

ORIGINAL RESEARCH

Digital photography as a pedagogical learning approach in nursing education

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ABSTRACT

Background and objective: The traditional teaching methods in practical nursing education seem to be either too theoretical or too practical. Therefore, combinations of theoretical and new pedagogical approaches are needed to teach and train students in practical nursing. The objective of this study was to explore the nursing students' experiences with the use of photography in the Simulation Unit, and to describe how photographs affect development of practical skills.

Methods: A descriptive and interpretive qualitative design was used. The collection of data was conducted by asking fifty-four students to answer three questions online after each session and based on the day's photographs. All photographs taken by the groups were uploaded to a virtual meeting room, a total of eight hundred and fifty-five photos. The photographs formed the basis for determining what the students have learned from examining and exploring photographs of the students themselves and their peers. Their subjective statements and experience were later downloaded and analysed using phenomenological analysis.

Results: Photography positively influences the nursing students' learning, increased their self-confidence and enhances competence in the exercise of skills. This gave the students a deeper understanding of the complexity of the practical procedures based on knowledge-based practice, and they learned quickly and easily.

Conclusions: The students become more self-regulated learners, developed better self-confidence, and bolstered their learning competence in relation to the degree requirements for knowledge-based procedural learning. There was consensus among the students that the photographs were a useful learning tool, both intra- and interactive, and were a useful supplement in learning practical skills.

Key Words: Nursing-students, Nursing-education, Simulation, Skills-learning, Photographs, Qualitative interpretive method

1. BACKGROUND

Practical knowledge is perceived to be the art of nursing,^[1,2] understood here as knowledge about caregiving and treatment, which are the cornerstones of nursing competence. One of the challenges in nursing education today is finding optimal approaches or methods to train students in practical skills, which also include compassionate communication. The training in the Simulation Unit has been an essential part of the bachelor's degree programme in preparing nursing students before placement to clinical practice.^[3-5] The policy

initiative and an increasing amount of literature within higher education call for new learning approaches. Researchers claim^[3,6-9] that clinical practice is important and an essential element in nursing education and must become a more virtual learning component in the nursing curriculum in the future.

In their comparative study, Martin et al.^[10] show significantly greater improvements in students' learning with the innovative help approach "How People Learn", the "What, Why

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and How". This method improves understanding and helps the students to discover new possibilities and gain deeper understandings.

Research^[6,11–13] shows that realistic photography helped students change their attitudes towards their chosen profession. Photography also helped students achieve their objectives in learning basic skill and increasing their own understanding of empathy. It also helped them to see what it means to be a patient and encourage them to reflect upon their own role as a nurse.

Cameras catch specific situations that stimulate students to understand each other when expressing nursing values such as care, respect, trust, cooperation, and cultural aspects.^[6,8,13] External feedback, both formal and informal, from the teacher and peer students, along with visual feedback from photographs evoke different forms of reaction in student trainees. This facilitates the students' learning processes. Photography increases the students' awareness and thus enhances their knowledge acquisition.^[14–16] Research points out that photographs lead the students towards an innovative to knowledge development in human conditions, relationships, ethics, and aesthetics in their profession.^[3,6,16–18] The photographs gave the students a clearer insight into human conditions, relationships, ethics, and aesthetics. The photographs sometimes illustrated difficult motor skills and involved specific movements that stimulated the students' ability to coordinate better, to think independently and become more self-regulated learners. The authors state that using photo-elicitation and snapshots as an approach in nursing training capture the nursing students' learning results through photographs that are representative in different learning situations. The authors' further state that this method also captures and transforms the outcomes and helps students to gain new insights, become more attentive and inquisitive. This in turn aids understanding. The method also helps the students to remember, reflect and review situations in photographs. The above authors also point out that photo-elicitation has been used for decades, especially in anthropology and sociology.

Steenfeldt Oestergaard et al.^[19] argue that the recurring challenge in Danish nursing education is how to bridge the gap between theory and practice. Several authors^[3,6–9,14,15,18–22] have expressed that photograph as a research method is underestimated in the nursing literature and that there is a need for modification within the practical part of the nursing profession, mainly because practice, along with technology in society, develop rapidly. Photography can be used to tell learning stories of what occurs or takes place.

1.1 Aim

To explore the nursing students' experiences with the use of photography in the Simulation Unit, and to describe how digital photographs affect development of practical skills in nursing education.

1.2 Research question

How do nursing students experience digital photography when learning practical nursing skills in the Simulation Unit?

2. METHOD

The study was inspired by Giorgi,^[23] and Brinkmann and Kvale^[24] and their phenomenology and view of reality. According to Kvale and Brinkmann the goal of phenomenology is to provide descriptions of experiences, behaviour and understanding. The qualitative method seeks knowledge in normal language. These authors talk about different features of interview knowledge, one of which is contextual. This methodological approach deals on a phenomenological philosophy, which includes communication, understanding and interpretation. This means that emphasis is on the context of human life. The method aims to nuance accounts of different aspects of how students learn their practical training situations.

2.1 Participants and setting

Four hundred and seventy registered first-year nursing students in the autumn and spring semester represented classes A and B. All the students were informed about the project in a meeting at the start of their studies. Fifty-four students from classes A and B agreed to participate in the project. Six study groups were established, consisted of seven to ten students. All students signed and gave their consent to participate in the study. They received two hours introduction about the different procedures, how to do and how to evaluate the procedures before each meeting in the Simulation Unit.

2.2 Data sampling

Using two handheld digital cameras, eight hundred and fifty-five photographs of the students were taken by the researchers while the students were in their practice session. After each practical session, the students had to study the day's photographs before answering three study questions:

- Describe your feelings, thoughts, and actions in using photographs to help learn the assigned practical nursing skills?
- In what way did the use of photography have effect on your self-confidence?
- How did photography make you aware of any ethical and aesthetical perspectives when learning the assigned practical nursing skills?

The students were encouraged to be specific when they expressed themselves on how the photographs influenced their learning of practical skills using the digital photography as a pedagogical learning approach. The students responded in writing online in the virtual meeting room.

2.2.1 The virtual meeting room

A virtual meeting room (VMR) was created. In this room all communication between the students and the researchers about the study took place via the University's web portal. Each digital folder was marked and given a name such as project description, participation, research questions, etc. All eight hundred and fifty-five photographs from the study were uploaded in this room. The students studied the photographs before answering the study questions. The participants had access to this VMR, in the same manner as the researchers, via their usernames and passwords.

The first printout of the students' answers to the three questions was anonymized because of the students' names and other sensitive data in it.

The printouts with the names of the students were locked in a safe at the Faculty of Health Sciences due to safety reasons. All the next printouts were anonymized.

2.2.2 The practical session in the Simulation Unit

The use of digital photography was supplement to the nursing curriculum plan in this study. The data sampling for the study focused out the following three procedures:

- 1) Various hygienic procedures
- 2) Bed making while a patient was bedridden
- 3) Intramuscular injections

The students took turns being nurse, patient, and observer in the learning processes. Each practical session started with a briefing about and demonstration of the skills. The students were grouped, three by three, around each hospital bed so that everyone had an opportunity to try out the different nursing roles. The last half-hour of each session was used to reflect collectively on five or six of the photographs that had been taken and picked out by the student groups. The selection of photographs was done in line with what the students wanted to discuss and learn more about.

2.2.3 Uploading and anonymization

The students had to submit the answers to the study questions before the next meeting. In both semesters the students uploaded their online answers themselves.

In the spring semester, the researchers collected, anonymized, and archived all the students' answers. A copy was printed and placed in the Faculty of Health Sciences' safe for protection. Then the online written answers were ready for analysis and interpretation. The participating students had access to

all the uploaded photographs in both semesters. The students' descriptions online were now ready for analysis in the VMR.

2.2.4 The roles as teachers and researchers

At the end of the practical session, the nursing students changed into their private clothes and went to the university's data rooms to download the document containing the three study questions from the VMR. At the same time, one of the researchers uploaded the photos of the day into the VMR, in a folder marked with the group's name and date. This ensured that the students had access to the digital photographs before they answered the survey questions. The students' answers were later uploaded into a new marked folder, to which only the researchers had access to.

In the analysis processes, data from the VMR was once again downloaded and placed in a new folder. Only the researchers had access to these analysis documents.

2.3 Analysis

The written data consisted of forty-eight pages with written data in font size eight and with single line spacing. The analysis processes started by breaking down the students' descriptions of how the photographs influenced their learning situation. The researchers met to discuss the relevant units and agreed on the themes. The analysis process includes three levels. Examples of the different levels are given below.

2.3.1 The self-understanding level

At this level, it was important to get a grasp of the text's natural meaning units. This concerned how the students expressed themselves and how the researchers interpreted the text and its meaning. According to Brinkmann and Kvale,^[24] the interpreter formulates the students' self-understanding, i.e., what the subjects themselves understand to be the meaning of their statements.

The following statement from one student is an example: *Norwegian is my second language. I was not clever at learning new skills. I do not like to make mistakes and am shy. I admit that the camera affected me at first.*

This quote shows a student's thoughts and feelings about learning. The introspected self-reflection the student displays provides a basis for understanding the student's world.

2.3.2 The commonsense understanding level

At this level the interpretation processes go beyond the participants' formulation. This analysis includes a wider frame of understanding than that of the subjects themselves.

One example is the following:

When setting intramuscular injections, students were enthusiastic about being photographed, especially in the role of

a nurse. They showed no visible signs of anxiety. The fact that students asked if photographs could be taken of was interpreted as a positive learning experience, which made a difference.

2.3.3 The theoretical understanding level

At the theoretical level, the meaning of a statement is more widely applied.^[24] The interpretations then go beyond the subject's self-understanding and thereby exceed a common-sense understanding. An example of this type of understanding is discussing the results in the light of earlier research. The passage below is derived from a discussion of the result. The digital photographs influenced learning in a shared environment:

The sporadic anxiety that students might feel at the outset of this study, in their encounter with their learning situation, was considered normal.

This is in line with the research by Ball and Hussey (2020) and shows that innovative technology can improve the students' experiences and reduce their anxiety before they go into the upcoming clinical setting.

3. RESULTS

The study showed that photography and subsequent analysis of photos taken positively influenced the learning process of the participating students.

Not only did it bolster their professional self-confidence and skills competence, but it also promoted interactions and collaboration and contributed to quicker acquisition of the necessary nursing skills.

- *The digital photographs influenced learning in a shared environment*
- *The digital photographs promoted interaction and cooperation in the groups*
- *The digital photographs enhanced the integration of knowledge*

3.1 The digital photographs influenced learning in a shared environment

Most of the students expressed that the photographs influenced and motivated their learning processes. The photographs made it possible to absorb larger amounts of data and information faster and more easily. This helped the students explain complex matters in relation to the various practical tasks and training. Studying the photographs helped them to focus on their course curriculum- and homework. During the final procedure, setting the intramuscular injection, students were eager to be photographed, especially in the role of a nurse. They showed no visible signs of anxiety. None of them described feelings of being anxious or fearful.

Instead, they asked to be photographed several times because it helped them in their learning of the various procedures.

When learning the procedure of setting an intramuscular injection on a patient, one of the peer students requested close follow-up and guidance from a teacher. This was interpreted as the students becoming aware of the usefulness of the photography as a pedagogical learning tool or discovery that the practical skills required different forms of knowledge.

The students revealed that the procedure of intramuscular injection is more than putting a needle into a muscle. The injection needed to be done under the control of a teacher. The nurse must inject the sodium chloride correctly into muscles. All the students' roles had particular challenges.

Therefore, it was beneficial for the students to have the photographs to look at especially when they trained together on the skills in the Simulation Unit in their free time. This in turn aided learning because they dared to confront themselves and in new ways.

One student made the following comment after being photographed:

As a beginner there are some challenges in performing, for example, the thought of not performing the nursing procedure well. This makes me nervous in the beginning. But the photographs show other students and me that we are all in the same situation. After then I felt good and secure, and it was fun. Surprisingly, the photographs amazingly put me in a learning mode. I mean, they motivated my learning.

The quotation above shows that negative thoughts and experiences can also be a positive driver, which later gave a really affect to the students' learning outcome. The photographs helped make it clear to them that most of their peer students were in the same situation, as beginners. By looking at and reflecting on the photographs the students became aware of the value of observing, listening, discussing, and correcting one another in the shared environment in the Unit. The photographs led them to identify their needs and share strengths and weaknesses. This means that the photographs motivated the students to assess and try to understand themselves and each other in a new way when learning practical skills.

The sporadic fear, that some students felt, particularly when they wanted to demonstrate their practical skills, or when they wanted to argue in the group, quickly disappeared.

Indirectly, the photographs helped them to show openness and to make one another feel secure by inviting each other to speak in the assigned roles. In this way they discovered the power of connection in doing practical exercises.

3.2 The digital photographs promoted interaction and cooperation in the groups

The students reported that the different roles inspired and stimulated them to talk and work together. "Fresh Experience" was a word used to describe this matter. The students describe that the photographs helped them to facilitate a more dynamic and interactive learning environment. Some students that repeatedly experienced getting feedback from the photographs gave a face-to-face relationship, a form of double exposure. The students also expressed that they felt secure in the various learning situations. The following written description summarizes the students' responses.

The photographs stimulated me to speak and ask the question: What happened? The photographs revealed how the practical procedure was carried out and showed the importance of teamwork.

The text above gives the impression that the photographs served as icebreakers. They made the students more active, more cooperative, empowered and involved in each other's learning process. Students found inspiration in the photographs, which facilitated communication between processes and prepared them for clinical practice. The students became more aware of how important communication was when they switched roles. They discovered that communication involved courage, empathy, emotions, and generosity.

3.3 The digital photographs enhanced the integration of knowledge

Many of the students described the photographs as their "extra eyes". Looking at photographs gave them extra support in discovering different ways of acting and doing.

Getting feedback from the photographs helped them in a more exploratory and pedagogical way to understand what to do. A statement from one student clarifies:

The photographs provided insights about human anatomy and physiology, patients' health experiences and attitudes of both patients and nurses. Photographs assisted other students and me to think and reflect over the different nursing procedures and principles step by step. The photographs helped me to understand the prescribed learning theories and practices.

These articulations tell us that the photographs affected students' thinking, reflection and verbalisation of their skills, performances, and relevant knowledge in a positive way. The students' creativity and inspiration gave them a deeper understanding of what they were doing and how to behave in practice. In addition, they gained new insights. Through looking at the photographs and using them, the students found that photographs sometimes communicated more directly than

words. Photographs provided a faster and easier understanding, promoted confidence, enhanced trust and flexibility, and increased their nursing competence in skills learning. The students described that they trusted each other, which in turn enhanced their self-confidence and the learning environment in general.

They were all beginners in a common situation/environment. The photographs created "bridges" between the practical and the theoretical learning. This made the students more aware of the connection between practice and theory.

One student expressed this in the following way:

In the role as a patient, I experienced that it was not painful to receive an intramuscular injection. We had practiced on a sponge to master the technique. The students, who injected 0.ml of NaCl, salt water, were calm and had control, followed the theory and the textbook. The teacher was with us. My peer students' hands did not shake before she set the injection. This student became my role model.

The quotation above shows that some students had discovered that the nursing profession is based on theory and practice, such as interaction and touching the patient, and placing the patient in a horizontal position when an intramuscular injection was to be given in the gluteal muscle. The photographs helped the students in various ways to perform the procedure precisely and with empathy and care for the patient. If you have seen something with your own eyes, you understand it in a completely different way, were the words the students used.

4. DISCUSSION

4.1 The digital photographs influenced learning in a shared environment

The nursing profession has changed over time. Research^[3,6-9,13-15,18-22] calls for better practice and varied learning methods as well as further and more clarifying research about pedagogical approaches.

Our literature review shows that the practical nursing education seems to be either too theoretical or too practical. Today's generation of teachers and students think differently than previous generations due to the new IT-technologies and the fact that owning a computer is almost common.

The results show that being photographed created a shared situation for the students. Using photographs seemed to be an effective way to prepare for the upcoming practice and reduce the students' anxiety about it in a high-quality and realistic way. The photographs also cached specific situations which stimulated the students to evoke values such as responsibility, respect, and trust as well as cultural awareness

and understanding.^[6,8,13]

The nursing profession has been through a theorizing phase, and this may also have taken priority away from practical teaching. Therefore, we also meant that new methods in teaching practical skills in Skills Laboratory are needed.

The results showed that the photographs taken of the students in ordinary teaching and guiding stimulated the students' learning processes in more holistic ways that affect the learning environment and promote learning. Digital photography was a good supplement as a pedagogical approach and a learning tool assigned to practical nursing skills. The students got confirmation or corrections on their own understanding of what happened in clinical situations. Several authors^[1,2,19] have described the art of the nursing profession. The intention in the nursing profession and nursing education is to teach the students to work in a knowledge-based manner and thereby build bridges that span the gap between theory and practice.

Kronk et al.^[18] state that photo-elicitation is a good approach in nursing because it captures the different learning situations. It helps the students to come closer to their learning situation which boosts new insights. This was confirmed in the present study, where the photographs had a positive and a constructive effect on student learning situations. There were fewer negative discussions among the students because the photographs were evidence of what had taken place. Thus, the pictures revealed the truth, and the students learned faster and more easily when they influenced one another. The students became better equipped to make decisions that led them to acquire and develop new knowledge. They could share insights and learn with and from each other in a secure environment.^[3,16,17]

The photographs gave the students clear insights into human conditions, relationships, ethics, and aesthetics. The photographs also stimulated students' skills in communication, participation, and cooperation. It affected the students' independent thinking and decision making. All participants could later study their group members via VMR.

Several students commented that they enjoyed having so many photographs to look at, because they all involved either themselves or a fellow student. The students thereby had a basis for comparison, judgment, and evaluation while they trained together prior to being tested before their clinical studies. This was almost like a new form of feedback.^[4,13,17,22] Some photographs confronted the students' sensitivity in their performances and at the same time yielded positive experiences in the learning processes leading to new knowledge acquisition. They triggered changes in attitudes about

themselves and their peer students because the photographs increased the students' awareness and thus improved their knowledge and sensitivity towards learning.^[11,14] The sporadic fear a few students felt at the start of this study, when they encountered their first learning situations, was considered normal at the first meeting in the Skill Unit. Ball et al.^[16] show that innovative technology can improve the students' experience and reduce their anxiety before they go into the upcoming clinical setting. The result shows that the effect of self-confidence through photography while learning practical skills is of key importance.

The beginner's fears and worries about not mastering disappeared when the students felt they were succeeding. They had learned more about their own strengths, weaknesses and the benefits of observation skills and insight into human conditions. Photographs influence learning and clarify expectations and face and confront and increase students' understanding of the learning process.^[4,16,25] Additionally, research about digital technologies reveals that videos, snapshots and photographs visually capture learning situations that encourage students to learn more about themselves and were trained to express respect and trust. They learn to cooperate with others in practical skills training.^[26,27]

It was an advantage that the students could print out the photos and have them accessible. The photographs thus became a learning tool to enhance the students' self-awareness and self-understanding, which later helped them to develop awareness in their social settings.

They learned in a shared environment. Almost all the students wrote that they found the third procedure, intramuscular injections, most challenging when they practiced alone without a teacher in the Simulation Unit.

4.2 The digital photographs promoted interaction and cooperation in groups

Some students mentioned that during the first meeting at the Simulation Unit they experienced some frustration. They did not see the learning results of the photographs. But when they printed out photographs from the VMR, they quickly discovered the benefit of the photography, and their frustration disappeared.

Earlier research^[3,6,7,13-16] confirms that informal and/or formal verbal feedback from the digital technology stimulates and engages students in their practical training to interact and cooperate. These relations promoted the students' learning in terms of skills, communicating, collaboration and teamwork. The photographs facilitated their learning processes and positively affected their influence and reasoning with others.^[14-16] In this way the students' anxiety levels were

lowered in preparation for clinical practice. This gave a deeper understanding of the quality of the words "being" and "doing" and a better understanding of their roles and their attitudes.

Several authors^[3,15,16] underscore the benefit of photography for students' way of thinking, decision-making, interaction, and cooperation, particularly in groups.

The students were more helpful towards one another and worked towards the same end. The digital photographs enhanced the students' ability to function in their distinct and different roles, and they became more aware of each other's behaviour.

Different authors^[14-16] state that the photography addresses students' awareness. Other students point out that in the beginning it was not always easy to get their hands and fingers to do the right things. This was clear in bed-making while a patient was bedridden.

In such situations they had to use both fine and gross motor skills to master the procedure. In these different settings the photographs were of great help, especially when they practiced alone or with fellow students. A few students described feelings of nervousness at the first meeting in the Simulation Unit. This feeling quickly dissipated.

4.3 The digital photographs enhanced the integration of knowledge

Photographs help the students to gain deeper understanding and to change their attitudes towards their own profession in interaction, cooperation and understanding.^[6,10-16] Our students also confirmed that the integration and cooperation were easier with this new learning approach, with digital photography. They also point out that the photographs made it easier for them to transform abstract ideas into the three practical procedures. In addition, the photographs helped the students to integrate and combine knowledge. The photographs gave the students opportunities to see and with their own eyes review what had happened. Students thought that observing one another and looking at the photographs spoke directly to them. Other researchers also note this view.^[6,11-13] Students write about mutual eye contact and the benefit of speaking together, and they stress that this was a good way to learn practical skills. This affected the students' skills learning and attitudes in a constructive way.^[3,16,17] This learning also included the acquisition of ethical knowledge in their skills learning.

The photographs thus spoke more directly to them because they showed the sequential steps in the procedures. Ganzer^[4] argues that self-reflection is important in learning situations and influences the students' self-reflection, self-insight, and

awareness in terms of what to do and what to believe in. It is essential to help students assess their basic care competence before they go into practice.^[1,2]

Research underlines that photographs and instruction together can motivate students in evidence-based practice, modernization, and conscientiousness in nursing.^[4,6,16] Photographs can also integrate knowledge, relate, and unify concepts in various situations.^[11] At the same time photographs can involve a risk of distortion and over-interpretation leading to misunderstanding. In such cases, the students may not have seen or understood the intention of the simulations. Research^[3,5,13,17] points out that learning manual skills and simulation are fundamental in nursing education and to be more actively involved in self-reflection and asking themselves questions to gain a deeper understanding of feelings and behaviour. Combining different methods and approaches is important for the students in stimulating reflections about the motor skills. The muscles and the brain, cognition and empathy must work together in the learning processes.^[3,5,8,19,20,27] The students mentioned that the photographs motivated them to take control and to be active in problem-solving.

4.4 Ethical considerations and limitations

The authors were not acquainted with the students before the study began. They were informed of the research project and were guaranteed anonymity and confidentiality and that they could withdraw from the study at any time without giving any reasons for their leaving. They gave verbal and written consent. The University administration and the Norwegian Centre for Research Data (NSD) granted authorisation to conduct the study, reference number 17231. Permissions were established and the students who participated in the project had also received written and verbal information about the study. To meet the challenge of nearness to the subject, no face-to face interviews were conducted. In this way the researchers did not influence the students while they answered the questions online. Five students dropped out of the study. The students looked upon us as teachers, not as researchers in the Simulation Unit. As teachers, we knew the skills, the area, and the equipment well. Limitations related to negative consequences in the study, were not mentioned by any students.

5. CONCLUSION

The students became more self-regulated learners, developed better self-confidence, and increased their competence related to the learning requirements. They also pointed out the beneficial learning experience while studying the photographs alone or together with peer students. These experi-

ences gave them a deeper understanding of the complexity of the practical skills. There was consensus among the students that the photographs were a useful learning tool, intra- and interactive, and helped the students to integrate knowledge. The students also discovered that communication involved knowledge, a willingness to understand emotions and situational awareness.

Recommendations for practice implication and research

The use of photographs corroborated that this learning approach in nursing education is an appropriate method, which lead to self-regulatory learning. Therefore, this study recommends using photography in teaching and guidance practice. More research is needed in this field. Based on the authority's requirements and regulations on patients records in Norway, there might be room for quality improvements concerning data collection for the nursing journal.

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DATA SHARING STATEMENT

No additional data are available.

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