



Is Competence Enough?

Defining and Prioritizing Nursing Informatics Competencies for Classroom-to-Clinical Transition

Roberta Christopher, EdD, MSN, APRN, FNP-BC, NE-BC, EBP-C, CAIF

Associate Professor, Keigwin School of Nursing

Jacksonville University

Research Team & Disclosure

Andrew Phillips, PhD, RN, FAMIA | Associate Professor

MGH Institute of Health Professions, School of Nursing, Boston, MA

Roberta Christopher, EdD, MSN, APRN, FNP-BC, NE-BC, EBP-C, CAIF | Associate Professor, Department Chair

Keigwin School of Nursing, Jacksonville University, FL

Mary Kennedy, RN-BC | Faculty

Northeastern University, Bouve College of Health Sciences, Boston, MA

Margie Sipe, DNP, RN, NEA-BC, FAONL, FAAN | Faculty

MGH Institute of Health Professions, School of Nursing, Boston, MA

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The Problem



Inadequate NI training can have serious consequences for patient care, outcomes, and organizational efficiency (Reid, 2026)



Many nurses and educators lack critical data skills (data mining, visualization, AI integration), risking exclusion from data-driven decision-making (Reid, 2026; Topaz & Pruinelli, 2017)



Without NI competency in education, nurses may lack skills to safely manage EHRs and clinical technologies (NAM, 2021; Rees et al., 2025)



Standards for minimal informatics competencies of nurse educators do not exist and are not integrated into board certifications (Forman et al., 2020; Belchez et al., 2026)



Programs have not systematically incorporated or developed native AI curricula (Montejo et al., 2024)

Background & Significance

- Nurses are the largest health care workforce segment (NCSBN, 2024)
- AACN Domain 8 mandates informatics competencies at all practice levels (AACN, 2021)
- ANA standards now embrace AI, machine learning, and innovative technologies (ANA, 2022)
- Rapid AI integration into clinical decision support, documentation, and diagnostics demands new competencies beyond traditional EHR skills
- NLN and NAM emphasize that nurses must be proficient with digital tools to advance health equity (NAM, 2021)

Why This Matters Now

Since this study was conducted, the health care landscape has accelerated:

- AI-powered clinical decision support now embedded in major EHR platforms (Ross et al., 2024)
- Generative AI literacy is an urgent competency gap in nursing education (Simms, 2025)
- Nursing programs have not yet systematically incorporated AI competencies into curricula (Montejo et al., 2024)
- These findings make the informatics competency gaps identified in this study even more urgent

Study Aim

To assess gaps in nursing informatics competencies among BSN graduates, as perceived by nurse educators and health care employers, to prioritize and improve informatics education for enhanced clinical practice readiness.

A goal is to identify priorities for nursing informatics education.

Study Design: Convergent Mixed Methods

QUANTITATIVE

NICA-RN Survey

Validated 27-item assessment
7 competency subscales
Self-assessed competencies

TRIANGULATE

QUALITATIVE

Focus Groups

3 focus groups via Zoom
Thematic analysis (NVivo)
Constant comparison method

INTERPRETATION

Triangulated findings to identify consistencies and divergences

Sample & Procedure

Nurse Educators

n = 55 completed NICA-RN survey

- REDCap distribution to undergraduate and accelerated nursing programs
- Mixture of program types (university, private, community)
- 8 educators participated in focus group
- \$20 gift card for focus group participation

Health Care Employers

n = 14 in 2 focus groups

- Nurse managers, clinical educators, and informatics leads
- Small to large academic and health care organizations
- Included community hospital representation
- Focus group questions aligned with 7 NICA-RN factors

The NICA-RN Instrument

Nursing Informatics Competency Assessment for Registered Nurses

- Developed through item reduction and factor analysis; 100+ items reduced to 27 items across 7 subscales
- Original validation: 548 responses, 262 valid for factor analysis; subscale reliabilities 0.83 to 0.95

Overall Educator $\alpha = 0.96$ (Excellent)

Subscale	Items	α (Original)	α (Educators)
Research & Emerging Trends	7	0.95	Excellent
Info & Comm Tech for Patient Care	6	0.95	Excellent
Info Management & Systems	5	0.87	Good
Data Privacy & Ethics	3	0.83	Good
Patient Engagement	2	0.93	Excellent
Implementation Lifecycle	2	0.88	Good
Quality & Safety	2	0.92	Excellent

Educator Demographics (n = 55)

38%

>15 years
teaching

65%

>15 years
nursing practice

47%

teach informatics
content

- Most organizations conferred both BSN and MSN degrees, with all other degree types represented
- Equal representation across program types

Quantitative Results

NICA-RN Competency Assessment by Subscale

Subscale 1: Research & Emerging Trends

$\alpha = 0.95$

Competency Item	M	SD	n
Uses bibliographic databases (PubMed, CINAHL) to search credible evidence	4.60	0.58	45
Integrates evidence-based standards to support clinical practice	4.58	0.54	45
Describes technology as a tool to promote evidence-based practice	4.22	0.82	45
Uses technology to collect and manage data to inform practice	4.16	0.75	44
Describes integration of research and EBP into the EHR	4.00	0.96	44
Describes emerging informatics areas influencing EHR and practice	3.78	0.91	41
Defines value of emerging trends (HIE, analytics, population health)	3.72	1.01	43

Subscale 2: Info & Comm Tech for Patient Care

$\alpha = 0.95$

Competency Item	M	SD	n
Demonstrates proficiency in basic computer skills	4.64	0.62	42
Utilizes telecommunication technologies to communicate effectively	4.55	0.71	42
Demonstrates skills in patient care technologies and information systems	4.30	0.77	43
Utilizes EHR systems to document nurse-sensitive outcomes	4.05	0.99	42
Applies safeguards and decision-making support tools	4.00	0.96	42
Applies patient care technologies for diverse patient populations	4.00	0.86	42

Subscale 3: Information Management & Systems

$\alpha = 0.87$

Competency Item	M	SD	n
Aware of standardized nursing/health care terminologies in EHRs	4.12	0.87	41
Describes methods of securing patient data and system access	3.77	1.05	40
Understanding of federal/state regulations influencing EHR design	3.57	1.07	35
Understanding of system design for efficient EHR use	3.55	1.27	38
Understanding of database management foundations (standards, ontologies)	3.47	1.18	36

Subscale 4: Data Privacy & Ethics

$\alpha = 0.83$

Competency Item	M	SD	n
Upholds ethical standards (data security, regulatory compliance, patient privacy)	4.73	0.55	41
Utilizes strategies to protect data in the EHR	4.61	0.67	41
Describes patient access rights and engagement pertaining to EHR	4.32	0.76	41

Subscale 5: Patient Engagement

$\alpha = 0.93$

Competency Item	M	SD	n
Teach patients about health care technologies and accessing their health information	3.83	0.93	42
Engage patients around use of health care technologies for better outcomes	3.79	1.07	42

Subscale 6: Implementation Lifecycle

$\alpha = 0.88$

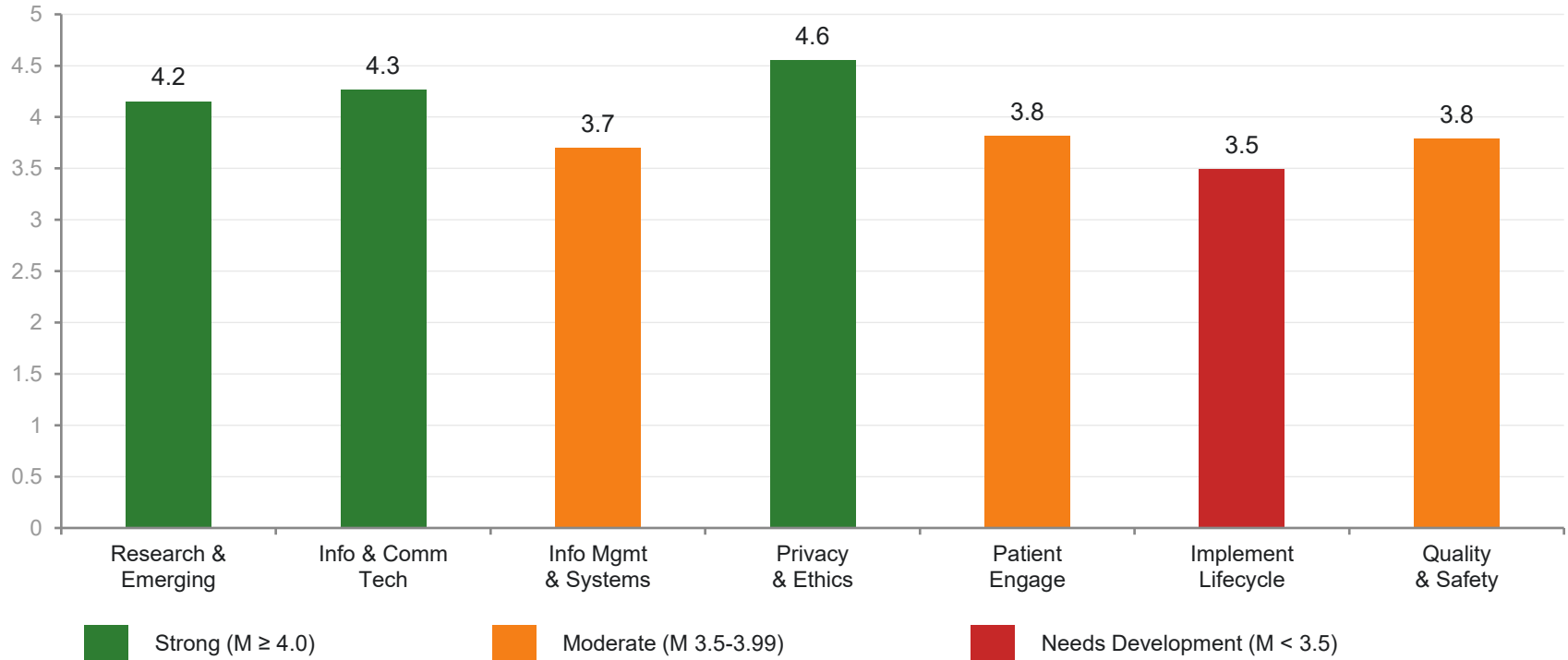
Competency Item	M	SD	n
Recognize importance of workflow redesign during EHR implementation	3.66	1.11	35
Participate in evaluation of systems (ease of use, GUI, workflow, training)	3.31	1.21	35

Subscale 7: Quality & Safety

$\alpha = 0.92$

Competency Item	M	SD	n
Determine indicators to monitor quality and effectiveness of nursing practice	3.79	0.96	38
Use information management tools and decision supports to monitor outcomes	3.79	0.93	38

NICA-RN Results: Competency Landscape



Focus Group Findings

Perspectives from Educators and Employers

Educator Focus Group: Key Themes

Overreliance on Technology: Students rely heavily on technology, risking loss of clinical judgment skills

Limited EHR Access: Community partners restrict student charting; difficult to provide hands-on EHR experience

Communication Overload: Alarm fatigue and information overload are recurring concerns for new nurses

Privacy/HIPAA as Strength: Privacy and ethics taught consistently throughout curricula

No Standalone Informatics Course: Informatics content woven into other courses rather than taught as dedicated course

Employer Focus Groups: Six Key Themes

1

Faculty Preparation Gap

2

EHR Complexity & Need for Change

3

Documentation Burden

4

Practice Transformed by Technology

5

Complex Privacy, Security & Ethics

6

Nursing Leadership Skill Gap

Employer Themes: Faculty Preparation & EHR Complexity

Faculty Preparation Gap

- Immediate skill and resource shortage in undergraduate faculty impacting EHR mentoring
- New graduates are tech-savvy but face a learning curve integrating clinical concepts with EHR
- Need to integrate informatics from the beginning of nursing education

EHR Complexity & Need for Change

- Need for standardization to accommodate workflow variations
- Difficult to see how collected data comes back to optimize care
- Calls for NLP, machine learning, and new technologies to support clinical documentation

Employer Themes: Documentation Burden & Practice Transformation

Documentation Burden

- The amount of information nurses are asked to document is described as untenable
- Calls for CMS and The Joint Commission to reduce unnecessary documentation
- Nurses still using paper workarounds despite EHR availability

Practice Transformed by Technology

- Technology is now "the new stethoscope," an adjunct to care
- The easier and more we expose students to technology, the more they can focus on the patient
- Health care environment overly complex with EHRs and clinical decision support tools

Employer Themes: Privacy/Security & Leadership Gap

Complex Privacy, Security & Ethics

- Shift from clinician-focused to patient-focused records creates new challenges
- Gap in translating patient data into actionable practice decisions
- Nurses need to understand how documentation links to health care finance

Nursing Leadership Skill Gap

- All employer participants agreed nursing leadership lacks skills to engage with solution providers
- Leaders need to communicate design requirements more effectively
- Unable to mandate or drive conversations with technology vendors

Where Educators & Employers Align

Domain	Educator Themes	Employer Themes
Clinical Judgment & Curriculum	Skills vs. clinical judgment; new AACN competencies	Faculty preparation; orientation gaps; leadership deficit
Technology Integration	Simulation; info management; role of informaticist	EHR complexity; EHR design and lifecycle
Communication & Decision Support	Managing communication technologies; overload	Communication culture; task saturation; technology as adjunct
Documentation & Quality	Quality focus	Documentation burden; EHR expectations; financial competencies
Ethics, Access & Engagement	Privacy/ethics; community partner EHR access	Complex privacy/security; training patients on EHR

Both groups emphasized strengths in foundational technology use and privacy/ethics competencies, while noting challenges in EHR complexity, documentation burden, and leadership skills.

Discussion & Implications

What do these findings mean for nursing education?

Key Takeaways

Strengths

- Evidence-based practice integration
- Data privacy and ethics
- Basic computer skills and communication tech

Gaps

- Database management and system design
- Workflow evaluation and EHR implementation
- Nursing leadership in informatics

The Bottom Line

A significant gap exists between the current state of informatics education and the skills required for clinical practice readiness. While foundational competencies are being taught, these do not consistently translate into the applied skills necessary to navigate today's technology-driven health care environment.

Implication 1: Faculty Development

Continuous Professional Development in Advanced Informatics

While educators reported strengths in evidence-based practice, privacy, and patient engagement, their lack of advanced technical competence in database management, workflow evaluation, and system design indicates a need for ongoing faculty development.

Continuous professional development opportunities focused on advanced informatics competencies will help educators remain current with evolving technologies and prepare graduates to meet employer expectations.



Implication 2: Institutional Investment & Partnerships

Stronger Academic-Clinical Collaboration

Nursing programs face persistent challenges related to limited faculty expertise, time, and resources for informatics education.

Strategies to bridge these gaps:

- Joint faculty appointments between academia and practice
- Enhanced access to EHRs during clinical training
- Integration of practicing informatics specialists into teaching roles



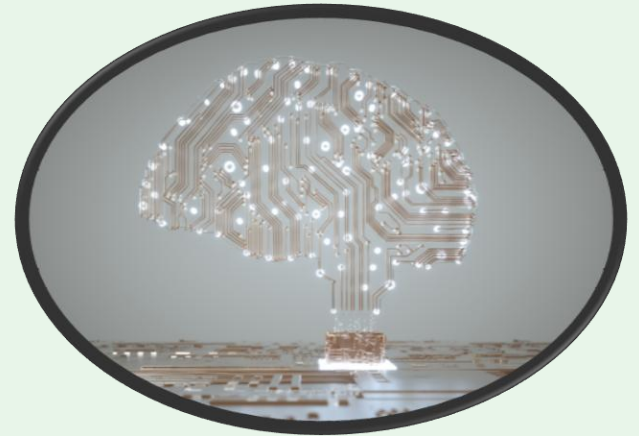
Implication 3: Informatics as Core Competency

Prioritize Informatics in Nursing Curricula

The shortage of informatics-trained educators and rapid technological change underscore the urgency of prioritizing informatics as a core competency.

Without sufficient training and technology access, students risk graduating with inadequate preparation for complex practice environments.

Stronger academic-clinical partnerships can provide authentic experiences that expose students to EHR complexity, documentation demands, and evolving patient care technologies.



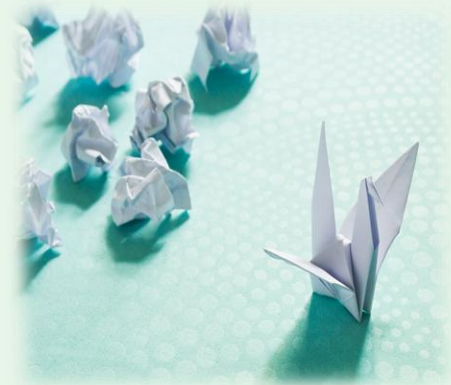
Implication 4: Cultivate Informatics Leadership

Building Leadership Capacity in Nursing Informatics

Nurse leaders must be equipped to:

- Advocate for technology integration in curricula and practice
- Reduce documentation burden through system redesign
- Participate in system design conversations with solution vendors

Preparing educators and leaders in this domain will enhance the overall readiness of the nursing workforce to engage in safe, efficient, and patient-centered care.



Limitations & Future Research

Limitations

- Cross-sectional design offers only a snapshot; cannot observe trends over time
- Reliance on self-reported data may introduce response bias
- Small, geographically limited sample (n = 55 educators) constrains generalizability
- Prelicensure students excluded due to low response rate

Future Research Directions

- Longitudinal, multisite studies comparing educator self-assessments with employer expectations
- Examine how informatics training impacts graduate performance
- Explore the role of nursing leadership in advancing informatics readiness

Questions for Discussion

1. How does your institution currently integrate informatics competencies into nursing curricula? Is it a standalone course or woven throughout?

2. What strategies have been most effective in bridging the gap between academic preparation and clinical informatics demands?

3. How can we better prepare nurse leaders to engage with technology vendors and influence system design decisions?

4. What role should academic-clinical partnerships play in advancing informatics education, and what models have worked at your institution?

5. How is artificial intelligence reshaping the informatics competencies nurses need, and how should curricula evolve to prepare graduates for AI-augmented clinical environments?

Is Competence Enough?

Competence ≠ Readiness



Widening Gap

AI-powered clinical decision support is now embedded in EHR platforms. Generative AI raises new documentation and ethics questions. Competency gaps are compounded by an entirely new technology layer.



Translation Failure

Foundational competencies are being taught, but do not consistently translate into the applied skills necessary to navigate today's technology-driven health care environment.



What We Need

Intentional curricular integration, stronger academic-clinical partnerships, leadership development at all levels, and systematic AI literacy programs across nursing education.



The Imperative

Nursing programs have not yet systematically incorporated AI competencies. Without action, the gap between education and practice will continue to widen.

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Thank You

Roberta Christopher, EdD, MSN, APRN, FNP-BC, NE-BC, EBP-C, CAIF

Associate Professor | Department Chair, DNP Programs and Scholarship

Keigwin School of Nursing, Jacksonville University

rchrist6@ju.edu