

# Toward Reflective and Capable Practice: A Heutagogical Model for Pediatric Side Rail Safety in Nursing Education

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## Abstract

Ensuring pediatric patient safety is a critical priority in nursing education, particularly in the safe use of hospital side rails designed to prevent falls. However, inconsistencies in nursing students' application of safety protocols point to gaps in competency, specifically in the domains of knowledge, psychomotor skills, and professional attitudes. This conceptual paper examines the foundations of nursing students' competency in pediatric side rail use, drawing on Benner's Novice to Expert Theory and a constructivist-interpretivist perspective. It organizes the discussion using the Knowledge, Skills, and Attitudes (KSA) model to assess readiness for real-world clinical tasks. While students often demonstrate theoretical knowledge, practical application, and safety awareness vary widely. The paper proposes Heutagogical strategies such as high-fidelity simulation, structured clinical mentorship, reflective debriefing, and curriculum alignment with pediatric safety standards. By integrating these strategies within a self-directed, learner-centered framework, nursing programs can better equip students to deliver safe, high-quality care in pediatric settings.

*Keywords:* Heutagogy; Pediatric patient safety; Nursing education; Side rail safety; Reflective practice

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## 1. Introduction

Patient safety in pediatric settings is paramount, as falls remain a leading cause of hospital-related injuries among children (. These incidents can lead to serious complications, prolonged hospital stays, and increased healthcare costs (World Health Organization, 2021). Side rails are among the most commonly used preventive measures, yet their effectiveness depends heavily on proper application. While appropriately used rails reduce fall risk, misuse may result in entrapment, bruising, or more severe outcomes (UK Government, 2023). Research highlights that pediatric in-hospital falls often occur from beds, underscoring the importance of appropriate rail use, design, and staff training (Kim, Kim, & Lim, 2021).

Despite existing hospital protocols, nursing students, who provide much of the bedside care, may lack the necessary competency in applying safety measures like side rails. Improving nursing students' safety competence is essential for reducing pediatric fall risks and ensuring high-quality care from the point of entry into clinical practice. This conceptual paper addresses this gap by exploring nursing students' competency in side rail use for pediatric patients, drawing from Benner's Novice to Expert Theory, adult learning theory and

a constructivist-interpretivist philosophical lens. It proposes a KSA-based framework to assess student readiness and recommends evidence-informed educational strategies such as simulation, mentorship, and curricular integration to enhance pediatric safety.

## 2. Theoretical and Philosophical Foundations

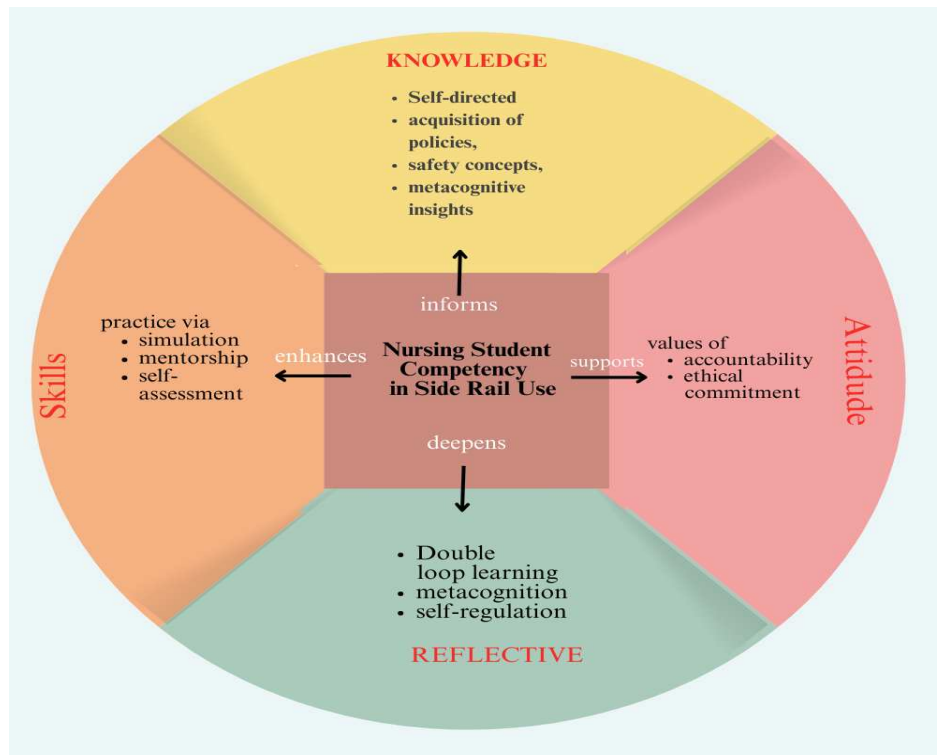
Patricia Benner's Novice to Expert Theory (1984) provides a developmental framework for understanding how nurses progress through five stages of clinical competence—novice, advanced beginner, competent, proficient, and expert—through real-world clinical experience and reflection. Nursing students typically function at the advanced beginner stage, relying on taught rules rather than contextual judgment. This stage presents a higher risk for safety lapses, such as improper side rail use, highlighting the need for structured, experience-based learning environments.

Complementing this is Knowles' (1978) Adult Learning Theory, or andragogy, which posits that adult learners are self-directed, motivated by relevance, and shaped by prior experience. In nursing education, this means that students benefit from learning approaches that allow them to take initiative, apply knowledge in meaningful clinical contexts, and reflect on outcomes. Knowles' theory reinforces the value of learner autonomy and internal motivation—key principles that align with heutagogy.

Meanwhile, interpretivist and constructivist paradigms provide further grounding for understanding how nursing students construct knowledge. Interpretivism emphasizes that meaning is shaped by individual experience and social context (Pulla & Carter, 2018), while constructivism views learning as an active, participatory process. These perspectives position students as co-creators of knowledge, rather than passive recipients, supporting learner engagement and reflective practice.

Building on this foundation, philosophical pragmatism reinforces the importance of practical outcomes, advocating for learning strategies that result in real-world improvements in safety and competence (Hothersall, 2019). It supports the design of education that not only informs but also transforms practice. Together, these theoretical and philosophical foundations support a heutagogical approach to self-determined learning that emphasizes reflection, capability-building, and learner-driven growth. Heutagogy encourages nursing students to take ownership of their development, apply knowledge in complex settings, and engage in critical reflection to foster both personal and professional transformation

## 2. Conceptual Model: A Heutagogical KSA Model



**Figure 1.** Heutagogical KSA Model for Nursing Student Competency in Pediatric Side Rail Use. Knowledge (*informs*), Skills (*enhances*), Attitudes (*supports*), Reflection (*deepens*).

As illustrated in **Figure 1**, learners cycle through four interrelated domains: Knowledge, Skills, Attitudes, and Reflection, to build Nursing Student Competency in Pediatric Side Rail Use.

### 1. Knowledge (*informs*)

Learners engage in self-directed exploration of hospital safety policies, pediatric fall-prevention science, and side-rail best practices—identifying gaps and seeking resources to deepen understanding. Kim et al. (2021) emphasize that effective pediatric fall-prevention programs rely on robust, learner-driven theoretical knowledge.

### 2. Skills (*enhances*)

Competency develops through experiential practice in high-fidelity simulations and structured mentorship. Students set personal performance goals, practice side-rail applications, and conduct self-assessments to refine technical precision (Vangone et al., 2024).

### **3. Attitudes (supports)**

Reflective exercises foster a safety-first mindset, accountability, and ethical commitment. Through journaling and debriefing, learners examine how their values influence clinical behavior (Poorchangizi et al., 2019).

### **4. Reflection (deepens)**

Employing **double-loop learning**, students critically evaluate not only what they do but how and why they learn driving metacognition and self-regulation (Pulla & Carter, 2018).

This model informs the design of learner-centered interventions such as high-fidelity simulation, structured clinical mentorship, and guided reflective debriefing presented in the subsequent Recommendations section.

## **4. Challenges in Clinical Training (Heutagogical Lens)**

Even with established safety protocols, nursing students often lack the autonomy and reflection needed to translate theory into practice in high-risk pediatric settings. Restricted clinical opportunities and risk-averse environments limit hands-on engagement with side-rail safety, constraining learners' ability to self-direct their skill development (Zhang et al., 2022). Additionally; variability in preceptor support and feedback further undermines critical reflection, students miss the guided debriefing that fosters metacognitive growth and deeper capability (Amoo et al., 2022).

Additionally, curricular structures that prioritize task completion over reflective dialogue reduce opportunities for double-loop learning and self-assessment, weakening students' capacity for adaptive problem-solving (Saleem et al., 2021). Compounding these barriers, anxiety in high-stakes pediatric environments can inhibit the risk-taking and experiential practice essential for mastering safety procedures (Cruz Araújo et al., 2022).

These challenges reveal a need for a heutagogical redesign of clinical education—one that restores learner autonomy, embeds structured reflection, and cultivates self-regulated capability, enabling students to build both confidence and competence in pediatric side-rail use.

## **5. Recommendations and Heutagogical Interventions**

To empower nursing students as self-determined learners and enhance their pediatric side-rail competency, the following heutagogical interventions are proposed:

### **Simulation-Based Learning**

High-fidelity simulation fosters learner autonomy, allowing students to identify their own learning needs, set performance goals, and practice side-rail adjustment in a safe, controlled environment. Through iterative scenario design, learners engage in double-loop reflection, revisiting both *how* they perform and *why* they make certain decisions. Evidence shows that such simulations significantly improve both knowledge acquisition and clinical performance in undergraduate nursing students (Vangone et al., 2024).

### **Structured Clinical Mentorship**

Consistent, trained preceptors function as learning coaches, facilitating reflection and guiding students' self-assessment. By providing timely, formative feedback and modeling best practices, mentors help learners bridge theory and practice, reinforcing student-driven goal-setting and adaptive problem-solving (Ryan et al., 2024).

### **Curricular Integration of Safety Competencies**

Embedding pediatric side-rail safety as a core outcome throughout the nursing curriculum empowers students to take ownership of their learning pathways. Self-directed projects, case-based modules, and competency checklists grounded in global and national standards ensure continuity and relevance. The WHO's Patient Safety Action Plan offers an international framework for integrating safety competencies (World Health Organization, 2021), CHED Memorandum Order No. 15 mandates outcome-based competencies and related learning experience hours for BSN programs (Commission on Higher Education, 2017), and the PRC's PNLE "Safe and Quality Nursing Care" domain provides licensure-aligned benchmarks for side-rail proficiency (Professional Regulatory Commission—Board of Nursing, 2019).

### **Reflective Debriefing Sessions**

Immediate, guided debriefs after clinical practice or simulation foster metacognitive growth. Learners articulate their reasoning, question underlying assumptions, and refine strategies for safer practice. High-quality facilitator–student interaction in debriefing has been shown to deepen critical reflection and learning engagement (Lymer & Sjöblom, 2024).

### **Cultivating a Safety-Driven Learning Culture**

Institutions should promote an environment where speaking up, error reporting, and peer feedback are normalized. Regular interprofessional debriefings and leadership walk-arounds model transparency and reinforce that safe practice is a shared, learner-centered responsibility (Özlem Soyer Er & Gül, 2024; Mistri et al., 2023).

By integrating these heutagogical interventions, nursing programs can support students in becoming reflective, capable practitioners who continuously direct their learning and uphold the highest standards of pediatric patient safety.

## 6. Conclusion

Bridging the gap between theory and practice in pediatric side-rail safety requires a shift to a heutagogical paradigm that empowers nursing students as self-determined learners. Grounded in Benner's developmental stages and Knowles' principles of andragogy, the proposed Heutagogical KSA Model—centered on Nursing Student Competency and its four learner-driven domains (Knowledge, Skills, Attitudes, Reflection)—provides a roadmap for education that is both structured and flexible. By embedding high-fidelity simulation, structured clinical mentorship, curricular alignment with global and national standards, guided reflective debriefing, and a culture of safety, nursing programs can foster the autonomy, metacognitive awareness, and real-world capability that students need to navigate complex clinical environments.

Implementing these heutagogical interventions creates an integrated, learner-centered ecosystem in which students set goals, practice skills, reflect on outcomes, and refine their professional values. This ongoing cycle not only enhances immediate competency in pediatric side-rail use but also cultivates lifelong habits of critical reflection and adaptive problem-solving—essential qualities for providing safe, high-quality pediatric care.

Future research should evaluate the impact of these strategies on measurable safety outcomes, student confidence, and clinical performance across diverse settings. By embracing a self-directed, capability-focused approach, nursing education can produce reflective, capable practitioners equipped to uphold the highest standards of pediatric patient safety from day one.

## Limitations

This paper is conceptual and has not yet been empirically tested; its applicability may vary across different clinical contexts, institution types, and student populations. The model's effectiveness may be influenced by factors such as resource availability, faculty expertise, and cultural norms in specific pediatric units.

## Future Research

To validate and refine the Heutagogical KSA Model, future studies should employ diverse student cohorts across multiple clinical sites. A mixed-methods approach can assess both measurable safety outcomes (e.g., side-rail competency scores, fall incidence) and learner perceptions (e.g., autonomy, confidence) through standardized assessments and focus-group interviews. Longitudinal research could examine how sustained engagement with heutagogical interventions impacts students' professional development and patient safety practices over time.

## Next Steps

To empirically validate the Heutagogical KSA Model, I propose a mixed-methods pilot study in a pediatric clinical teaching environment. A cohort of junior nursing students will participate in a structured learning

sequence involving high-fidelity simulation, clinical mentorship, and guided reflection, designed according to the framework. Quantitative data will be collected via standardized pre- and post-intervention assessments of side-rail skills using a competency checklist scored by blinded evaluators. Qualitative data will be gathered through focus group interviews, during which students will reflect on their experiences, autonomy, and confidence in applying safe practices. Skill scores will be compared using paired statistical tests, while focus group transcripts will undergo thematic analysis to identify patterns in learner perceptions and metacognitive growth. Results will inform the refinement of the model and guide larger-scale implementation.

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