ORIGINAL RESEARCH

Design for learning through inquiry to enhance clinical reasoning among new nursing graduates at a tertiary referral centre in Singapore

Huiluan Chen*[1], Benny Kai Guo Loo[2], Delphine Hui Fang Tan[3], Cristelle Chu-Tian Chow[2], Julia Eng Chui Lee[4]

[1] *Nursing Education and Development, Sengkang General Hospital, Singapore*
[2] *Division of Medicine, KK Women's and Children's Hospital, Singapore*
[3] *Division of Nursing, KK Women's and Children's Hospital, Singapore*
[4] *Nursing, National Cancer Centre, Singapore*

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ABSTRACT

Purpose: Clinical reasoning is essential for nurses. Shift from third-person to first-person perspectives to enhance new nursing graduates' clinical reasoning. The pilot study developed clinical reasoning learning and assessed the design to determine if it had contributed to enhancing new nursing graduates' clinical reasoning.
Methods: Descriptive statistics were utilised to analyse sociodemographic data. The thematic analysis explored the open-ended questions concerning new nursing graduates' perspectives on the design.
Results: The thematic analysis uncovered four key learning themes that promoted the utilisation of the design.
Conclusions: The results suggested that the design for learning suited new nursing graduates, and they expressed satisfaction with using it. More extensive studies are needed to gain deeper insights into the design for learning incorporated into clinical nursing education.

Key Words: Design for learning, New nursing graduate, Clinical reasoning, First-person sense, Clinical nursing education

1. INTRODUCTION

1.1 Changing clinical reasoning learning from the third-person sense to the first-person sense

The traditional approach to teaching new nursing graduates to recognise the warning signs of clinical deterioration at this centre is based on a series of lectures or role play. Each session's elements are organised so that new nursing graduates can reiterate the information conveyed to them.[1] They must link that information with the observable warning signs of clinical deterioration. During the lecture process, individual new nursing graduates must distinguish a specific symptom from a functional change associated with a disease or syndrome. This learning condition increases the likelihood of absorbing all the information in the lecture notes. Confidently relying on the speaker's lecture notes and connecting to warning signs of clinical deterioration, this learning method is largely accepted without anyone questioning it. If someone presents alternative views as facts, it is considered disrespectful to the speaker. In developing nursing curricula and training, advocating such views is discouraged to prevent offending speakers and undermining the credibility of teaching resources' integrity.

1.2 The motivation

Furthermore, despite many new nursing graduates remaining uneasy about their science knowledge to support understand-

*Correspondence: Huiluan Chen; Email: tan.hui.luan@skh.com.sg; Address: Sengkang General Hospital, Sengkang East Way, Singapore.

ing of pathophysiology,[2–4] they become acquainted with the information as content experts articulate the facts. New nursing graduates struggle to understand the significance of developing their knowledge of warning signs, which necessitates the effort to apply it to real patient situations. New nursing graduates may not yet grasp the process of knowledge creation and the act of inquiry. New nursing graduates often misinterpret clinical reasoning, making it less effective. To enhance clinical reasoning learning in nursing, we must shift new nursing graduates' understanding of the warning signs of clinical deterioration, viewing them as a metaphor for discovery rooted in the practice of inquiry, aligned with the processes that professional nurses follow.

1.3 Changing teaching clinical reasoning concepts through participation in Conversation, clinical learning in action and in Pursuance of – (CAP)

1.3.1 *The What*

Simulations are used in all resuscitation training sessions. They enhance clinical experience by simulating various levels of fidelity. Such simulations are limited by the participants' varied clinical experiences with or observations of actual patients. Though participants from various departments come together to attend a session, they must, within 30 minutes, revive the manikin from unconsciousness based on the predetermined scenario. In many instances, these simulations are adequate for achieving the goal of involving everyone; the simulation merely serves as a substitute due to the increasing demand for clinical placements and patient and staff safety considerations.

1.3.2 *The Why*

We utilised the concept of simulation-based practical learning and established a harmonious learning environment that supports new nursing graduates in a workshop setting. A shift in the culture of practical classes is essential for the success of this learning process. The emphasis should shift from instruction to learning, with inquiry-based learning employed to foster learner-centred education grounded in pedagogical principles—CAP.

1.3.3 *The How, including learning objectives that new nursing graduates should achieve upon completing the workshop*

Clinical simulations provide an unparalleled method for promoting experiential learning from a first-person perspective. Regardless of how traditional teaching takes place in a clinical setting, the focus remains on third-person learning. The current curriculum aims to cover the subjects outlined in the book, and educators dedicate significant time to lecturing various groups of nurses and endeavouring to convey those lecture notes. In alignment with Bloom's taxonomy, educators illustrate that for new nursing graduates to grasp the content, they must first possess clinical reasoning knowledge. New nursing graduates are tasked with completing an assignment and are instructed to apply what they have learned to progress to the third level of Bloom's taxonomy. This instructional approach often falters for clinical tasks involving numerous aspects that make them challenging to understand or manage.

However, this pilot study included a learning objective that focused on seeking information and engaging in questioning through dialogue. The experiment station (see details of the design-for-learning) offered new nursing graduates the opportunity to utilise inquiry-based learning, enabling them to think, communicate, and engage in dialogue with a simulated patient (the voice of a nurse educator). This experience allowed them to act and value in a manner akin to professional nurses. Given that decisions regarding warning signs should be grounded in the realities of clinical deterioration and physical examination, alongside the limited availability of curriculum time, the pilot study took priority over all other considerations. This prioritisation provided new nursing graduates the means to develop the habitus and a reflexive approach to professional practice, adopting a first-person perspective. The aim was that, through this approach, new nursing graduates would engage in simulation-enabled clinical reasoning practices in clinical wards instead of merely participating in preparatory learning for studying clinical reasoning and attempting to memorise the occurrences of warning signs.

1.4 Applicable pedagogy

Take part in conversation->pathophysiology in action->in pursuance of the pedagogy framework.

The conceptual outcome of inquiry–warranted assertion is the basis of the Changing clinical reasoning learning from third-person to first-person sense, inspired by Dewey, Biesta & Burbules, authored chapter 3 – The Process of Inquiry, 2003. Dewey placed his argument that a person begins to inquire, and his/her experience turns into a cognitive mode when the person is in a problematic situation.[5] In this state of thinking, a nurse's experience is converted from the level of feeling to the level of options, and the relationship between these two is acknowledged.

The lecture style of learning, for example, on the abnormal physiology of a disease state, is a core feature of health professional programmes. While lectures can efficiently teach content, it is generally accepted that a deep approach to learning necessitates embedding content knowledge into case studies. Such case studies are built around authentic

scenarios, ideally prepared in consultation with practising clinicians and educators, to ensure contemporary practices are embedded into the case material. However, when taught in the classroom, the success of these case studies about promoting a deeper approach to learning partly relies on the nurses' capacity to successfully engage with the material and create a mental image of the clinical situation. This is very challenging for new nursing graduates with limited clinical experience.

Given the limitations surrounding teaching and learning practice related to clinical reasoning in the lecture, The Thinking Nurse (ttN) workshop discussed in this later part (point 2. Method - Design-for-learning) attempts to shift the focus of new nursing graduates learning from a third-person sense to a first-person sense, thereby, transforming the new nursing graduates' condition for acquiring what is learned. As such, it seeks to implement a mode of learning as inquiry and to transform clinical reasoning learning to one based on the professional practice of nurses.

1.5 Research question

The in-house orientation programme for new nursing graduates featured a clinical reasoning workshop. Therefore, we chose to collect data to understand how new graduates managed case studies, guided by the following research questions:

RQ1: What is the utilisation of inquiry during the workshop?
RQ2: What factors influence new nursing graduates to inquire?
RQ3: How would perceived inquiry self-efficacy improve new nursing graduates' clinical reasoning?

2. METHOD

2.1 Design-for-learning

2.1.1 *The thinking nurse*

Time frame. The Thinking Nurse (ttN) is a case-based workshop that uses clinical simulation to allow new nursing graduates to experience "clinical reasoning in action" in a clinical setting. Simulation scenarios focused on various patient cases based on real hospital situations. It was conducted for three weeks, with two lessons held each week. The first session introduced the workshop, while the fifth session conducted summative learning outcomes assessments. After the fifth session, new nursing graduates were asked to answer open-ended questions about how the simulation experience enhanced their understanding of clinical reasoning. The remaining three sessions were dedicated to discussions in the clinical simulation class. Each session lasted up to two hours.

Participation framework. The Thinking Nurse (ttN), in pursuit of realising this through the interactive activity with new nursing graduates who participated in the simulation class conversation, engaged in an activity aimed at making sense of experiencing "clinical reasoning in action" while formulating and interrogating the patterns of circumstances observed during this process. It was intended that through this initiative, new nursing graduates would develop not only an understanding of the abnormal presentation of symptoms and how it manifested within the various cases of patients explored in the workshop but also a sense of their identity as nurses engaged in clinical reasoning through their associated activities of knowing, doing, being, and valuing which are inherently involved in the role they undertook during the activity.

Table 1. The Thinking Nurse (ttN) - Take part in conversation->clinical reasoning in action->in pursuance of: The pedagogy framework

Take part in conversation	Clinical reasoning in action	In pursuance of
Facilitator-facilitated conversation	Experiencing, self-identity, embodied embedded	Application on an actual patient
	In situation, person-environment transaction	Clinical ward

The objective was that, by doing so, new nursing graduates would engage in simulation-based clinical reasoning practices within clinical wards rather than focusing solely on memorising symptoms in preparation for studying clinical reasoning. Consequently, their learning journey facilitated their transition into nurses connected to real life – that is, patients in the real world – within clinical wards. Table 1 illustrates the framework of a new nursing graduate evolving into a nurse over time.

Teaching and learning process: The Thinking Nurse (ttN) is an interactive activity comprising five stages. Table 2 summarises the cases of patients relevant to the medical specialities focused on in each activity stage.

Table 2. Summary of cases of patients addressed in each activity stage

1.	Introduce the module
2.	Nervous, Circulatory and Lymphatic cases
3.	Integumentary, Muscular and Skeletal cases
4.	Respiratory, Endocrine and Urinary/Excretory cases
5.	Summative tests of learning outcomes
6	Application on an actual patient

The Thinking Nurse (ttN) workshop is part of the in-house orientation programme for new nursing graduates. Our aim regarding clinical reasoning learning was to foster a causal

understanding of the abnormal presentation of symptoms and how it manifested in various patient cases, rather than merely having new nursing graduates learn content.

The teaching and learning process began with inquiry-based learning, where the new nursing graduates had no choice but to seek ways to enhance their understanding by gaining hands-on experience to develop an initial sense of how things function. Consequently, a crucial aspect of the design was to provide adequate support for exploratory learning during the activity. This approach allowed the new nursing graduates to engage with the available materials, enabling them to discover the connection between a manifesting condition and a suspected diagnosis.

Continuing the teaching and learning process allowed new nursing graduates to take preferred actions that would yield desirable outcomes and explore various alternative actions (not suggested by the facilitator) that could lead to negative consequences. New nursing graduates must be allowed to take "wrong" actions, for only through this can they understand why a "right" action is indeed right. It was the correct action that achieved the intended result. This approach was evident in the activity, as new nursing graduates established connections, compiled their inquiry questions, and utilised these questions with the manikin later. The positive outcome of this approach was that it provided new nursing graduates with a first-hand experiential basis for affirming why the "right" action was genuinely the right one – a justified assertion.

Activity structure: At the start of the activity, a leader appointed for the session initiated the first simulation scenario for her group. The other three nurses participated in the session led by her. When the nurses took part for the first time, they were asked to create their activity character. They could choose a funky, rustic, or studious nurse.

Once the new nursing graduates developed their characters, Eunoia, their facilitator (a nurse educator trained in oncology), presented the session's context within the narrative. The four nurses, positioned as novice nurses, were briefed on the patient's history, clinical symptoms, and vital signs. As they interacted with the manikin to elicit a more detailed patient history, Eunoia provided the voice of the manikin to create real-time conversations with the nurses. A physical examination (including blood pressure, heart and lung sounds, and radial pulse) of the manikin was conducted. The nurses collaborated to suggest additional tests that could be undertaken, formulate a provisional diagnosis, and devise a care plan. The nurses then implemented the care plan.

Stage 1 activity commenced in this specific context. The voice of the manikin represented a patient who experienced ecchymoses of the skin and slight splenomegaly (Nervous, Circulatory and Lymphatic Systems), including the following: Mr D was an 8-year-old boy who presented to the Children's Emergency (CE) department with his mother. He had exhibited less enthusiasm for his usual activities for a few days. He informed his mother that he felt tired and was sometimes nauseated, and she noted that he had a low-grade fever (37.8 degrees Celsius). Mrs C, the boy's mother, took him to a GP, who stated no abnormalities during the physical examination. He advised Mrs C that her son probably had a viral infection. A week passed, and the boy was still not feeling better, so Mrs C brought him to CE. D was in primary three and had an elder brother who was 5 years older. Upon examination, the patient weighed 26 kg and was 128 cm tall. He appeared to be in considerable discomfort, resting on the arm of his chair. He looked pale and exhibited slight lymphadenopathy.

In this scenario, nurses utilised laboratory and imaging studies to exclude leukaemia. They assessed and interviewed the manikin to identify relevant signs and symptoms. Besides the physical parameters, nurses engaged in conversation with the manikin to ascertain the severity of the discomfort and reactions to the immediate plan of care (including comfortable and appropriate rest on the bed trolley, safety measures with all side rails and the bed trolley locked, and adjusting the bed trolley to the correct height, along with administering paracetamol). Recognising the importance of minimising the waiting time in providing a provisional diagnosis to address the bruises and treat the enlarged spleen was a key learning outcome for nurses, which was intended to be made more explicit through the simulation experience.

Table 3. Finding answers considering these aspects

Questions consisted of the following aspects:
1. What aspects of this case do you wish to focus on?
2. Which examinations will you carry out on the patient immediately?
3. Given the patient's history, what other conditions could account for his presentation?
4. Discuss the measures that need to be taken to limit the extent of the condition.
5. List the measures that you would advise the patient to take to reduce the progression of the current condition.

Regrettably, their information regarding leukaemia was of limited competence, and they were unable to assess the manikin for signs and symptoms pertinent to leukaemia. They had no idea how these interview questions would be answered (Finding answers regarding these aspects is shown in Table 3). Fortunately for the nurses, the manikin unex-

pectedly "recovers", prompting relief. They reflected upon their understanding of the Nervous, Circulatory, and Lymphatic Systems and the signs and symptoms of paediatric leukaemia. They questioned their uncertainty, recognising a disconnection between what they knew and how to apply that knowledge. The information they believed they had absorbed from their notes remained mere printed material in their heads. Eunoia called them and asked them to return to the experiment station to test their ability to connect the signs and symptoms of paediatric leukaemia to the three organ systems. Eunoia suspected it was the vague concept they regarded as a symptom looming before them.

Table 4. Free text observations from nurses (these comments were the actual ones written by nurses from the class)

The funky nurse	ALL patient always have low-grade fever upon diagnosis.	Q: Does this patient have fever at the point of examination? For how long does he have fever?
The rustic nurse	When perform physical examination, if patient appears pale, lerthagic and has petechiae on his skin, I conclude he has some form of blood disorder.	Q: Does he look pale to me? Does he look lerthagic to me? Perhaps he didn't sleep well last night? Even if he has petechiae and it is a form of fine capillary bursts underneath the skin, does it mean anything?
The studious nurse	Upon palpation, I found patient has enlarged lymph nodes, and based on the history from his mother, he high chance is a leukaemic patient.	Healthy child won't have enlarged lymph nodes unless he has some problems with his immune system, therefore, does it mean he is an ALL patient?

The nurses returned to their desks with information on elements that could contribute to developing a particular condition and how it is manifested. Eunoia provided helpful suggestions to the nurses, who fumbled through the available materials to uncover the connection between a manifesting condition and a suspected diagnosis. Table 4 (Free text observations from nurses) illustrates some of the comments and questions nurses recorded at the experiment station. It was clear that the nurses struggled to comprehend the information they had regarding their inquiry. They were merely considering leukaemia in its physical sense, apprehending it directly through their senses and their capacity for language. This experiment station allowed nurses to piece together information in a somewhat confused manner, and as a result, it presented a carefully considered opportunity for them. As the nurses made the connection, they tabulated their inquiry questions and applied them to the manikin.

The nurses could leave their desks when satisfied with their work at the experiment station. Eunoia directed them to return to Activity 1 to utilise their questions on the manikin. This time, they had a full complement of questions developed by seeking information. Simultaneously, they worked at the experiment station, using those questions to assess the manikin for signs and symptoms relevant to leukaemia and to interview "him." If they used the question "leukaemic patients always have a fever" (see Table 4 – the funky nurse), they faced the dilemma of administering paracetamol to the manikin. Two fellow physician colleagues and I knew that the most common symptom associated with ALL is a low-grade fever of unknown aetiology, and further evaluation for leukaemia was warranted when the fever persisted for more than two weeks; for this reason, the manikin could be given paracetamol. Although the manikin might be afebrile, once the effect of the prescribed medicine wore off, he would likely become febrile again. While this was unknown to the nurses, it did bring some improvement, albeit not much, and the nurses began to seek information by questioning.

If nurses asked, "Has petechiae on his skin?" (see Table 4 – the rustic nurse), they might think it indicated fine capillary bursts beneath the skin. However, considering aspect 3 of Table 4, they understood that blood tests needed to be ordered and performed. When nurses asked, "A healthy child won't have enlarged lymph nodes unless there are issues with his immune system," they were not entirely correct in their reasoning. They might have conducted their physical examination to locate enlarged lymph nodes (lymphadenopathy). Still, they overlooked that reactive lymphadenopathy is common in children and adolescents, and clinicians should first rule out infectious or inflammatory conditions. Once again, nurses repeated the inquiry process and assessed the manikin. They addressed the bruises and the enlarged spleen, thus completing the Stage 1 activity.

Beyond stage 5 of The Thinking Nurse (ttN) lies a space that allows nurses to apply "clinical reasoning in action" with an actual patient in a clinical ward. The new nursing graduates undertook the preceding three activity stages. Although not conducted in the simulation class, this stage formed part of the pedagogical framework that empowered new nursing graduates to develop the "in pursuance of". Considering the notion of visibility, the practical application of an actual patient in a clinical ward offered valuable opportunities for assessing nurses' learning, encompassing nurses' attitudes, values, and beliefs. A summative assessment was adminis-

tered alongside the learning process.

Learning clinical reasoning through inquiry, which required repeated action and reflection in situated problem-solving contexts, new nursing graduates learned clinical reasoning in action rather than merely knowing about concepts.

3. Assessment of Learning

3.1 Method

As mentioned in point 2.1 – Design-for-learning, new nursing graduates were asked to answer open-ended questions on how the simulation experience enhanced their understanding of clinical reasoning after the fifth session.

3.2 Sample and setting of the study

A tertiary referral centre with 830 beds in Singapore had been selected as the site for this study, which involved practical training for healthcare professionals. During the study period, 110 new nursing graduates were employed at this tertiary referral centre and attended the workshop. Convenience sampling identified participants who were readily available and willing to take part. This study utilised convenience sampling when new nursing graduates were available. Still, they needed to be willing to engage with the learning methods implemented in this study instead of the existing ones. Seventy-five of the 110 new nursing graduates were excluded from the study due to limited opportunities to apply the learning methods. Thirty-five were included in Microsoft Excel, while 13 new nursing graduates opted not to participate in the study.

Consequently, 22 new nursing graduates completed the open-ended questions. The deputy director of nursing supervised the centre's education unit and approved the introduction of learning clinical reasoning through inquiry during the orientation period for the new nursing graduates. By providing their nurses with information on the new learning methods, nursing leaders supported them in better understanding this research. This involvement helped them become more engaged, increasing their motivation to participate in the study. With these measures, we achieved a participation rate of 63.0%.

3.3 Data analysis

Sociodemographic variables were analysed using descriptive statistics. The open-ended questions were analysed through thematic analysis. Themes were constructed based on the provided data since topics, ideas, and patterns of meaning repeatedly emerge from the data.

3.4 The ethical considerations

Informed consent was provided orally, and the study was voluntary. Consent was obtained before the data was collected. Participants were assigned a unique code to ensure anonymity, which was noted on the open-ended questions. Only the authors can access the data stored on a password-protected computer. Under normal educational practices and settings, this study qualified for Category 1 exemption and did not require Institutional Review Board approval, according to the ethics committee. This study was approved by the SingHealth Centralised Institutional Review Board (Study Number 2022/2102).

4. Achieved Results

4.1 Characteristics of the sample

Table 5 displays the participants' sociodemographic data (N = 22). The participants were new nursing graduates, and over half lacked nursing experience. The majority of participants were female (n = 20). Of the 22 participants, two had worked as enrolled nurses for over 6 years before enrolling in the nursing diploma course at one of the local polytechnics. Three had served as healthcare assistants or health aides for 1 to 6 years before undertaking the nursing diploma course. Most participants (n = 19) graduated with a diploma in nursing from local polytechnics, while 3 obtained a degree in nursing. All participants registered as nurses with the Singapore Nursing Board.

Table 5. Participants' sociodemographics

Sociodemographics	Participants
Age (years), mean (SD)	23.09 (2.9)
Gender, N (%)	
Female	20.00 (90.9)
Male	2.00 (9.1)
Ethnicity, N (%)	
Chinese	15 (68.2)
Malay	2 (9.1)
Indian	4 (18.2)
Filipino	1 (4.6)
Highest Qualification, N (%)	
Diploma (local)	19 (86.4)
Degree	3 (13.7)
Current Nursing Position, N (%)	
Staff Nurse	22 (100.0)
Duration in Nursing Profession (years), N (%)	
0	17 (77.3)
1-6	3 (13.7)
> 6	2 (9.2)
The Speciality of the Ward Currently Working, N (%)	
Paediatric Medical	12 (54.6)
Paediatric Surgical	1 (4.6)
Paediatric Oncology	2 (9.1)
Gynaecology	3 (13.7)
High Dependency	3 (13.7)
Gynaecology Oncology	1 (4.6)

4.2 Reportable learning experiences of the participants

Participants indicated that they could apply what they had gained from their training. Table 6 specifically illustrates the applicability of self-questioning regarding source credibility, engagement in reflection, the incorporation of inquiry to modify their findings to make them more relevant and sensible through justifications, and the quality of feedback from the trainers. A few participants expressed mixed emotional responses regarding the feedback received from trainers.

Table 6. Thematic analysis of participants' learning experiences during the training

Four themes characterised various dimensions of learning	Each theme is supported by quotations showing examples from the analysed material
Self-questioning of source credibility	Most participants shared that the learning clinical reasoning through inquiry in situated problem-solving contexts was a novel experience for them. Still, they appreciated the modality as innovative and interactive, as it was "easy to learn" and an "enjoyable experience". An essential learning experience through the experience was that it helped participants "analyse (their) thinking processes". By identifying the various cues, they tried to critique their "rationale behind certain actions" and "evaluate the credibility of sources". The quote that is used for this theme would be, "It assists me in comprehending my thought processes and is beneficial for evaluating the credibility of sources"; this connects with "learning how to learn" [P12]. Similarly, the use of inquiry helped participants question "about a patient's condition and current stage and prompted (them to) question (their) assumptions". Participants identified that a patient's clinical information could include reliable and unreliable components "depending on the perspective, the intended audience, and the purpose".
Engagement in deep reflection	Especially while crafting the case scenario of actual patients, they have cared for, the participants felt that a critical learning experience that enhanced their clinical reasoning was the process of deep reflection. They felt a sense of ownership towards their writing, and the process made them "contemplate (their) work more deeply". A participant also reported that the scenario writing "helped (her) reflect on (her) care practices", suggesting that this was an opportunity to integrate her nursing experience into her writing. However, this was also a slightly uncomfortable exercise for some participants, as they reported it as "frustrating" and time-consuming, with difficulty identifying "what information to include in the case scenario". The quote would be, "Writing the case scenario helped me reflect on my care practices and expand my ideas" [P2]; this connects with integration.
Consolidation of varying perspectives to strengthen own learning	There were mixed emotional responses to the trainer feedback exercise. While a few participants felt that the feedback they received from their peers was "helpful in enhancing (their) answers", others felt nervous and self-conscious about "receiving criticism from (their) colleagues, particularly (concerning their) own performance", and expressed a preference of not having their peers present during their case presentation. Regardless of their emotional experience, however, participants appreciated that the use of inquiry emphasised that "nothing is simply black and white", and it was helpful to consider different perspectives from all feedback providers, whether trainers or peers alike. It could be, "By sharing, I am able to receive feedback and gain insight from other individuals' case scenarios" [P6]; this connects with the human dimension.
Consideration of holistic justifications to aid decision-making in nursing practice	Participants related the various activities within the training to their nursing practice. They reported that a significant learning experience was reflected in their use of inquiry to modify their case scenario to be more relevant and sensible through justifications. For example, a participant had "made significant revisions to the rationales in (her) case scenario", while another was prompted to "seek additional evidence to bolster (her) arguments". This suggested that participants were able to identify that their initial case scenario might have contained too many assumptions, and inquiry helped them to "identify flaws in arguments". They also shared that their responses, after revising the case scenario, were more "articulate" and "coherent". In applying this learning to nursing practice, a participant shared that after "creating (her) own case scenario based on (her) patient encounter", she noticed that she was better able to answer questions about her patients. The quote would be, "The questioning helps me gain a better understanding of how to respond to questions about a patient's condition and current stage". (P9); this connects with Application and Caring.

5. DISCUSSION

This pilot study aimed to assess the use of inquiry in participants' crafted case scenarios involving patients under their care. The theme identified from free-text responses, "self-questioning of source credibility," characterised various dimensions of learning. Participants noted that questioning helped them identify reliable components of a patient's clinical information and encouraged them to challenge their assumptions. Furthermore, participants linked the various activities within the training to their nursing practice. Incorporating inquiry into learning benefited participants and underscored its significance in clinical nursing education.

The free-text responses from this pilot study resembled the research conducted by Ho et al.,[6] which indicated that employing the Socratic learning model can effectively cultivate students' critical thinking for improved patient care. We instructed the participants to use inquiry, and they engaged in various activities under the supervision of trainers. Initially, participants were uneasy about receiving criticism from their peers. Some expressed that it was frustrating and time-consuming to ascertain what information to include in a case scenario. However, with the training, those initial challenges evolved into opportunities for development. During feedback sessions, trainers offered participants clearer information, aiding them in achieving immediate learning objectives. The joy of discovering answers independently was fostered rather than the frustration of striving for lofty targets.

In another study by Makhene,[7] nurse educators emphasised the importance of asking questions, encouraging students to think critically and reflect on their thinking patterns. In this pilot study, participants valued the teaching experience through inquiry, which helped them "analyse (their) thinking processes." As participants immersed themselves in the simulated yet "real" case scenarios of patients in their care environment, they clarified their understanding of the patient's case and rationalised their reasoning. In the subsequent step, the participants assessed the credibility of sources and analysed the rationale behind specific actions. Inquiry at this stage has encouraged them to question "the patient's condition and current stage, prompting (them to) reconsider (their) assumptions." By engaging in this learning modality, participants developed the ability to apply the next steps to the specific case they were discussing. Furthermore, the entire process offered a platform for participants to ask questions and clarify their understanding, which enabled them to think more critically about the patient's case.

In a study by Samadi,[8] participants were taught to formulate questions and provided explanations that linked the materials with their prior knowledge and experiences. The free-text responses indicated that participants who articulate information to themselves may gain from learning such content by enhancing their reasoning or connecting new information to established knowledge. In subsequent sessions, participants had to exert significant mental effort. Instead of providing information to assist them in solving problems, trainers guided them towards discovering the required information. The trainers encouraged clinical reasoning throughout participant discussions, drawing out ideas and hypotheses through inquiry. High-quality discourse does not direct or reference teaching or request the correct answers as a traditional classroom would. The trainer's prompts resembled, "The narrative explanation could be more precise."

In the experiment station, the self-assessments enhanced participants' clinical reasoning, including their reflection on care practices. Writing case scenarios aided in thinking about their care activities, what they were doing during the process, attempting to uncover why certain things went awry, and considering what contributed to successful outcomes, among other aspects. This type of reflection is termed "reflection on action," which entails reviewing interactions after some time and analysing the rationale behind an individual's actions.[9] Both 'reflection on action' and strategies for enhancing reflection are also discussed in the study by Hannigan.[10] Additionally, the research conducted by[11] indicates that reflection can help individuals integrate the emotional components of their learning. It can benefit the clinical learning environment, where numerous aspects of professional roles are experienced and acquired. According to the study by Mann et al.,[11] educators must provide adequate guidance and supervision when employing reflection as a learning strategy.

Reflecting on this pilot study, participants structured their clinical reasoning and utilised feedback from trainers and colleagues to assess their performance. During the feedback exercise, one prompt was, "Can you provide an overall rationale?" This question probes the individual's perspective, as the individual must agree with the answer they held then, while acknowledging that they did not have the answer to the question and actively sought the correct response. Feedback from trainers clarified participants' doubts regarding the accuracy of their writing. Free-text responses indicated that participants benefited from gaining diverse perspectives and enhancing their evaluation of information sources related to their patients' cases. Panneerselvam's[12] study highlighted the students' perspective that feedback is a two-way dialogue in learning; based on the assessment, educators provide specific information to students that addresses knowledge gaps. In this pilot study, participants reciprocated with some feed-

back. Some participants were more open than others to giving feedback on their peers' work and receiving feedback from them.

Interestingly, participants found it more enjoyable to express their reasoning when engaging with trainers than when discussing each other's work. In other words, participants felt apprehensive about sharing their thoughts, which could be due to nervousness and self-consciousness regarding potential negative feedback from their peers, despite their intention to aid in improving one another's work. In Yoong et al.'s[13] study, both peer feedback and faculty feedback significantly enhanced first-year students' proficiency in a nursing skill. Similarly, Burgess et al.[14] concluded that feedback is crucial for learning. This pilot study showed the potential to improve participants' ability to self-assess and engage in self-reflection. Researchers have indicated that reflecting on action benefits nursing professionalism[9–11] and may assist nurses in enhancing their skills to provide better and safer patient care.

In this pilot study, participants reflected on their use of inquiry to enhance their clinical reasoning skills and adjusted case scenarios to render them more relevant and sensible through justifications. Participants utilised their thoughts and words to address questions and think about their plans. They placed excessive value on their initial ideas due to various biases in the thinking process. This hindered them from recognising their biases or accurately recalling their choices. Participants employed inquiry to deconstruct a situation into its components and reveal underlying assumptions by posing probing questions. Trainers applied these strategies to motivate participants to gather and analyse patient information. They assessed the relevance of that information and determined possible nursing actions to enhance the patient's physiological and psychological well-being.

One of the limitations was due to the uniqueness of the workshops implemented in this pilot study and the limitations of available resources concerning nurses' willingness to participate in promoting the workshops across multiple sites. Convenience sampling was employed to recruit study participants. A pilot or limited-access study utilised this method when a larger sample size was unfeasible, or the analysis was intended for further research.

Another limitation was that the Kirkpatrick-New World Model[15] was not evaluated at every level. This pilot study did not assess levels three (change in participants' behaviour) and four (outcome in practice). Furthermore, a subsequent limitation was that the activities were time-consuming.

6. Conclusion

This pilot study aims to enhance clinical reasoning among new nursing graduates by shifting from third-person to first-person perspectives. The workshop content supplements the traditional curriculum by cultivating problem-solving, clinical reasoning, and process-related skills. This pilot study may demonstrate incremental progress in clinical nursing education through innovative curricular changes. Through small-group instruction on processing skills and one-to-one inquiry, this educational method improves clinical reasoning abilities, fosters understanding of the emotional and interpersonal aspects necessary to better comprehend and respond to patients' needs, and encourages reflexivity. The findings emphasise enhancing skills in clinical reasoning that enable new nursing graduates to reflect on their actions, potentially serving as a bridge between fundamental nursing knowledge and clinical application. Furthermore, mental reconstruction appraisals can influence the future performance of new nursing graduates in the dynamic healthcare industry, which is characterised by uncertainty and new situations.

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Authors contributions

H. L. Chen was responsible for the study design, manuscript drafting, and revision. C. C. T. Chow was responsible for data analysis and manuscript revision. H. F. Tan was responsible for data collection. B. K. G. Loo was responsible for manuscript revision. All authors read and approved the final manuscript. The authorship is as agreed: H. L. Chen, B. K.G. Loo, H. F. Tan, and C.C.T. Chow.

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Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

Informed consent

Obtained.

ETHICS APPROVAL

The Publication Ethics Committee of the Association for Health Sciences and Education. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

PROVENANCE AND PEER REVIEW

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

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REFERENCES

[1] Colsch R, Lehman S, Tolcser K. State of pathophysiology in undergraduate nursing education: A systematic review. J. Nurs. Educ. Pract. 2020; 11(3): 11-16. https://doi.org/10.5430/jnep.v11n3p11

[2] Craft J, Christensen M, Bakon S, et al. Advancing student nurse knowledge of the biomedical sciences: A mixed methods study. Nurse Education Today. 2017; 48: 114-119. PMid:27771542 https://doi.org/10.1016/j.nedt.2016.10.003

[3] Logan PA, Angel L. Nursing as a scientific undertaking and the intersection with science in undergraduate studies: Implications for nursing management, Journal of Nursing Management. 2011; 19: 407-417. PMid:21507113 https://doi.org/10.1111/j.1365-2834.2011.01247.x

[4] Clancy J, McVicar A, Bird D. Getting it right? An exploration of issues relating to the biological sciences in nurse education and nursing practice. Journal of Advanced Nursing. 2000; 32(6): 1522-1532. PMid:11136422 https://doi.org/10.1046/j.1365-2648.2000.01608.x

[5] Biesta G, Burbules N. Pragmatism and educational research. 2003. https://philpapers.org/rec/BIEPAE-2

[6] Ho YR, Chen BY, Li CM. Thinking more wisely: using the Socratic method to develop critical thinking skills amongst healthcare students. BMC Medical Education. 2023; 23(1): 173. PMid:36941597 https://doi.org/10.1186/s12909-023-04134-2

[7] Makhene A. The use of the Socratic inquiry to facilitate critical thinking in nursing education. Health SA Gesondheid, 24. 2019. Available from: https://www.ajol.info/index.php/hsa/article/view/193806/183074 PMid:31934434 https://doi.org/10.4102/hsag.v24i0.1224

[8] Samadi D. Self-Explanation and Self-Questioning Prompts in Online Medical Health Learning. 2017. Available from: https://summit.sfu.ca/_flysystem/fedora/sfu_migrate/17061/etd10075_DSamadi.pdf

[9] James CR, Clarke BA. Reflective practice in nursing: issues and implications for nurse education. Nurse Education Today. 1994; 14(2): 82-90. PMid:8177188 https://doi.org/10.1016/0260-6917(94)90109-0

[10] Hannigan B. A discussion of the strengths and weaknesses of 'reflection' in nursing practice and education. Journal of Clinical Nursing. 2001; 10(2): 278-283. PMid:11820349 https://doi.org/10.1111/j.1365-2702.2001.00459.x

[11] Mann K, Gordon J. MacLeod A. Reflection and reflective practice in health professions education: a systematic review. Adv in Health Sci Educ. 2009; 14: 595–621. PMid:18034364 https://doi.org/10.1007/s10459-007-9090-2

[12] Panneerselvam S. Feedback among nursing professionals: a narrative review. International Journal of Health Sciences and Research. 2018; 8(2): 266-271.

[13] Yoong SQ, Wang W, Chao FFT, et al. Using peer feedback to enhance nursing students' reflective abilities, clinical competencies, and sense of empowerment: A mixed-methods study. Nurse Education in Practice. 2023; 69: 103623. PMid:37002994 https://doi.org/10.1016/j.nepr.2023.103623

[14] Burgess A, van Diggele C, Roberts C, et al. Team-based learning: design, facilitation and participation. BMC Med Educ. 2020; 20(Suppl 2): 461. PMid:33272267 https://doi.org/10.1186/s12909-020-02287-y

[15] Kirkpatrick J. An introduction to the new world Kirkpatrick model. Kirkpatrick Partners. 2015. Available from: https://www.kirkpatrickpartners.com/wp-content/uploads/2021/11/Introduction-to-The-New-World-Kirkpatrick%C2%AE-Model-1.pdf PMid:32180382 https://doi.org/10.4324/9781003128755-1