of significance were carried over from one session to another for further investigations, connecting one session to the next and across the campuses. We experienced saturation effect during data collection as we realised that the participants' descriptions and experiences were being repeated and confirmed (Crang & Cook, 2007). This served to validate the upcoming data interpretation.

Partly participating observations were the primary data sources. With observations, we aimed to capture the actions and conversations related to manikins. A thematic observation form guided the observations (see **Table 2**). Observations were turned into text, as field notes were taken during the sessions. The field notes were structured chronologically depending on what happened throughout the sessions, and significant or surprising statements or occurrences were described in detail (Hammersley & Atkinson, 2019).

Since we aimed to deepen and explore significant observed events, 23 conversational interviews complemented the observations. All interviews were performed and recorded in separate rooms immediately after each session. The informants were encouraged to describe their experiences using a semi-structured, thematic interview guide (see **Table 3**). The interviews lasted for 8 to 37 minutes (mean: 16.6 minutes). Nine teachers were interviewed individually, and a total of 14 interviews were conducted with 17 students. In two interviews, two and three students, respectively, were interviewed together because they had interacted in a way that had caught interest. **Table 4** presents an overview of the interviews.

2.3. Reflexivity

Through self-reflection on the researchers' role during data collection, we attempted to increase transparency, dependability, and credibility (Hammersley & Atkinson, 2019; Madden, 2017). The first author entered the field primarily as a researcher, secondarily as a nurse and nurse teacher. To fit in and follow the dress code for skill laboratories, the researcher wore a uniform. Depending on the context of each session, the researcher shifted between standing still and walking around. During the observations, spontaneous conversations were held with the participants if they said or did things that raised questions. Sometimes, the participants were eager to discuss and answer questions, and, at other times, they ignored the researcher, with some students indicating that they had not noticed the researcher. Some teachers expressed a feeling of being supervised by the researcher's presence. With a background as a nurse and nurse teacher, the surroundings, equipment, and language, in the sessions were familiar to the first author, enabling an understanding of what was going on and where to direct attention. It facilitated an emic perspective and enabled the asking of relevant questions. One campus was the researcher's workplace, and most teachers and facilities were known, which may have affected both the required etic perspective and ability to pay attention to new things (Madden, 2017). However, data from the other three campuses helped balance out the situation.

2.4. Analysis

In line with the epistemological assumptions in ethnography, we prepared a systematic yet flexible analysis process, combining coding and ethnographic writing. Ethnographic writing is about structuring and writing up what the interpreted data is 'really' about (Madden, 2017). CHAT was applied to the discussion, but it also influenced the analysis because it was performed with us bearing these concepts in mind, and we investigated the sessions as one activity system. **Table 5** provides an example of the analysis process.

The handwritten field notes were transformed electronically into descriptive, full-text field notes immediately after each session. The recorded interviews were transcribed verbatim and slightly adjusted to the written text. Subsequently, the field notes and transcribed interviews were merged into 15 descriptive and reflective field descriptions, aiming to depict each session as a unique event. The field descriptions were uploaded into the NVIVO12 software tool (QSR International, 2018), facilitating the coding process. An immersive reading of each field description was followed by systematic line-by-line coding of all the texts to identify data relevant to our research question. Coded data were inductively given descriptive labels, resulting in 19 descriptive categories (Saldaña, 2015). The corresponding author was responsible for the initial preparation and coding of the data.

Table 1
Overview of observed sessions.

Campus	Observation hours	Learning objective	Manikin	Previous experience with manikins	Teachers (Trained facilitators)	Students (Men)	Teachers interviewed	Students Interviewed
A	9h 30min	To learn assessment of vital signs and place the patient into Fowler's position	Laerdal* Nursing Anne Simulator® with SimPad	First experience	7 (4)	92 (30)	3	2
B	8 h 30min	To learn ostomy care, urinary catheterisation, and intramuscular and subcutaneous injections	Laerdal Nursing Anne® for skill training/ non-technological	Second to fourth experiences. One previous experience in insertion of nasogastric tube	3 (1)	23 (0)	2	3
C	5h 25min	To learn assessment of vital signs and experience normal respiration, heart rate, and blood pressure values	Laerdal Nursing Anne Simulator® with SimPad and Laerdal 3G SimMan® with LEAP	First experience	5 (3)	57 (8)	1	3
D	11h 25min	To practice assessment of vital signs, implement nursing actions, and communicate and cooperate in scenario	Laerdal Nursing Anne Smulator® with SimPad	Second experience. One previous experience in the assessment of vital signs	3 (3)	32 (7)	3	6
	34h 30min (Mean: 2h 30 min/session)				**18 (11)**	**204 (45)**	**9**	**14**

* It was a coincidence that all manikins were from Laerdal, though is the largest manufacturer of simulation equipment in Norway.

Table 2
Contents of the observation form (original table translated from Norwegian).

Focus	Specification
Participants' actions:	How do the participants: - Approach the manikin? - Handle the manikin? - -Act throughout the session?
Language, conversations, and verbal expressions:	- What do the participants say to each other? - How do the participants talk to/address each other? - How do the participants talk about/to the manikin? - What spontaneous expressions and utterances occur? - What emotions are expressed and how?
Non-verbal communication:	What nonverbal expressions occur: facial expressions, gaze/eye contact, gestures?
Social atmosphere:	- How do I experience the social climate? - How do the participants organise themselves? - How do the groups work? - How do the participants cooperate?
Objects and surroundings:	- How do the participants stand? - Where do they position themselves in the room? - Are specific items shown attention? Which, how? - How do the participants relate to physical objects in the room?

The authors individually read the data for each category, and, in collaboration, the categories were cleaned by merging some and removing others whose data were not relevant to the research question. To protect and bring out the original data content, the data were processed in Norwegian. From this point, the text was written in English, as the authors' writing became freer. Thereafter, the categories were interpreted and organised to capture and formulate relevant patterns in the data, resulting in five analytic categories that formed the base of the ethnographic writing. Since patterns appeared both inside and between the categories, the categories were interwoven. We sought persistent interactional patterns, repeating events, and contradictions. Iteratively, we verified our interpretations by re-reading the field descriptions to understand the findings in their original context and consulted the literature and theory to explore and elaborate on our reflections and test our ideas.

Table 3
Contents of the interview guide (original table translated from Norwegian).

Questions for students and teachers	Follow-up questions
Introduction:Experience of session and own participation	
	- Can you tell what you have done today? - What attitude and expectations did you have? - Can you tell your experiences and how you felt? - Can you describe your experience in a few words?
Ending:Events or moments of significance	
	- Did something positive or negative happen that made a special impression? What do you think about that now? - I heard you say: "xxx"- Can you explain what you meant? - I saw you did "xxx"- What do you think about this?
Questions for students **How was it to relate to and use the manikin?**	
	- How was the meeting with the manikin? How was it to use it? - What do you think about it now? - How would you describe your own and your group's attitude to the manikin? - Has it added something to use a manikin; what? - What would you say you have learned? - How did the manikin affect you during the session?
How did you experience the relation to peers and teachers?	
	- How did you feel in the group? - Do you know the other students? What significance does it have? - What do you think about your group's collaboration? - What significance does the collaboration have? - What do you think of your group's communication? - How did you experience the relation and communication with the teacher?
Questions for teachers **How was it to relate to and use the manikin?**	
	- How would you describe your attitude to the manikin and to using it the way you have done today? - How do you think it is for the student to meet and use the manikin? - How do you think they experienced it using the manikin? - Do you think it has added anything to use manikin the way you did? If so, what? - Have you thought of how your own way of talking about/relating to the manikin affect the students?
How did you experience the relation to the students?	
	- What do you think of the students' communication and cooperation? - How did you experience your contact and communication with the students?

2.5. Ethics

The Norwegian Centre for Research Data approved this study (NSD, ref. no: 834499). Ethical approval was obtained from the ethical board of the University. Each participant signed a written consent form on the session day. They were informed that they could withdraw from the study at any time with no resulting consequences. Some students only consented to participate in the observations. The participants were assured that their participation was anonymous, and citations would be modified to secure their anonymity. We considered the participants to belong to no vulnerable groups, and the study and reporting were considered to involve no harm to the participants or field. The processed data required to reproduce the results cannot be shared due to ethical reasons.

3. Results

Through the interpretation of the 15 field descriptions, we found five analytic categories. In the first category: *manikin as an object*, manikins were used to teach and learn technical and procedural skills. In the second category: *manikin as a subject,* manikins were used to practise the same skills in a caring manner. The third category: *the interplay between the object and the subject*, describes how these two approaches were in play in parallel. Further, two learning spaces were permanently present. In category four: *the individual learning space,* students' experiences and explorative activities gave them the feeling of dealing with a patient. Category five: *the collective learning space*, involved opportunities for collaborative and reflexive learning. The results are illustrated in **Fig. 2**.

Table 4
Overview of interviews.

Interview no.	Informant	Age	Gender	Student: Previous experience in patient work? Yes, No, Some	Student: Previous experience with simulation or manikins? Yes, No, Some
1	Teacher	55	F	-	-
2	Student	40	F	No	No
3	3 Students	22, 25, 23	F, M, M	No, Some, No	No, No, No
4	Teacher	34	F	-	-
5	Teacher	39	F	-	-
6	Student	21	F	No	No
7	Teacher	62	F	-	-
8	Student	28	F	Yes	No
9	Student	24	F	Yes	Yes
10	Student	20	M	No	No
11	Teacher	48	F	-	-
12	2 Students	19, 24	F, F	Some, Some	No, No
13	Student	49	F	No	No
14	Teacher	60	F	-	-
15	Student	20	M	No	No
16	Student	19	F	No	Some
17	Teacher	37	F	-	-
18	Student	33	F	No	No
19	Student	32	F	Yes	No
20	Teacher	33	F	-	-
21	Student	20	F	No	No
22	Student	19	F	No	No
23	Teacher	43	F	-	-
		Students' Mean: 25.7 years Teachers' Mean: 39.5 years			

Table 5
Examples of coding process and interpretation of data.

Coded data	Descriptive category	Analytic category	Interpreted patterns	Integrated into results
During this situation, neither the students, nor the teacher pay any attention to the manikin, except the arm they use to take blood pressure. (Field note 6)	Students' treatment of manikin	Students' treatment and descriptions of, and reactions to the manikin	Students focus on a body part and use manikin as a technical skill tool	Manikin as object
Although most of them ignore the patient, there are exceptions; one student is to set an injection on the manikin's hip. Suddenly, she realises that it might lie uncomfortable and supports it with some pillows. (Field note 9)			Students treat manikin as a patient with care in skill training	Manikin as subject Manikin as object
"I think if we had not had that doll, I would have been much more insecure. I got confirmation of what I was doing, that the technique I had was right, it helped me a lot". (Field note 4)	Students' descriptions of using a manikin		Manikin gives feedback and confirmation The manikin's human body gives the feeling of doing procedures on a patient	The individual learning space The individual learning space
"You get the feeling of how it is. Just knowing theoretically how a procedure works, you don't get the impression of how it feels, but you get that with the dolls, you feel resistance, you get those distances, for example to the catheter, it helped a lot, because you got the feeling of what it's actually like to do it, and you see that you are doing it right". (Field note 8)			Spontaneous reactions, exploration of face, touching	The collective learning space
Immediately, some of them notice the manikins as they enter. I hear one exclaiming: "Cool!". Some walk over to it, look at it, touch it, put an ear to the mouth, put their hand on its chest. (Field note 1)	Students' reactions to manikin		Reactions to sounds, signs of life and human-like features, Initiates discussions and reflection	
When the manikin starts to breathe visibly and audibly, someone exclaims "Wow!". This triggers a little smile and laughter. One says: "he breathes heavily!" When the doll gets stridor, someone laugh and smile, someone start to discuss "could it be COPD?". (Field note 7)				

3.1. Manikin as an object

Sometimes, the students and teachers approached the manikin as an object to teach and learn technical skills. This approach was most evident in the sessions with formal learning goals to learn such skills. Thereafter, the teachers primarily and explicitly introduced the manikins as dolls and not as patients. They had an instrumental approach to the manikin and used it to transfer and practice psychomotor skills, such as taking blood pressure or performing urinary catheterisation. When taking this approach, teachers emphasised that students should acquire such skills alone:

> *Today, there was no exercise in communication and interaction or anything like that; it was more directly on the procedure and hearing blood pressure. (Interview 5: Teacher)*

They stated that students must become familiar with handling equipment correctly. They were aware that the students were inexperienced and acquiring new skills was challenging. A teacher who taught urinary catheterisation said:

> *The first time you do a procedure, you focus on the equipment and the small spot where to insert the catheter, without thinking that the body is*

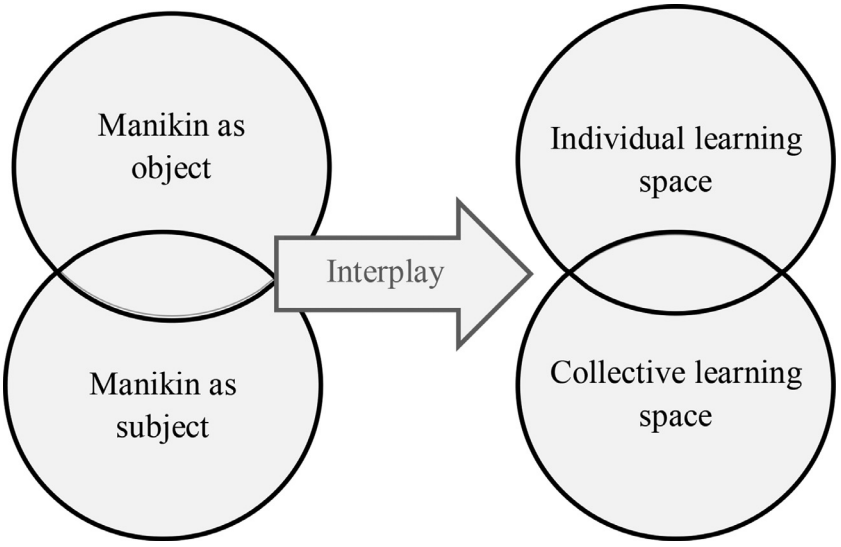

Fig. 2. Illustration of results, derived from the interpretation of the 15 field descriptions.

anything more than the urethral opening. The students must be allowed to start there. (Interview 14: Teacher)

Another teacher said that the students should first acquire and build a foundation of basic psychomotor skills before they could develop the communicative and caring skills required to deal with human beings:

They must get good at something and get a foundation to build on. Students who had previously taken the course said that there were too many elements if we included all. So now, we only focus on the procedures to become good at those. That is why we train on dolls and not patients.

(Interview 11: Teacher)

Consequently, the manikin's resemblance to humans added little meaning to how they were used. Only body parts were given attention. One teacher called the manikin a *spot to inject on*. The teachers drew little attention to the manikin's human features and did little to indicate that it should be anything more than a tool. Situations where teachers used manikins as a table for equipment or leaned on it visually represented this attitude. One teacher remarked:

We use the mechanism to listen. It becomes an instrument in learning, not [as] a simulator, but as a patient. (Interview 11: Teacher)

The teachers tended to emphasise the students' procedural performance and equipment handling. In this case, the manikin allowed them to ensure that the students mastered a procedure; for example, if a student obtained a particular blood pressure value, the teacher could verify this with the set value. Hence, the teachers were reassured that the students performed the procedure correctly:

It is nice to have the doll as an opportunity to check and know that it matches the blood pressure value on the pad. It provides me with an opportunity to control that what they say they have heard is correct; an opportunity for me to say: 'I think it was wrong, you must try again'. (Interview 4: Teacher)

In parallel, many students appreciated the feedback and confirmation they received from the manikin. It gave them a sense of security and confidence, and a feeling of mastery of technical skills. One student expressed:

If we had not had that doll, I would have been much more insecure. I got confirmation that the technique I used was correct; it helped a lot! I like to be sure that what I do is right. (Interview 3: Students)

3.2. Manikin as a subject

At other times, the students and teachers directed the manikins as subjects that the students could use to practice communicative and caring behaviour on, together with technical skills. This approach was slightly more significant in the scenario-sessions with a formal learning goal for applying skills to a patient. Moreover, in other sessions, the teachers explicitly expected the students to approach the manikins as persons. With this approach, it was significant that the manikin resembled a human:

We could have injected in an orange, but no one had thought of asking the 'patient' how it feels. I think we are doing something more by having a patient-like object. (Interview 14: Teacher)

Therefore, teachers encouraged students to communicate and interact with the manikin, as they would have with a patient. One teacher expected the students to show the same respect for the manikin as they would for each other:

When we use dolls, I want it to be as realistic as possible, that they show respect for the doll as they would show respect for a peer student. They cover the doll as if it were a peer or another person lying there. (Interview 14: Teacher)

In their effort to teach the students to show respect, some teachers sometimes reminded students to inform the 'patient' during their work or they pointed out that that the manikin was exposed:

The teacher asked: 'How do you think the patient feels when lying like that'? After that, the student quickly covered the doll's genitals. (Field description 8)

Many students recognised communication as a fundamental skill in nursing practice. Therefore, they agreed to the necessity of practising communicative skills, reminding themselves that the manikin was supposed to be a patient. As one of them remarked:

I believe there is learning in getting that communication part, that we always remember that it is a patient and not only a doll; it is a patient we are training on. We must remember to treat it as a patient in the way we talk to it, that we explain what we are doing because we know that communication is the most important to practice in everything we do. (Interview 8: Student)

Frequently, students were observed acting according to this idea. This also occurred in sessions where the formal learning goal was technical skills, and the teachers only expected them to approach the manikins

as objects. It became apparent in situations where some students spontaneously and without solicitation treated the manikin with care:

Later, I noticed that the student carefully covered the manikin with the blanket. (Field description 4)

Another student visualised this when she pretended to knock at an invisible door, entered the patient's room, and explained to the manikin what she was doing throughout the procedure, even though the manikin was non-technical and voiceless.

3.3. The interplay between the object and subject

In all sessions, the students and teachers shifted between approaches to the manikin as an object and a subject. This depended partly on the formal learning objectives and partly on the teachers' instructions. For example, the formal learning objective at campus A supported the object approach, but some teachers took the object approach, while others the subject approach. At campus C, both formal and informal expectations emphasised the object approach. However, for some students, the manikin's human resemblance was meaningful, and they felt that the teachers reduced this meaning if they did not support it through their behaviour:

Even if we know that it was only a procedure we are going through, it is essential that they [the teachers] *are role models in a way, that they say that this is a person and that we should not lean over the person, that we should not keep the arms on the person. We do not do that! (Interview 9: Student)*

Considering all the sessions, both approaches were continuous in play, in parallel. Generally, this interplay was harmonious and allowed the students to practice procedural, communicative, and caring skills together. Nevertheless, teachers sometimes behaved contradictorily. Once, a teacher referred to the manikin as a subject, asking a student what the patient would think while at the same time punching the manikin in the chest. In another situation, the teacher said that the main benefit of manikins was that the students did not have to reflect that a patient feels pain, even if they had, seconds before, told them to treat it like a patient.

Although the students knew that manikins did not feel pain, the thought of hurting them as patients almost hindered some of the procedures. A student who changed a stoma exclaimed that she feared that it would hurt. In similar situations and technically advanced procedures, the teachers sometimes referred to the manikin as a patient they did not need to pay attention to; the manikin does not scream if it hurts. She said:

You do not have to think that it is a patient; we do not have to consider human considerations. (Field description 6)

To enable the students to act as required, the teachers encouraged them to distance themselves from the manikins as subjects and treat them as objects.

Sometimes it seemed challenging for these first-year students to communicate with the manikin simultaneously as they struggled with the procedures. In one situation, the student looked confused when the teacher asked if she had informed the patient while sorting equipment and preparing for catheterisation. In this way, she was forced to shift her approach towards the manikin from that of an object to that of a subject.

3.4. The individual learning space

In this interplay, each student had individual experiences when using the manikin. During each session, the manikin often transformed from being an unfamiliar object they barely dared to touch into a source of practical experience and a feeling of dealing with patients. One teacher was convinced that students remember the experiences and emotions they get from using manikins in a way different from the one they do with theoretical knowledge:

I think emotions mean a lot; experiences mean a lot. It sticks. You get a hook to hang it on and associate with. I am sure that the students who were startled will remember it; they bring this feeling with them. (Interview 11: Teacher)

Four underlying aspects contributed to this feeling. The first was the manikin's face. The students showed curiosity by exploring and picking at the manikin's face. Frequently, they looked at its eyes and examined its teeth and mouth. Even if some students found the face uncanny, it transformed the manikin into someone they could talk to. Some students who worked with a pelvic during catheterisation missed this opportunity:

I think it was boring to have a pelvic for this procedure. It is bad not to have a face to talk to, even if the focus is on the genitals. Another student, who first used the pelvis, then the manikin, said: 'There is a difference, it is easier to talk to the doll: the face helps'. (Field description 8)

The second aspect lay in talking to the manikin. Many students described how their talking to the manikins reinforced the feeling that they were dealing with a patient. Mostly, the students talked to the manikin when the teacher voiced it. However, it was surprising how some spoke to the manikin even when it was voiceless. Students sometimes created imaginary conversations with a patient envisioned in their mind, as exemplified by a student who was injecting the manikin in a session where the teachers did not expect the students to talk with it as a patient:

She talked carefully to the manikin and informed it that: 'Now you will get some morphine so you can get rid of your pain; that will be good'. (Field description 9)

The third aspect was the value of hearing sounds and listening to the manikin. This aspect separates the session in which they used non-technological manikins from more technologically advanced ones. Hearing pathological sounds had a different impact than hearing healthy sounds of peers. The sounds amplified and clarified their experiences:

We heard normal respiration, which changed into wheezing sounds, such as in COPD patients. It sounded realistic, and it was stronger. At the same time, the sounds were clean; it sounds right, making it easier to know what to listen to. It is good learning 'this is how it should sound'. (Interview 8: Student)

The fourth aspect of touching the manikin was complex. All students were familiar with touching their peers as patients during skill training. However, many experienced it as challenging and embarrassing to touch each other. A teacher believed this was because they must cross an intimate barrier. The manikin appeared to be neutral and removed this barrier.

The doll makes it easier to practice procedures that can be challenging to do on each other because it feels too 'intimate', such as care… (Interview 8: Student)

The manikin enabled students to touch in a more caring manner. Frequently, students were observed comforting the manikin by patting it on the back or arm or wiping invisible spittle or sweat.

Together, these four aspects provided students with a feeling of interacting with a patient. Many students described this feeling as the most crucial learning benefit:

You get the feeling of how it is. Just knowing theoretically how a procedure works, you do not get the impression of how it feels. But you get that with the dolls; you feel resistance; you get those distances, for example, to the catheter. It helped a lot because you got the feeling of what it is like to do it. (Interview 12: Students)

3.5. The collective learning space

In all the investigated sessions, the manikin became a meeting point for conversations and reflections. Frequently, two or three students, alone or together with a teacher, gathered around a manikin. They asked each other questions and explained what they were doing and how they did it, and introduced different perspectives:

> *I get other people's views on things and see their ways of doing things; maybe someone has learned it. Everyone adds to what they have knowledge of. (Interview 10: Student)*

The students not only talked to the manikin as a patient, but they also talked about the manikin with each other. These conversations appeared to be of great importance because they were detached from the presence of an actual patient. They discussed in a way that would have been impossible in the presence of a living patient. A student said:

> *Because we cannot talk with it, we communicate with each other. I think that then we communicate better because we cannot communicate with the doll. (Interview 12: Students)*

Teachers participated actively in these discussions and motivated students to describe and reflect on their experiences and impressions:

> *The teacher and students stood together, reflecting on different sounds and conditions they may indicate. The teacher asked, 'What did you hear'? They talked and reflected on different respiratory patterns and what may have caused them. The teacher encouraged them to describe what they had heard. (Field description 6)*

A teacher described their role as someone who triggered and stimulated such reflections. Simultaneously, when the students began to interpret their impressions, professional reflections became apparent: *Is this normal?* The manikin gave them a concrete image of a patient. In this way, it became an aid for teachers to convey how clinical skills should be performed.

> *The doll facilitates the teacher to show us how to do it. If we are sitting in a classroom, [they] explain things, but we do not always understand it. It is better to see this visually. Like, when you are to insert a catheter and have a urethral opening, [they] can show: 'Now you should put it here'. However, from a book or a picture, it is abstract. (Interview 12: Students)*

In this way, the manikin's body helped visualise things the students had only read about, such as the location of a stoma:

> *By having a doll with an apparent stoma, something that looks like an intestine, they at least know where on the body they can find it. (Interview 7: Teacher)*

Often, the teachers visualised the theory and syllabus when they referred to the manikin. The students tied theoretical knowledge with what they were doing and seeing. This became especially clear when it came to physiology and anatomy:

> *The teacher asked questions related to physiology and anatomy. I realised that the doll contributed to a tangible and shared focus. (Field description 5)*

Through these discussions and reflections around the manikin, the students expanded their understanding of things they might not have understood before.

4. Discussion

To answer the research question, we apply to the results CHAT's concepts: the object of activity, learning and learning culture, and expansive learning. These were the concepts for which we found support in the results. The discussion surrounds how the manikins worked as knowledge mediators and introduced the students to the continuous balance between the technical and interpersonal aspects of nursing practice.

In our findings, students and teachers directed their attention to manikins essentially as objects or subjects. Consistent with Ireland (2017), they used manikins as physical objects or symbolical humans, reflecting the manikins' inherent, dual nature (Handeland, Prinz, Ekra, & Fossum, 2021). Both students and teachers used manikins to optimise students' learning on their way to becoming qualified, competent nurses. In other words, promoting students' learning directed their activities and constituted their object of activity (Engeström, 2001, 2011; Sannino & Engeström, 2018). This objective tied all the sessions together, regardless of formal learning outcomes, type of manikin, or learning activity. Students and teachers employed manikins in the way they perceived them as optimal from this shared object of activity.

Each approach relates to a distinct understanding of how knowledge should be distributed and what first-year nursing students should learn, leading to the emergence of two learning conceptions. When manikins were used as objects, learning appeared to be like a road that the students had to walk step by step, learning one thing at a time. This is consistent with Keskitalo et al.'s (2013) description of learning as acquiring knowledge and skills. This learning conception relates to the learning of technical and procedural competencies in nursing practice. Nevertheless, some studies point out that manikins make students emphasise technical and physical aspects of nursing (Dean et al., 2015; Lee et al., 2019). Therefore, this learning conception can be criticised for detaching communicative skills from technical ones (Anderson & Nelson, 2015).

When manikins were used as subjects, learning unfolded as a process that aims to connect the technical with interpersonal and caring skills, parallel with Keskitalo et al.'s (2013) description of learning as advancing and applying. From this conception, the symbolic human body becomes a subject in the students' imagination. The teachers assume that this provides students with an authentic experience of handling a patient. However, to what extent they learn and retain interpersonal and caring skills by approaching manikins as subjects remains unclear.

The two learning conceptions coexist. Agreeing with Claxton (2002) and Kumar (2019), we argue that they constitute a one-compound learning culture. This learning culture seems to create a stimulating, flexible learning environment that reflects the complexity of nursing practice. If students are supposed to learn a specific technique, such as urinary catheterisation, a relation to the patient can stand in the way and disturb their attempts. Hence, the object is relevant. On the contrary, if the students are expected to understand how to catheterise a patient, it is favourable to activate the notion of a patient: the subject. Since the face is a significant aspect, a symbolic action can be used to cover the manikin's face with a towel to mark when students relate to it as an object and remove it when they relate to it as a subject. In short, it is not the manikins themselves that are essential, but how the students and teachers activate the manikins' qualities. A manikin does not expect anything from anyone, but the participants communicate their expectations to each other through it.

Nevertheless, we sensed a struggle in the students' use of manikins caused by teachers often referring to manikins with ambivalence and inconsistency. Rarely did one clear, unison voice communicate what the manikins were supposed to be. For example, even if the learning outcome was to learn a specific skill (object), teachers sometimes communicated that the students should also learn communication and care (subject).

Reflecting on our findings, expecting first-year students to exhibit caring behaviour the first time they do a procedure seems unlikely. When they are developing their practical skills, students must first learn and master the psychomotor aspects of the procedure sequentially before performing the procedure with accuracy and fluency. They can, then, become flexible and perform the procedure while adapting their actions to the patient's needs. Caring behaviour is fundamental and permeates the other steps (Nielsen et al., 2013). One can argue that stu-

dents should acquire a base of psychomotor skills before developing communicative and caring skills. However, since caring behaviour pervades high-quality nursing, teachers who remind students to inform the manikin are likely to stimulate awareness of this component and invite students to develop caring skills gradually. To support the students' learning process, manikins could, at an early level, be used in simple scenarios to enhance the notion of a patient in skill training before gradually introducing more complex patient-scenarios at higher educational levels.

Learning in the individual learning space is related to experiential learning, as understood in Dewey's tradition (Dewey, 1938; Miettinen, 2000). Manikins stimulate curiosity and spontaneous exploration and engage students' sensory perceptions. Through this, the students train their senses, which is essential in professional nursing practice (Ihlebæk, 2018). For example, Lavoie et al. (2020), who found that the impact of hearing realistic sounds when using manikins was significant, support our results. Students' sensory perceptions are processed and interpreted as one meaningful unit: the feeling of doing something with a patient. This feeling seems to evoke emotions and raise an awareness of care. Vygotsky argued that emotions and thoughts are related (Mahn & John-Steiner, 2002). Emotional experiences connect to brain structures that influence deep learning (Goleman, 1995), supporting the teacher who believed that the students remember their experiences with the manikins; they stick in their minds (Dunnington, 2014).

In the collective space, learning is related to collaborative and reflective skills. In this study, when students and teachers gathered around a manikin, they created an environment in which they could discuss in a manner that could not have been possible in the presence of a living patient. Because the manikin possesses human features without human dignity, it allows students and teachers to discuss about it without caring. In our results, these discussions were distinctly more invested with the character of an object than a subject. Through guided reflections (Schön, 1986), or situated coaching (Benner, 2015), teachers support students in becoming reflective professionals early in their education. This challenges the students to reason and argue for their thoughts and actions, which is necessary for professional discussions.

Together, the two learning spaces offer experiential learning and opportunities to train reflective and reasoning skills: what Benner (2015) calls thinking-in-action. However, these skills were not included in the formal learning goals. Additionally, these skills are more difficult to measure than, for instance, the setting of an injection. Only to a limited extent, curriculums in nursing education embrace these skills (Benner, 2015).

A final point to explore is whether manikins are used as a source for expansive learning, implying a change or development in the object of activity initiated by contradictions and opposing forces (Engeström, 2001, 2011; Sannino & Engeström, 2018). Tensions and inconsistencies related to the use of manikins as objects or subjects characterised our results. However, we were unable to derive a solid argument pertaining to these tensions initiating a change consistent with Engeström's (2001) description. The bearing object of activity remains in students' learning. So, where can the object of activity be directed towards developing the system? One solution may be that students and teachers constitute an objective that does not primarily direct students' learning but also that their learning, above all, shall serve the well-being of future patients. An objective of activity resting on patients' well-being may infuse students' learning with a deeper meaning, and it may connect the educational system with clinical practice, similar to what Berragan postulated (2013).

Nursing education can support this change in several ways. Tensions inherent in the manikins' dual nature may be a driving force for change and should not be eliminated. In this study, the students seemed to encounter the struggle or balance between the technical and procedural dimensions, on the one hand, and each patient's needs and well-being, on the other. Increased awareness of this balance may give students an insight into realistic professional practices. We believe that students can become critical and inquire into existing practices through a shared exploration of this balance. If the students and teachers together become a community of learners (Cordeau, 2012), they may discover new knowledge and new ways of doing things: expansive learning. A redefined object of activity will influence students' and teachers' roles and relations, the organisation of learning methods, and, consequently, the use of manikins.

4.1. Limitations

The purposive sampling strategy with engaged students being interviewed may have limited the findings' relevance (Etikan, 2016). Furthermore, specific cultural characteristics of each campus may have influenced the data. Nevertheless, we believe these limitations were equalised by the large number of sessions and participants and multiple sites. The study postulates findings that ran across the fifteen sessions. The validity depends partly on how we succeeded in elucidating differences in these sessions. From an ethnographic perspective, the study lasted a short period. Additionally, the sessions were time-limited, so only brief connections were made during the observations. Together, this may have provided a broad perspective at the cost of depth.

The researcher's presence and interventions during data collection may have influenced the participant's behaviour and data collected. Some interview questions may have guided the answers in the direction of the results. For example, the question *How was it to meet the manikin?* may have led them to describe the manikin as a subject, though, most participants talked freely and directed the interview to this topic before the questions were asked. Data may unintentionally have been interpreted in the light of the researcher's previous experiences. Nevertheless, the question, when it came to how manikins were used, bore similarity to the first author's practice at other nursing educations. This way, the researcher's presence and experiences may also have served to confirm the observations.

The transcribed interviews, coded material, and results were not verified by participants during the analysis process. For future studies, we recommend cross-checking data with participants before coding. In our case, a selection of participants could have read the transcribed interviews or field descriptions. However, we believe the extensive observations, together with the authors' individual readings and interpretations of the data, to some extent, outweigh this issue. Nevertheless, the authors are solely responsible for misunderstandings or misleading interpretations.

5. Conclusions

From this ethnographic study, we found that manikins were approached as objects or as subjects. This interplay reflects the manikins' dual nature, in which there lies the potential for learning both technical and interpersonal aspects of nursing. Additionally, two learning spaces appeared: the individual space, which provides the feeling of doing something with a patient, and the collective space, which provides collaborative and reflective learning opportunities. While both teachers and students directed their activities towards promoting students' learning, it was unclear what the use of manikins entailed because they were used with ambivalence and inconsistency over several sessions.

From the constructs of CHAT, this study enabled a deeper understanding of how students and teachers turn manikins into mediators of knowledge. It also becomes clear that the tensions inherent in the manikins' dual nature may be a driving force for change and expansive learning and should, therefore, not be eliminated. Regardless of the type of manikin and educational method, the use of manikins involves experiential learning and training in professional reflections and dialogue. Thus, the presence and use of manikins may introduce first-year nursing students to the continuous act of balancing the technical and interpersonal aspects of clinical nursing practice necessary for a competent nurse.

5.1. Implications for education and future research

Deploying manikins in different educational activities creates possibilities for nursing education. With an increased awareness of the features that influence the learning experience, such as the face, opportunities to explore and talk to and about the manikin, teachers can make targeted use of these features. Experience with manikins shows the potential to link theory and practice. This potential can unfold by facilitating students to work freely with manikins or implementing manikins in theoretical courses. However, a precondition for efficient and targeted use is a higher consciousness and more consistent ways of approaching manikins. We call for increased awareness among nursing teachers about what they want to achieve with manikins and treat them accordingly.

Empirical knowledge of the transferred value of practising caring behaviour with manikins is scarce. Little is known about how these experiences are recalled and activated in meetings with actual patients. This area should be explored further.

This study finds utmost relevance in nursing education. Nevertheless, presumed that the manikins' dual nature is inherent in the manikins being independent of field, culture, and setting, the results may have relevance in other educations where manikins are used. If the complexity and potentials of using full-body manikins are acknowledged, these results can support lower-grade students from various disciplines in their professional formation. This study may inspire different educational disciplines to investigate the implications of how educational tools, other than manikins, are used to mediate knowledge and learning. Here, CHAT represents a useful framework.

Author contributions

The four authors have made substantial contributions to the manuscript and have given final approval for this version of the manuscript to be published. They have agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This manuscript has not been published or presented elsewhere in part or its entirety and is not under consideration by any other journal.

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