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ORIGINAL RESEARCH

How guided self-reflection improves critical thinking of nursing students in the pre-clinical stage?

Rona Cahyantari Merduaty[1], Aulia Addinillah Arum[2]

Author information
[1] Department of Nursing, University of Indonesia, Indonesia
[2] Department of Linguistics, Universitas Gadjah Mada, Indonesia

ronacahyantari@ui.ac.id

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Abstract
Self-reflection has proven to improve clinical performance and support nursing students in formulating clinical reasoning. However, self-reflection is more commonly used during clinical placement. This study examines the effectiveness of guided self-reflection assignments in improving nursing students' critical thinking skills during practical learning at the academic stage. The research method used in this study is the single-subject experimental design by applying the Holistic Critical Thinking Scoring Rubric (HCTSR) to assess the respondent's self-reflection after performing two procedures taught in the laboratory. Twelve nursing students participated in this study in August 2022. Visual analysis is used to analyze the student's critical thinking score trend. The study indicates that 7 of 12 nursing students perform a positive trend during the procedure by improving their HCTSR score each intervention day. In general, the visual analysis displays an increasing trend from a maximum score of 3 (solid critical thinking) in the first self-reflection to a maximum score of 4 (very-strong critical thinking) in the last self-reflection. Guided self-reflection assessment and feedback effectively improve the thinking skills of nursing students undergoing practical learning at the academic stage. Concise and contextual guiding questions in writing self-reflection, specific self-reflection assessment rubrics, and lecturer feedback should be essential aspects of every nursing learning process, both at the pre-clinical and clinical stages.

Keywords: Self-reflection; nursing student; students' performance; critical thinking; nursing care

Introduction

Self-reflection is one of the advanced and independent learning methods commonly used in nursing education worldwide, including in Indonesia (Bulman & Schutz, 2013). In nursing education, self-reflection writing is an assignment that focuses on clinical practice experiences that highlight new values or perspectives from the experience to help students develop critical thinking, understand themselves, and find coping strategies that lead to improved clinical performance (Naber & Markley, 2017). Previous studies found that self-reflection made by students after undergoing clinical practice plays a significant role as a media for expressing thoughts, emotions, and feelings about the experiences gained from practice (Hwang et al., 2018; Mirlashari et al., 2017; Mlinar Reljić et al., 2019). The role of self-reflection writing on practical experience is the basis that can be an effective tool to increase awareness and confidence in working on nursing skills (Mlinar Reljić et al., 2019). In addition, self-reflection writing is critical in helping students integrate learning with the adjustment process in nursing practice (Mirlashari et al., 2017).

In general, studies on the benefits of self-reflection assignments for nursing students are carried out on students who have or are currently undergoing clinical practice with a qualitative approach through interviews or content analysis of self-reflection assignments collected by students. A qualitative study from Indonesia focuses on seeing the experience of nursing students while doing reflective practice during the nursing profession program (Khoiriyati & Sari, 2021). Another study also assesses the impact of self-reflection on nursing student's authenticity during clinical practice (Matshaka, 2021). Each study implies that most self-reflection was assigned in the clinical stage and focuses on the student's qualitative or quantitative perspective. Using the written self-reflection entries as data is uncommon to evaluate nursing students' critical thinking. Only a study from Mlinar Reljić et al. (2019) uses written

self-reflection entries, although the result does not implicitly assess the critical thinking that nursing students display in their writing.

On the other hand, Liu & Stapleton (2018) argue that appropriate writing assessment can be used to achieve educational purposes, such as developing critical thinking skills in students. Even though their studies are based on the analysis of linguistic features, we believe that the main result, which claims that students' critical thinking can be reflected in their writing performances, is also applicable in other disciplines, including nursing education. Therefore, more comprehensive research and reliable measuring of improving nursing students' critical thinking through assessing self-reflection assignments are still highly required. This study aims to measure nursing students' critical thinking after performing self-reflection assignments as a part of practical learning in the pre-clinical stage by assessing written self-reflection entries. This study also investigates the effectiveness of guidance and lecturer feedback in self-reflection to improve nursing students' critical thinking. The Holistic Critical Thinking Scoring Rubric (HCTSR) will measure critical thinking at three observation points with three different types of self-reflection guidance.

Method

This study used an experimental design with a single-subject method involving 12 (twelve) nursing students at the academic stage. The single-subject method was chosen because it allows researchers to observe changes in respondents' self-reflection performances after being given a series of interventions within a certain period, and it is specifically often used for studies of behavioural change in the field of education (Siegle, 2015; Wambaugh & Schlosser, 2014). This study was conducted in the General Nursing Laboratory, Faculty of Nursing, Universitas Indonesia. Respondents were recruited on July 24, 2022, and continued with intervention and data collection on August 1-5, 2022. The Ethics Committee of the Faculty of Nursing, Universitas Indonesia, has issued a letter of ethical review completion in note no. KET-201/UN2.F12.D1.2.1/PPM.00.02/2022. Respondents involved in this study are twelve nursing students in the pre-clinical stage who had received Basic Nursing Practicum Courses. The rationale for applying these criteria is that students at the pre-clinical stage are already familiar with nursing procedures demonstrated in the laboratory and self-reflection as a component of the course assignments.

Researchers demonstrated three types of nursing procedures that would be witnessed directly in the laboratory: wound care, intravenous insertion, and medication administration. After the researcher demonstrates the procedure, students will be asked to do a re-demonstration. After a re-demonstration of the first procedure, self-reflections obtained by interview are used as the control or baseline data in this study. Respondents were then asked to write self-reflection by answering the guiding questions translated from The University of Edinburgh website in the intravenous insertion procedure re-demonstration. The researcher provided feedback on the self-reflection reports made, and respondents were asked to read the feedback before participating in the demonstration of the medication administration procedure. Lastly, after the re-demonstration of the medication administration procedure, respondents also write self-reflection with a more concise guidance format. Critical thinking skill is the only outcome measured in this study. Critical thinking, as the dependent variable in this study, is divided into four groups based on the HCTSR rubric. Critical thinking assessment is seen from the content of self-reflection written by respondents. The assessment uses an ordinal scale of 1 to 4, representing fragile critical thinking to very strong (from the smallest to the most enormous scale).

Students' critical thinking was measured by HCTSR, developed by Peter A. Facione and Noreen C. Facione in 2014 and published by Insight Assessment / The California Academic Press. There are four levels of critical thinking ranging from 1-4 as scoring in HCTSR, which indicates critical thinking that is very weak to very strong. Written and verbal reports were assessed using HCTSR from several indicators: performance in interpreting evidence, questions, and experience; explaining with appropriate and appropriate arguments or rationales; analyzing and evaluating experiences carefully; drawing appropriate conclusions; validating the results obtained from the learning process with the correct rationale; use relevant evidence or references. Scores 1 and 2 are classified as having feeble critical thinking and weak if they misinterpret questions and experiences during the learning process and are biased in explaining or providing arguments. Weak critical thinking is also shown by validating the results and drawing conclusions by relying on assumptions.

On the other hand, scores of 3 and 4 indicate strong and very strong critical thinking. Strong critical thinking is characterized by a strong interpretation of experience and questions so that arguments can be presented

comprehensively. A solid analytical process is considered to show very strong critical thinking. Slightly different, the ability to offer an analytical process indicates a score of 3 in critical thinking. On strong and very strong critical thinking, conclusions are drawn objectively with the support of relevant data or evidence. Blinding was only conducted for the reviewer of self-reflection. Participants were not blinded. No statistical methods were used in this study. The investigation of critical thinking skill changes relies only on visual analysis. Visual analysis is the leading method and cornerstone to evaluate the change of data trends and reduce the potential variability in a subject design study (Lane & Gast, 2014; Ledford et al., 2018).

Results

Twelve students consented to participate in this study, and no one has withdrawn **(Table 1)**. The finding shows that the majority of respondents' critical thinking score is 3-4, indicating most respondents have sufficient or even very strong critical thinking **(Figure 1)**. Only one respondent is very weak in critical thinking (score 1), and three others scored 2, indicating weak critical thinking. According to these results, respondents can be assumed to be homogeneous because they have almost the same distribution of critical thinking scores. However, this assessment may not be accurate due to the differences in the self-reflection assessment format. This baseline data was obtained from the self-reflection process carried out by interviews; thus, the assessment entirely relied on verbal reports. Respondents also did not have sufficient time to prepare themselves by looking for journal references or supporting evidence in answering the provided questions. However, the reviewer may be biased in scoring because the assessment tool was initially referred to as being used for written self-reflection.

Table 1. Participants characteristics

Variable	Frequency (n)	Percentage (%)
Sex		
• Male	2	16.7
• Female	10	83.3
Age		
• 23 years old	1	8.3
• 21 years old	6	50
• 20 years old	4	33.4
• 19 years old	1	8.3
Level		
• Year Two	3	25
• Year Three	9	75
Enrolled term of Basic Nursing Skills		
• Year 2	12	100

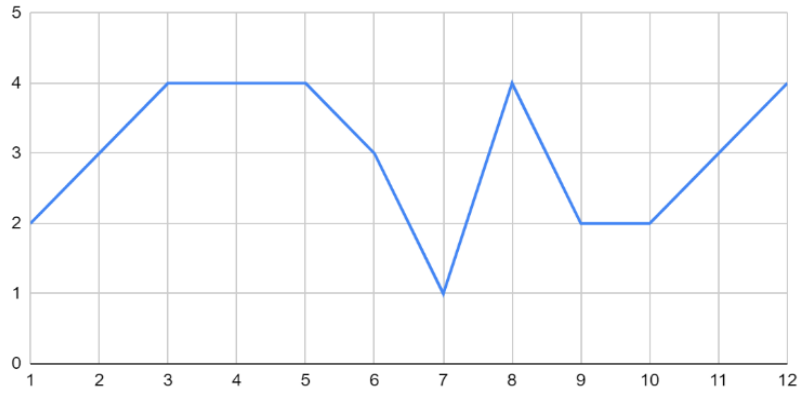

Figure 1. Critical Thinking Score obtained through Verbal Self-Reflection (Baseline)

The change in critical thinking ability in the written self-reflections after the re-demonstration of the procedure by the facilitator (principal investigator) **(Figure 2 and 3)**. Both reviewers 1 and 2 scored quite similarly. None of the respondents displayed very strong critical thinking (score 4) when asked to write self-reflection with a relatively long question guide translated directly from the self-reflection writing guide by The University of Edinburgh (2019). However, fifty percent (6 respondents) displayed critical solid thinking. The other six respondents were also in the range of weak critical thinking and very weak. After undergoing the first intervention, respondents were given a one-day break to read and understand the feedback provided by the principal investigator from the previous self-reflection report. Figure 3 shows critical thinking in the second intervention, where respondents were asked to write a second self-reflection report with concise guidance, which was constructed by the research team. In Figure 3, fifty-eight percent of respondents' critical thinking scores increase in the score range of 3-4, indicating they have strong and very strong critical thinking. The increase in critical thinking generally affected the decreasing number of respondents who show weak or very weak critical thinking, although the decline is insignificant.

Figure 2. Critical Thinking Score obtained through First Guided Self-Reflection

Figure 3. Critical Thinking Score obtained through Second Self-Reflection and Feedback

Discussion

The visual representation of the baseline data shown by the twelve respondents may not be entirely valid. The research team obtained baseline data from the interview process with questions formulated from the Gibb cycle self-reflection guide. The interview process has the same structure as debriefing, commonly used in simulation-based nursing practice learning. The research team's assumption that the descriptive interviews' results will objectively show the respondents' critical thinking is not wrong. Previous studies suggest that self-reflection is one of the essential elements of the debriefing process (Eppich et al., 2015; Thompson et al., 2018). In this study, the differences in critical thinking in self-reflection writing 1 and 2 indicate that the different reactions to the guiding questions affected the student's ability to articulate their thought processes in relating practical experiences with existing theories into self-

reflexology. Boredom may occur if students use the same guiding questions every time they write self-reflection (Dunlap, 2006). It was assumed that students tend to be reluctant to explore deeper in their learning experiences while using the same guidance. In this study, the researcher tried to simplify the guiding questions for the respondents so that the self-reflection could align more with the expected learning objectives and the critical thinking displayed was more prominent. Guiding questions in self-reflection should also be adjusted to the learning context and what aspects the facilitator wants to assess in-depth (Dunlap, 2006). This result also confirms Liu & Stapleton's (2018) study, which revealed that distinct writing prompts may result in different writing performances. In addition, they also suggest that problem-solution and behaviour interpretation in writing tasks have essential educational implications for critical thinking development (Liu & Stapleton, 2018).

Theoretically, the structure in self-reflection writing turns out to adopt components of critical thinking. Perception, analysis, synthesis, and evaluation of information to solve problems are components of a mental process called critical thinking (Berman et al., 2016; Papathanasiou et al., 2014). All those components are the structure of self-reflection developed by Gibb. Experience, as a vital point in self-reflection, is also a source for gathering information as capital for critical thinking (Papathanasiou et al., 2014; Wang, 2017). The respondents' critical thinking positively correlates with self-reflection writing. Nurses who feel they can practice self-reflection and draw meaning from their practice significantly improve their critical thinking (Chen et al., 2019). The effectiveness of short questions to guide self-reflection in answering questions related to practical learning also indicates that simple reflection questions posed by educators during the usual written evaluation process can significantly stimulate students' ability to think critically. Another interesting point about this study is the usage of two types of guides in self-reflection. According to a previous study, self-reflection writing using a guide can effectively develop the ability to provide judgment and clinical rationale when managing complex nursing care (Smith, 2021). A set of guiding questions in self-reflection or journal writing can help students create meaningful connections between concepts or theories, experiences, and learning processes(Elverson & Klawiter, 2019). Guiding questions in journaling or self-reflection have long been known as educational instructional technology that can interpret students' abilities in describing cognitive and perceptual changes from practical experiences and learning processes (Dunlap, 2006; Hodges, 2018). A set of guiding questions given in self-reflection assignments can help students focus on identifying what was learned and how the learning process was carried out, assess what was good and could be improved in the future, and consider the priority things learned. Therefore, in this study, students show a positive trend in critical thinking when given guiding questions in self-reflection after demonstrating the procedure.

Receiving feedback may also improve the critical thinking of respondents in this study. A study reports that self-reflection and teacher feedback are helpful in learning (Erdemir & Yeşilçınar, 2021). Feedback is reported to help students build their capacity to evaluate their learning performance, reducing dependence on teachers in the learning process (Carless & Boud, 2018). Specifically, in the nursing student learning process, feedback will train students to develop critical thinking to provide clinical judgments on cases encountered during practice. The assumption that the feedback in this study affects students' critical thinking may also be because it contains instructions that explicitly aim to direct and guide students to improve their writing performance (Watling & Ginsburg, 2019). However, in this study, the baseline data shown by the respondents was not ideal because the researcher should have tested critical thinking ability in the pre-intervention stage more than once to obtain a stable visual picture. The study of Byiers et al. (2012) emphasizes the importance of stability and minimal variation of data from respondents in baseline data so that the measurement of the dependent variable results is more significant in showing trends. The researcher also uses the same measuring instrument to assess written self-reflection and has not carried out the process of perception understanding in assessing verbal self-reflection for baseline data. According to the study findings, the baseline data may be more accurate if assessed using the Northeastern Illinois University (NEIU) Critical Thinking Rubric. Perhaps this study's result is reasonable to be generalized to broader pre-clinical nursing students regardless of background.

The assignment of self-reflection influences the practice learning process of nursing students at the pre-clinical stage. Experience, an essential element in writing self-reflection, is not limited to clinical experience. Therefore, self-reflection with adequate guidance and feedback can improve the critical thinking of nursing students undergoing practical learning at the pre-clinical stage. A standardized rubric and guidance on self-reflection based on nursing evidence-based practice that can be adapted into different learning settings in the pre-clinical stage is needed. Reflecting on this study, it can be implied that self-reflection is beneficial not only for nursing students in the clinical setting but also for nursing students in the pre-clinical setting. During laboratory practice in pre-clinical settings, the lecturer or facilitator plays a significant role in stimulating nursing students' critical thinking by using their experiences relating to the procedure and encouraging them to identify the gap between theory and practice. An interactive procedure demonstration in the laboratory could be a way to stimulate nursing students to write self-reflection more critically.

Conclusion

In the artificial intelligence (AI) era, like nowadays, self-writing assignments could be the most effective assessment tool for nursing education, which applies the integration of experience, emotion, and cognitive domain. Self-reflection might be the only writing piece the AI system could not formulate precisely since it needs feeling as the essential domain of a unique experience. Therefore, it could be a cornerstone of nursing education to use self-reflection as a learning assessment tool in every setting. This study also recognizes the importance of writing prompt formulation in self-reflection assignments, which can significantly impact nursing pedagogy. More thoughts need to be considered on how the nursing lecturer creates an interactive learning environment, guidance, and assessment rubric that can stimulate nursing students to apply critical thinking in writing self-reflection and could be measured objectively.

Author's declaration

The authors made substantial contributions to the conception and design of the study and took responsibility for data analysis, interpretation, and discussion of results. For manuscript preparation, all the authors read and approved the final version of the paper.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

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