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A Systematic Review on Higher Order Thinking Skills Analyzing Evaluating and Creating in Nursing Education

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Abstract

Integrating higher-order thinking skills in nursing education is crucial for preparing competent, effective, and adaptable nurses. This research contributed to examining the current state of Higher-Order Thinking Skills- analyzing, evaluating, and creating in nursing education. In further, its' integration into nursing education and its impact on clinical decision-making and professional growth is essential. In this present study, articles were indexed in English databases (Web of Science, Scopus, ScienceDirect, SINTA, and Google Scholar). 20 documents published between 2013 and 2023 in the English language were reviewed. The research steps were performed according to the PRISMA writing standard and the quality assessment was done by three researchers independently with Crowe's critical appraisal tools due to the heterogeneity of the study designs according to the inclusion criteria. Higher Order Thinking Skills encompass the more complex cognitive functions of analysis, evaluation, and creation in nursing education in terms of incorporation, implementation, and integration. By embedding these Higher Order Thinking Skills, focusing on the skills of evaluating, analyzing, and creating, into nursing curricula, educators ensure that students are not only proficient in foundational knowledge but also adept at critical thinking and innovation. Incorporating, implementing and integrating Higher-Order Thinking Skills-analyzing, evaluating, creating in nursing education is crucial for preparing students to meet the challenges of contemporary healthcare. Nursing education may generate skilled, creative, and morally minded professionals who can provide excellent patient care in a constantly changing healthcare environment.

Keywords: *HOTS ; Nursing Education; Analyzing; Evaluating; Creating*

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1. Introduction

Nursing is a complex and dynamic field that requires practitioners to engage in advanced cognitive processes (Phil et al., 2023; Perez, 2022). Higher Order Thinking Skills (HOTS) encompass these advanced cognitive functions (Riegel at al., 2021). These skills are essential for navigating the multifaceted nature of healthcare, ensuring that nurses can deliver the highest standards of care in diverse and often challenging environments (Lee & Oh, 2020). In addition, HOTS ensures that nurses are well-equipped to meet the demands of modern healthcare environments. The ongoing development and application of these skills are crucial for advancing the nursing profession and improving patient outcomes (Pegueroles et al., 2020). Therefore, HOTS are indispensable in nursing practice, underpinning the ability to provide high-quality, safe and effective patient care (Ozcan & Elkoca, 2019).

The components of HOTS including analyzing, evaluating and creating enable nurses to engage deeply with clinical information, make informed decisions, and innovate in patient care (Melles et al., 2021; Muhibbuddin et al., 2023). Analyzing involves breaking down complex information into smaller, more manageable parts to understand relationships and underlying structures (Miterianifa et al., 2021). In nursing, analytical skills are crucial for interpreting patient data and clinical scenarios. On the other hand, evaluating involves making judgments about the value or effectiveness of information, processes, or outcomes based on criteria and standards. This skill is vital for decision-making and ensuring quality care in nursing (Pursio & Kankkunen, 2021). In addition, creating involves generating new ideas, products or processes through innovative thinking and problem solving. In nursing, creative skills are essential for developing new approaches to patient

care and addressing complex clinical challenges (Dumitru, 2019; Rababa et al., 2022).

Integrating HOTS in nursing education is crucial for preparing competent, effective, and adaptable nurses. The components of HOTS, that is analyzing, evaluating, and creating play a vital role in enhancing critical thinking, clinical decision making, problem solving, and overall professional development (Aein et al., 2020; Baloyi, 2023). In further, incorporating HOTS learning strategies into nursing education not only enhances the ability of future nurses to handle complex and unpredictable situations but also prepares them to be leaders in the healthcare field. By fostering critical thinking, problem-solving, and adaptability, nursing education can produce professionals who are well-equipped to deliver high-quality, patient-centered care (Alonso-Pena & Alvarez, 2023; Cardenas-Becerril et al., 2023; Ilaslan et al., 2022).

Absolutely, incorporating HOTS into nursing education involves adopting various learning strategies at a practical level for student such as Case-Based Learning (CBL) that uses real-life scenarios to encourage students to apply theoretical to practical situations (Lopez et al., 2020). Simulation-based learning which uses realistic clinical simulations to provide hands-on experience in a controlled environment (Nunes et al., 2020). Problem-based learning that is a student-centered approach where learners are presented with a problem to solve, rather than being given information directly (Jeenia et al., 2021). Reflective practice involves students reflecting on their experiences to learn from them and improve future performance has proven to develop self-awareness, critical thinking and professional growth (Cheng et al., 2020). Evidence-based practice (EBP) integration into curriculum ensures that students learn to apply the best available evidence in clinical decision-making. This involves teaching students how to critically appraise research and integrate findings into their practice (Patelarou et al., 2020). In fact, mentorship programs and clinical rotations provide real-world experience and guidance from experienced nurses, helping students apply HOTS in practice (Tambunan, 2024). Although previous literature reviews have been conducted relative to HOTS-analyzing, evaluating and creating in nursing education, few recent systematic reviews have been conducted. This systematic review aims to analyze the most recent scientific evidence on the usefulness and implementation of teaching and learning strategies on HOTS-analyzing, evaluating, creating in nursing education. The specific objectives are: (i) to describe the scientific literature in the field of HOTS-analyzing, evaluating, creating as an nursing education method; (ii) to discover the strategies and the integration of HOTS in the nursing educational curriculum; (iii) to study the degree of implementation of HOTS-analyzing, evaluating and creating strategies in nursing education. This research contributes to the understanding of how HOTS specifically analyzing, evaluating, and creating are integrated into nursing education, offering insights into their impact on clinical decision making and professional development.

2. Method

Search strategy

All stages of this research were performed based on the writing of systematic studies, PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Page at al., 2020). The study population in this study included articles on the HOTS-analyzing, evaluating, creating in nursing education that were indexed on one of the Internet sites. The Web of Science, Scopus, ScienceDirect, SINTA (Indonesia Research and Community Service Information System Ministry of Education, Culture, Research and Technology), and the Google Scholar search engine were searched in English between 2013 and 2023. Boolean operators were used in conjunction with these terms to create a protocol that would help make the search using these terms more specific. The following items were combined using AND, OR and NOT operators. Example of the searching strategy used in Web of Science was: ((Higher Order Thinking Skills) OR (critical thinking) AND analyzing AND evaluating AND creating AND (nursing education) OR (nursing students)).

Selection of studies

In total, this systematic review was initially studied in 324 articles and reports, considering the entry and exit criteria of articles in the relevant databases. The pertinent topics were chosen for investigation after the authors' titles and abstracts were examined, and comparable and unrelated items were eliminated. Due to the increasingly complex clinical challenges of patient care, advanced cognitive development is continuously being studied. To limit the amount of studies and focus on the recent trend of nursing education, a time frame from 2013 to 2023 was set, as well as being limited to peer-reviewed and English studies. Criteria for selecting articles are: (i) Descriptive, analytical, interventional and review articles related to the last 10 years; (ii) English language articles published in scientific research journals inside and outside the country, the full text of which was available; and (iii) Articles related to the study of the HOTS-analyzing, evaluating, creating in nursing education.

Criteria for deleting articles were: articles that did not have a full text, articles that did not have a clear focus solely on the HOTS-analyzing,

evaluating and creating in nursing education. To review the articles obtained in the search of databases, were evaluated and evaluated according to the inclusion and exit criteria in the working method, three research colleagues participated. After reviewing the inclusion and exclusion criteria of the study, 20 articles in accordance with the above criteria entered the final quality assessment.

Data Extraction and Analysis

The first, second and third authors constructed a framework for data extraction. This framework provided details about the study, including its title, the countries in which it was carried out, its aims or objectives, its techniques and design, and the key findings related to this review. In order to facilitate the data analysis process, the information was extracted and consolidated in a spreadsheet using a data table. For consistency and validity, every piece of data was double-checked.

Quality assessment

We adopted Crowe's critical appraisal tool (CCAT) to critically appraisal the quality of each included study. The CCAT tool is relevant due to the heterogeneity of the study designs in this review as it enables a wide range of research designs (quantitative, qualitative, review and mixed-method studies) to be evaluated. It also provides a high level of reliability (Crowe, 2013). The preliminary, introduction, design, sampling, data collection, ethical matters, results, and discussion are the eight category components in the CCAT, with a total aggregate score of 40 and five points for each category item. The CCAT User Guide offered detailed descriptions and references on how each category item can be scored (Crowe, 2013). For over half of the investigations, the second and third author utilized CCAT, while the first author applied it to all of the trials. This procedure was carried out independently and disagreements were continuously discussed and settled.

3. Results and Discussion

Higher Order Thinking Skills (HOTS) encompass the more complex cognitive functions of evaluation, analysis and creation. In the context of nursing education, these skills are particularly crucial for a number of reasons, here are some of them:

Incorporating HOTS-Analyzing, Evaluating, Creating into nursing education. Higher Order Thinking Skills (HOTS) encompass the advanced cognitive processes of analyzing, evaluating and creating (Khalil et al., 2023). In the context of nursing education, these skills are particularly crucial for several reasons:

Analyzing entails disassembling complicated data into simpler parts in order to comprehend it more fully. In nursing education, this skill is essential for: (1) clinical reasoning: nurses must dissect patient information, symptoms and medical histories to make informed decisions about care plans; (2) problem-solving: by analyzing case studies and real-life scenarios, nursing students learn to identify problems and develop appropriate solutions; (3) data interpretation: understanding and interpreting clinical data, laboratory results and research findings are critical for effective patient care (Silva et al., 2023; Alsaleh, 2020).

Evaluating refers to the ability to make judgments about the value or effectiveness of different options or practices based on criteria and standards. In nursing education, this includes: (1) critical thinking: nurses need to assess credibility and relevance of information, research and practices to ensure high-quality patient care; (2) ethical decision-making: evaluating the ethical implications of decisions and actions is fundamental to nursing practice; (3) reflective practice: evaluating one's own performance and outcomes to continuously improve skills and knowledge (Tseng et al., 2022; Tambunan and Simbolon, 2022; Loyens et al., 2023).

Creating involves putting together different elements to forms a new, coherent whole or original solution. In nursing education, creating is relevant for: (1) care planning: developing comprehensive and individualized care plans for patients based on their unique needs and conditions; (2) innovation designing new protocols, procedures, or approaches to improve patient outcomes and healthcare delivery; (3) education and training: creating materials and programs to teach patients, families, and other healthcare professionals (Connor and Massey, 2023; Mohammed & Hussein, 2020; Zhang & Chen, 2020).

Incorporating HOTS in nursing education helps prepare nurses to meet the demands of modern healthcare environments, which require adaptability, lifelong learning and interdisciplinary collaboration. While adaptability addresses the ability to adapt to rapidly changing healthcare situations and advancements in medical technology, lifelong learning commits to the continuous learning and professional development to keep up with new evidence-based practices. In addition, interdisciplinary collaboration refers to the working effectively with other healthcare professional to provide holistic and patient-centered care (Tsimane & Downing, 2020; Calma et al., 2019).

Implementing HOTS-Analyzing, Evaluating, Creating in Nursing Education. Implementing HOTS in nursing education can significantly enhance the learning process and better prepare students for the complexities of real-world healthcare. Strategies for implementing analyzing, evaluating and creating into nursing education:

Analyzing, this skill can be developed through case studies, simulation exercises and critical incident analysis. Case studies include real-life scenarios and discussion and reflection. Real-life scenarios present students with detailed patient case studies, encouraging them to analyze patient history, symptoms and laboratory results. Discussion and reflection facilitate group discussions where students can dissect the care and discuss different aspects, promoting a deeper understanding of the patient's condition. On the other hand, simulation exercises includes high-fidelity simulations and debriefing sessions. While reflective journals encourage students to maintain journal where they reflect on critical incidents during their clinical practice and analyzing what happened and why, group analysis uses reflections as a basis for group discussions, fostering peer learning and collaborative analysis (Gomez et al., 2019; Dogan & Sendir, 2022).

Evaluating, this skill refers to making judgments about the value or effectiveness of different options or practices based on criteria and standards. This skill can be fostered through Evidence-Based Practice (EBP) projects, ethical case discussions and peer review activities. EBP projects include literature review and appraisal tools. While literature review could form assigned projects where students must evaluate current research literature to support clinical decisions, appraisal tools could be teaching students to use appraisal tools to evaluate the quality and relevance of research articles. In ethical case discussions, the ethics committees and debate sessions are utilized to enhance critical thinking. Ethics committees are simulating ethics committee meetings where students must evaluate the ethical implications of clinical cases and make recommendations. Debate sessions are organizing debates on controversial topics, encouraging students to evaluate differing perspectives and defend their positions. In terms of peer review activities the strategies on peer feedback, rubrics and criteria are utilized. Peer feedback in such implement peer review sessions where students evaluate each other's clinical performance or written assignments. Rubrics and criteria are established through provide clear rubrics and criteria for evaluations to ensure objective and constructive feedback (Musharyanti & Yusup, 2021; Li et al., 2023).

Creating, this skill involves putting together different elements to form a new, coherent whole or original solution. This skill can be nurtured through care plan development, innovation projects and creative teaching methods. Care plan development in such individualized care plans and inter-professional collaboration. While individualized care plans would have students develop comprehensive care plans for patients, incorporating multiple aspects of patient care and creating tailored interventions, inter-professional collaboration would encourage collaboration with students from other healthcare disciplines to create interdisciplinary care plans. In further, innovative projects would be in the form of quality improvement projects and technology integration. Quality improvement projects would assign projects focused on identifying areas for improvement within a healthcare setting and developing innovative solutions. Technology integration would encourage the use of technology to create new tools or methods for patient education, monitoring or treatment. In addition, creative teaching methods include role-playing and project-based learning. Using role-playing exercises to simulate complex scenarios requires students to create solutions on the spot. The project-based learning implementing learning that requires students work on ling-term projects that require creative problem-solving and innovation (Liu, 2020; Boso et al., 2021).

Integrating HOTS-Analyzing, Evaluating, Creating into Nursing Education Curriculum

To effectively implement HOTS in nursing education, it's essential to integrate a number of strategies into the curriculum systematically. Integrating HOTS into the nursing curriculum would mean these skills are woven into the fabric of the educational experience, becoming a natural part of every course and learning activity. The practical steps for integrating HOTS into the nursing education curriculum include curriculum design, faculty development, interdisciplinary learning, continuous assessment, simulation and clinical practice and use of technology. When designing curriculum, aside of developing a holistic curriculum where HOTS are core learning outcomes for each course, use backward design to ensure each course and module aligns with the goal of developing HOTS is too crucial (Pangandaman et al., 2024). Educators are need to be trained to teach and assess HOTS effectively. Providing workshops and resources on strategies to foster analyzing, evaluating and creating are part of faculty development action. In order to facilitate collaborative learning experiences that require HOTS, implementing team-based projects and care studies that involve multiple disciplines are addressing interdisciplinary learning. Continuous assessment reveals the utilization of varied and ongoing assessments to measure HOTS. Though action in design assessment requires critical thinking such as reflective journal, concept maps, and evidence-based practice projects. Simulation and clinical practice is a subset of incorporated approach of HOTS into simulation scenarios and clinical rotations. Simulation scenarios are developed where students are required to analyze

data, evaluate patient outcomes and create care plans (Guerrero et al., 2022). Lastly, use of technology is leverages educational technology to enhance learning experiences. The usage of technology includes utilize simulation software, virtual reality and digital care studies to provide immersive learning environments (Boso et al., 2021).

This systematic review explored the integration and impact of Higher Order Thinking Skills (HOTS)-analyzing, evaluating, and creating within nursing education. Our findings highlight the critical importance of these cognitive skills in preparing nursing students for the complexities and demands of modern healthcare environments. Analyzing skills are foundational for effective clinical reasoning and decision-making. The reviewed studies consistently show that incorporating case studies, simulation exercises, and critical incident analyses significantly enhances students' ability to break down complex patient data and situations. For instance, high-fidelity simulations provide realistic scenarios that require students to synthesize information quickly and accurately, mirroring real-world clinical settings (Coffman et al., 2022; Ahmady & Khani, 2022). The use of reflective journals and group discussions further promotes a deeper understanding and critical analysis of clinical incidents, encouraging continuous improvement and learning. The evidence suggests that these methods not only improve students' analytical abilities but also their confidence in handling complex clinical situations. This is particularly important as healthcare becomes increasingly intricate, requiring nurses to process and analyze vast amounts of information rapidly (Jarvis & Baloyi, 2020; Momennasab et al., 2021).

Evaluating skills are crucial for evidence-based practice and ethical decision-making. Our review indicates that activities such as evidence-based practice projects, ethical case discussions, and peer review activities are effective in enhancing students' evaluative abilities. Assigning literature review projects and training students in critical appraisal tools fosters a culture of evidence-based practice, essential for maintaining high standards of patient care. Moreover, ethical case discussions and simulated ethics committees develop students' ability to make informed judgments about patient care, considering both clinical and ethical implications. These activities not only improve critical thinking but also prepare students to handle moral dilemmas in their professional practice, fostering a sense of ethical responsibility (Opsahl et al., 2020; Calleja et al., 2020: Shayestehfard et al., 2020).

Creating skills enable nurses to develop innovative solutions and individualized care plans, addressing the unique needs of patients. The review highlights that care plan development, quality improvement initiatives, and creative teaching methods such as role-playing and project-based learning are effective strategies for fostering creativity (Ghasemi et al., 2020). Care plan development tasks encourage students to integrate various aspects of patient care into a coherent and personalized plan, promoting holistic thinking (Riegel et al., 2021). Quality improvement projects and technology integration tasks challenge students to innovate and improve existing practices, preparing them to contribute to advancements in healthcare delivery (Sheikh et al., 2021). Project-based learning and role-playing scenarios provide dynamic and interactive learning environments where students can experiment with new ideas and solutions, enhancing their problem-solving and creative thinking skills. These methods ensure that nursing students are not only able to apply existing knowledge but also to generate new approaches and solutions in clinical practice (Pascon et al., 2022; Ahmady & Shahbazi, 2020).

The integration of HOTS in nursing education has significant implications for both educators and students. For educators, it necessitates the adoption of diverse and interactive teaching methodologies that go beyond traditional didactic approaches. Faculty development programs are essential to equip educators with the skills and knowledge to effectively teach and assess HOTS (Borgmann et al., 2020; Mlambo et al., 2021). For students, the development of HOTS is essential for navigating the complexities of modern healthcare. As nursing practice becomes more interdisciplinary and technology-driven, the ability to analyze, evaluate, and create will distinguish proficient nurses from their peers. These skills not only improve clinical competence but also enhance professional satisfaction and career longevity by fostering a deeper engagement with the profession (Tambunan & Kristiana, 2022; Tulyaku et al., 2024).

4. Conclusions and Suggestions

Incorporating, implementing and integrating Higher Order Thinking Skills-analyzing, evaluating, and creating into nursing education is essential for preparing students to meet the challenges of contemporary healthcare. The strategies identified in this review provide a robust framework for educators to enhance these critical cognitive skills. By fostering HOTS, nursing education can produce competent, innovative, and ethically grounded practitioners capable of delivering high-quality patient care in an ever-evolving healthcare landscape.

While this review provides valuable insights into the incorporation of HOTS in nursing education, it

is not without limitations. The variability in study designs, methodologies, and educational contexts across the reviewed studies may affect the generalizability of the findings. Additionally, the review primarily focuses on undergraduate nursing education, with less emphasis on the development of HOTS in advanced practice nursing or continuing professional education. Future research should aim to address these gaps by exploring the long-term impact of HOTS on clinical practice and patient outcomes. Longitudinal studies that follow nursing graduates into their professional careers could provide a more comprehensive understanding of how HOTS developed during education translate into practice. Moreover, research should investigate the effectiveness of HOTS integration in diverse educational settings and among different student populations to ensure broad applicability of the findings.

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6. References

Aein, F., Hosseini, R.S., Naseh, L., Safdari, F., Banaian, S. (2020). The effect of problem-solving-based interprofessional learning on critical thinking and satisfaction with the learning of nursing and midwifery students. *Journal of Education and Health Promotion*, 9, 1-6. https://doi/org/10.4103/jehp.jehp_640_19

Ahmady, S., Khani, H. (2022). The Development of the Framework of Effective Teaching-Learning in Clinical Education: A Meta-Synthesis Approach. *Education Research International*, 4751931. https://doi.org/10.1155/2022/4751931

Ahmady, S., Shahbazi, S. (2020). Impact of social problem-solving training on critical thinking and decision making of nursing students. *BMC Nursing*, 19,94.

Alonso-Pena, M., Alvarez, C. (2023). Clinical simulation in health education: a systematic review. *Invest Educ Enferm*, 41(2), e08. https://doi.org/:10.17533/udea.iee.v41n2e08

Alsaleh, N. (2020). Teaching Critical Thinking Skills: Literature Review. *TOJET: The Turkish Online Journal of Educational Technology*, 19, 20-30.

Baloyi, O.B. (2023). Development of higher-order thinking skills in nursing students through online problem-based assessment. *Health SA Gesondheid*, 28(0), a2423. https://doi.org/10.4102/hsag.v28i0.2423

Borgmann, L.K., Cantrell, M.A., Mariani, B. (2020). Nurse Educators; Guide to Clinical Judgment: A Review of Conceptualization, Measurement and Development. *Nursing Education Perspectives*, 41(4),215-221. https://doi.org/10.1186/s2912-020-00487-x

Boso, C.M., Merwe, A.S., Gross, J. (2021). Students' and educators' experiences with instructional activities towards critical thinking skills acquisition in a nursing school. *International Journal of Africa Nursing Science*, 14:100293. https://doi.org/10.1016/j.ijans.2021.100293

Calleja, J.L., Sanchez, A.S., Soto, P.R. (2020). Is clinical simulation an effective learning tool in teaching clinical ethics? *Medwave*, 20(2), e7824. https:/ doi.org/10.5867/medwave.2020.01.7824

Calma, K.R.B., Halcomb, E., Stephens, M. (2019). The impact of curriculum on nursing students' attitudes, perceptions and preparedness to work in primary health care: An integrative review. *Faculty of Science, Medicine and Health - Papers:Part B*, Retrieved from https://ro.uow.edu.au/smhpapers1/832.

Cardenas-Becerril, L., Jimenez-Gomez, M.A., Bardallo-Porras, M.D., Lopez-Ortega, J., Monroy-Rojas, A., Puschel, V.A.A. (2020). Presence of the Reflective and Critical Thinking Capacity in Nursing Curricula in Iberian America. *Invest. Educ. Enferm*, 38(3), e14.https://doi.org/ 10.17533/udea.iee.v38n3e14

Cheng, Y.C., Huang, L.C., Yang, C.H., Chang, H.C. (2020). Experiential Learning Program to Strengthen Self-Reflection and Critical Thinking in Freshmen Nursing Students during COVID-19: A Quasi-Experimental Study. *Int. J. Environ. Res. Public Health*, 17,5442. https://doi.org?10.3390/ijerph17155442

Coffman, S., Lommi, M., Morrow, K. (2022) Scaffolding as active learning in nursing education. *Teach Learn Nurs*, 18,1, 232-237. https://doi.org/10.1016/j.teln.2022.09.012

Connor, J., Massey, D. (2023). Clinical judgment in nursing-An evolutionary concept analysis. *Journal of Clinical Nursing*, 32, 3328-3340. https://doi.org/10.1111/jocn.16569

Crowe, M. (2013). Crowe Critical Appraisal Tool (CCAT) User Guide Version 1.4. Available online: https://conchra.com.au/wp-content/uploads/2015/12/CCAT-user-guide-v1.4.pdf (accessed on 28 June 2024).

Dogan, P., Sendir, M. (2022). Effect of different simulation methods in nursing education on critical thinking dispositions and self-efficacy levels of students. *Thinking Skills*

and Creativity, 45,101112. https://doi.org/10.1016/j.tsc.2022.101112

Dumitru, D. (2019). Creating meaning. The importance of Arts, Humanities and Culture for critical thinking development. *Studies in Higher Education*. https://doi.org/ 10.1080/03075079.2019.1586345

Ghasemi, M.R., Moonaghi, H.K., Heydari, A. (2020). Strategies for sustaining and enhancing nursing students' engagement in academic and clinical settings: a narrative review. *Korean J Med Educ*, 32(2), 103-117. https://doi.org/10.3946/kjme.2020.159

Gomez, M.A.J., Becerril, L.C., Oyola, M.B.V., Pineda, M.C., Diaz, L.Y.B. (2019). Reflective and critical thinking in nursing curriculum. *Rev. Latino-Am. Enfermagem*, 27,e3173. https://doi.org/ 10.1590/1518-8345.2861.3173

Guerrero, J.G., Ahmed, S.A., Attallah, D.M. (2022). The Acquired Critical Thinking Skills, Satisfaction, and Self Confidence of Nursing Students and Staff Nurses through High-fidelity Simulation Experience. *Clinical Simulation in Nursing*, 64, 24-30. https://doi.org/ 10.1016/j.ecns.2021.11.008

Ilaslan, E., Adibelli, D., Teskereci, G., Cura, S.U. (2022). Development of nursing students' critical thinking and clinical decision-making skills. *Teaching and Learning in Nursing*, 00,1-8. https://doi.org/10.1016/j.teln.2022.07.004

Jarvis, M.A., Baloyi, O.B. (2020). Scaffolding in reflective journaling: A means to develop higher order thinking skills in undergraduate learners. *International Journal of Africa Nursing Sciences*, 12,100195. https://doi.org/10.1016/j.ijans.2020.100195

Jeenia, F.T., Hoque, A., Khanom, M., Jahangir, S., Tanin, J.U. (2021). Introducing Problem-Based Learning as an Effective Learning Tool to Medical Students: An Approach in Bangladesh. *Bangladesh Journal of Medical Education*, 12(1), 22-31. https://doi,oeg/ 10.3329/bjme.v12i1.52306

Khalil, R.Y., Tairab, H., Qablan, A., Alarabi, K., Mansour,Y. (2023). STEM-Based Curriculum and Creative Thinking in High School Students. *Education Sciences*,13, 1195. https://doi.org/10.3390/educsci13121195

Lee, Y., Oh, Y. (2020). Levels, antecedents, and consequences of critical thinking among clinical nurses: a quantitative literature review. *J Educ Eval Health Prof*, 17, 26. https://doi.org/ 10.3352/jeehp.2020.17.26

Li, R., Lund, A., Nordsteien, A. (2023). The link between flipped and active learningL a scoping review. *Teaching in Higher Education*, 28,8, 1993-2027. https://doi.org/10.1080/13562517.2021.1943655

Liu, H.Y. (2020). Inter-professional nursing education and the roles of swift trust, interaction behaviors, and creativity: A cross-sectional questionnaire survey. *Nurse Education Today*, 95,104598. https://doi.org/10.1016/j.nedt.2020.104598

Lopez, M., Jimenez, J.M., Gill, B.M., Castro, M.F., Cao, M.J., Frutos, M., Castro, M.J. (2020). The impact of an educational intervention on nursing students' critical thinking skills: A quasi-experimental study. *Nurse Education Today*, 85, 104305. https://doi.org/ 10.1016/j.nedt.2019.104305

Loyens, S.M., <eerten, J.E., Schaap, L., Wijnia, L. (2023). Situating Higher-Order, Critical, and Critical-Analytic Thinking in Problem-and Project-Based Learning Environments: A Systematic Review. *Educational Psychology Review*, 35, 39. https://doi.org/10.1007/s10648-023-09757-x

Melles, M., Albayrak, A., Goossens, R. (2021). Innovating health care: key characteristics of human-centered design. *ISQua*, 33,S1, 37-44. https://doi.org/10.1093/intqhc/mzaa127

Miterianifa., Ashadi., Saputro, S., Suciati. (2021). Higher Order Thinking Skills in the 21st Century: Critical Thinking. *ICONS*, EAI. https://doi.org/10.4108/eai.30-11-2020.2303766

Mlambo, M., Silen, C., McGrath, C. (2021). Lifelong learning and nurses' continuing professional development, a meta-synthesis of the literature. *BMC Nursing*, 20:62. https://doi.org/ 10.1186/s1292-021-00579-2

Mohammed, K.M.A., Hussein, H.E.A. (2020). Effect of Implementing Evidence-Based Nursing Practice Program on Critical Thinking Disposition among Internship Students. *Egyptian Journal of Health Care*, 11(3), 455-473.

Momennasab, M., Ghanbari, M., Rivaz, M. (2021). Improving nurses' knowledge, attitude, and performance in relation to ethical codes through group reflection strategy. *BMC Nursing*, 20,222. https://doi.org/10.1186/s12912-021-00749-2

Muhibbuddin., Artika, W., Nurhalimah, C. (2023). Improving Critical Thinking Skills Through Higher Order Thinking Skills (HOTS)-Based Science. *International Journal of Instruction*, 16(4), 283-296. https://doi.oeg/10.29333/iji.2023.16417a

Musharyanti, L., Yusup, R.M., Priyatnanto. (2021). Teaching method to increase critical thinking in health profession student: a literature review. *Bali MedJ*, 10(3),1083-

1087. Https://doi.org/ 10.15562/bmj.v10i3.2836

Nunes, J.G.P., Amendoeira, J.J.P., Cruz, D.A.L.M., Lasater, K., Morais, S.C.R.V., Carvalho, E.C. (2020). Clinical judgment and diagnostic reasoning of nursing students in clinical simulation. *Rev Bras Enferm*, 73(6), e20180878. https://doi.org/10.1590/0034-7167-2018-0878

Opsahl, A., Nelson, T., Madeira, J., Wonder, A.H. (2020). Evidence-Based, Ethical Decision-Making: Using Simulation to Teach the Application of Evidence and Ethics in Practice. *Worldviews on Evidence-Based Nursing*, 17(6), 412-417. https://doi.org/10.1111/wvn.12465

Ozcan, H., Elkoca, A. (2019). Critical Thinking Skills of Nursing Candidates. *International Journal of Caring Sciences*, 12(3), 1600-1606.

Page, M.L., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffman, T.C., Mulrow, C.D, et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 327,n71. https://doi.org/10.1136/bmj.n71

Pangandaman, H., Mukattil, N., Lambayong, J.H., Abdulhan, M., Hayudini, R., Salve, M., Matumadi, I., Macalaba, S., Kadil, R., Mangontawar, A. (2024). Systematic review of the effectiveness of flipped classroom approaches in developing clinical skills among nursing students. *J Res Dev Nurs Midw*, 21(1), 6-10. https://doi.p\org/10.29252/jgbfnm.21.1.6

Pascon, D.M., Vaz, D.R., Peres, H.H.C., Leonello, V.M. (2022). Project-based learning in remote teaching for undergraduate nursing students. *Rev Esc Enferm USP*, 56, e20220058. https://doi.org/ 10.1590/1980-220X-REEUSP-2022-0058en

Patelarou, A.E., Mechili, E.A., Martinez, M.R., Dolezel, J., Gotlib, J., Savic, B.S., Panczyk, M., Patelarou, E. (2020). Educational interventions for teaching evidence-based practice to undergraduate nursing students: A scoping review. *Int. J. Environ. Res. Public Health*, 17, 6351. https://doi.org/10.3390/ijerph17176351

Pegueroles, A.F., Martin, D.R., Pozon, S.R., Perez, E.Z. (2020). Critical thinking in nursing clinical practice, education and research: From attitude to virtue. *Nursing Philosophy*, 22(1), e12332. https://doi.org/10.1111/nup/12332

Perez, M.R., Navarro, F.M., Pichardo, A.D., Morales, C.T. (2022). Current Social Perception of and Value Attached to Nursing Professionals' Competences: An Integrative Review. *International Journal of Environmental Research and Public Health*, 19, 1817. https://doi.org/ 10.3390/ijerph19031817

Phil, J.C.M., Flenady, T., Massey, D., Dwyer, T. (2023). Clinical judgment in nursing - An evolutionary concept analysis. *Journal of Clinical Nursing*, 32, 3328-3340. https://doi.org/ 10.1111/jocn.16469

Pursio, K.P., Kankkunen, P. (2021). Professional autonomy in nursing: An integrative review. *J Nurs Manag*, 29, 1565-1557. https://doi.org/10.1111/jonm.13282

Rababa, M., Bani-Hamad, D., Hayajneh, A.A., Mugheed, K.A. (2022). Nurses' knowledge, attitudes, practices, and decision-making skills related to sepsis assessment and management. *Electronic Journal of General Medicine*, 19,6, em420. https://doi.org/10.29333/ejgm/12556

Riegel, F., Crossetti, G.M.O., Martini, J.G., Nes, A.A.G. (2021). Florence Nightingale's theory and her contributions to holistic critical thinking in nursing. *Revista Brasileira de Enfermagem*, 74(2), e20200139. https://doi.org/10.1590/0034-7167-2020-0139

Shayestehfard, M., Torabizadeh, C., Gholamzadeh, S., Ebadi, A. (2020). Ethical Sensitivity in Nursing Students: Developing a Context-based Education. *Electronic Journal of General Medicine*, 17(2), em195. doi: 10.29333/ejgm/7812

Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B.D et al. (2021). Health information technology and digital innovation for national learning health and care systems. *The Lancet Digital Health*, 3(6), e383-e36. https://doi.org/10.1016/S2589-7500(21)00005-4

Silva, H., Lopes, J., Morals, E., Dominguez, C. (2023). Fostering Critical and Creative Thinking through the Cooperative Learning Jigsaw and Group Investigation. *International Journal of Instruction*, 16,3, 261-282. https://doi.org/10.29333/iji.2023.16315a

Tambunan, E.H. (2024). Theory-Practice Gap During Clinical Learning: A Descriptive Qualitative Study of Nursing Students' Experiences and Perceptions. *J Caring Sci*, 13(2), 74-81. https://doi.org/10.34172/jcs.33251

Tambunan, E.H., Kristiana, D. (2022). Exploring nursing students' experiences with faculty caring behaviors in learning. *Jurnal Keperawatan Soedirman*, 17(2), 43-49.

https://doi.org/10.20885/1.jks.2022.17.2.5711

Tambunan, E.H., Simbolon, I. (2022). Reflective Writing in Basic Nursing Concept Course: A Qualitative Study of Nursing Students. *Integrated Nursing Journal*, 4,1, 47-58.

Tseng, T.J., Guo, S.E., Hsieh, H.W., Lo, K.W. (2022). The effect of multidimensional teaching strategy on the self-efficacy and critical thinking disposition of nursing students: A quasi-experimental study. *Nurse Education Today*, 119, 105531.https://doi.org/10.1016/j.nedt.2022.105531

Tsimane, T.A., Downing, C. (2020). Transformative learning in nursing education: A concept analysis. *International Journal of Nursing Sciences*, 7(1), 91-98. https://doi.oeg/ 10.1016/j.ijnss.2019.12.006

Tulyaku, P., Mohamed, M.G., Ravi, R.K., Baby, P. (2024). Synthesizing Critical Thinking Proficiency in Nursing Education: A Systematic Review. *Mosul Journal of Nursing*, 12(1), 50-61. https://doi.org/10.33899/mjn.2024.183131

Zhang, J., Chen, B. (2021). The effect of cooperative learning on critical thinking of nursing students in clinical practicum: A quasi-experimental study. *Journal of Professional Nursing*, 37(1), 177-183. https://doi.org/10.1016/j.profnurs.2020.05.008