National Nursing Informatics
Deep Dive Program

Tools for Managing Information Through Technology

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University of Minnesota School of Nursing

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Disclosure

I have no relevant financial interest to disclose nor am I endorsing any commercial products identified in this presentation.
Objectives

At the end of this session, you will:

1. Appreciate the value and challenge of nursing data.
2. Discuss importance of information literacy among pre-licensure nursing students.
3. Explore methods to educate students on patient care technologies.
4. Identify informatics tools used to support safe nursing care.
5. Demonstrate examples for navigating the electronic health record as a teaching tool.
6. Discuss role of informatics knowledge to achieving patient outcomes.
7. Identify tools and strategies connecting nursing informatics to knowledge and patient outcomes.
8. Describe the benefits of standardization of nursing terminologies.
Warm-Up with a Quick Poll

• Visit: [http://z.umn.edu/ddwpoll](http://z.umn.edu/ddwpoll)
• Answer a few quick questions
• Take few minutes
• Let’s see real-time results
"I ran all of your symptoms through the computer and now the computer is sick too."
Challenge of Nursing Data

http://3mhealthinformation.files.wordpress.com/2012/08/nursing-process-flow1.png
Don’t we all wish it were that simple?

• Today’s data-intensive environment
• What should pre-licencure students be taught about nursing data?
• How do we connect nursing documentation with knowledge?
• Where do we start?
AACN Essentials: Jumping Forward to Basics

• What every student needs to know, and why?
• Knowledge work and knowledge management
• A framework for integrating knowledge into entering, understanding, analyzing nursing data
Essential IV: Information Management and Application of Patient Care Technology

Rationale

“Knowledge and skills in information and patient care technology are critical in preparing baccalaureate nursing graduates to deliver quality patient care in a variety of healthcare settings. . . .

. . . baccalaureate graduates must have competence in the use of information technology systems, including decision support systems, to gather evidence to guide practice” (p.17)

Basic Knowledge

How we can ensure RNs are ready for informatics-rich environment

• AACN essentials
• TIGER competencies
• QSEN’s KSA
Before You Start

- Baseline assessments can be valuable
- Avoid generalized assumptions about what students already know
- You could either over or underestimate
- Assess broad skills set first
- Move to specifics
Building a Course for Undergrads

• Incorporating the curricular Crosswalk
  • Discussed earlier by Dr. Clancy
  • Based on
    • AACN Essentials,
    • Tiger Competencies, and
    • QSEN’s knowledge, skills, and Attitudes

• Incorporating knowledge work model
  • Go beyond what we want students to know
  • Why should they know it
  • Why should they care?
  • What it means to them
Assessing What Students Know

• Basic computer competencies
  – Pre-test
  – Post-test
  – Available learning resources
    • Fill in knowledge gaps
    • Refresh current knowledge

• Why is this important?
How about computer skills?

Miller et al. (2014)

Ranking of % of new/novice nurse reporting they are highly or very-highly skilled by skill area (28 skills)

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td>93%</td>
</tr>
<tr>
<td>Internet use and search</td>
<td>92%</td>
</tr>
<tr>
<td>Word processing</td>
<td>80%</td>
</tr>
<tr>
<td>Lab results look up</td>
<td>77%</td>
</tr>
<tr>
<td>Treatment documentation</td>
<td>68%</td>
</tr>
<tr>
<td>Patient education</td>
<td>62%</td>
</tr>
<tr>
<td>Care plan development and update</td>
<td>59%</td>
</tr>
<tr>
<td>Order entry</td>
<td>45%</td>
</tr>
</tbody>
</table>
What New Nurses Know

Miller et al. (2014)

Time it took nurses to become comfortable using an EHR
Pre-test Question Sample

Question 1
Spreadsheet programs have a formula bar to perform mathematical calculations?

Select one:
- True
- False

Save my answers

Question 2
To quickly access favorite websites, it’s recommended to write their addresses on a piece of paper for future reference.

Select one:
- True
- False

Save my answers

Question 3
I have used a spreadsheet programs before, such as Microsoft Excel.

Select one:
- a. Yes
- b. No

Save my answers
Pop Quiz

- Test your computer hardware and software knowledge
- URL: http://z.umn.edu/popquiz
Post Test

• Same question pool
• Randomized questions/responses
• If passing score ➔ Go to next module
• If not good score
  – Referred to online resources
  – Retake post-test
  – Watch basic computing videos
Basic Knowledge

• Understanding how things work
• Understanding why things work
  • Is even more important
  • Ties clinical knowledge to informatics knowledge
• Allows for reflection
• Drawing wisdom from data at hand
KNOWLEDGE is knowing what to say.

WISDOM is knowing when to say it.
Engaging the Learner

• Warming up exercises on everyday informatics usage
• Example: e-Health Survey
• Sharing instant results allows for more interactive learning
Engaging the Learner (cont’d)

Highlighting the value of nursing informatics

Teaching someone to be a clinician vs technician?

It’s somewhere in between

• A knowledgeable clinician

Example: Hi-Tech Aging: (Alma’s Story)
Challenges in Teaching Informatics

• 5 minute Discussion
• Please form small group with 2-4 persons in each
• Discuss the following:

  • What are main challenges you have faced?
  • How did you overcome these challenges?
  • What was it like to teach this subject?

• Write notes on paper
• Or, go to http://z.umn.edu/challenge and enter your responses
Engaging the Learners (cont’d)

• Meaningful knowledge acquisition
  – Individual informatics knowledge discovery

• Group project to put learning to use
  – Find gaps
  – Suggest solutions

• Self and peer evaluation tools to enhance group functioning

• Real-time instructor engagement/follow-up
Using Peer Evaluations to Improve Group Work in Informatics eLearning Environment

Jehad Adwan, PhD, RN & Madeleine Kerr, PhD, RN
School of Nursing, University of Minnesota, Minneapolis, MN

Procedure

Self and Peer Evaluation Survey 1
The survey was administered after group assignment #1 to assess group performance. Color-coding was used to instantly spot troubled areas. See visual representation below.

Tailored Intervention for Individuals and Groups
The educational intervention was instructor feedback to each student. Feedback messages were brief and encouraging depending on scores.
1. Congratulations! Your scores were well above average. Keep up the good work!
2. Your scores were above average for many of your group efforts! There’s room for improvement in (specified behavior). Keep up the good work!
3. Unfortunately your scores were below average for (specify areas) of your group efforts. I want to be sure you are successful in this course. Please contact me so that we can schedule a time to discuss ways of improving your performance.
When the pattern of scores suggested that an entire group was struggling, the instructor sent a message to the group to assist in resolving issues.

Self and Peer Evaluation Survey 2
The second survey was done after assignment #2. Comparisons by task and groups were done. See visual representation showing all groups performance in the bottom of the poster.

Reward
Students received credit for completing the self and peer evaluations and the grade of each group assignment was influenced by their self and peer scores they received on their contributions.
Engaging the Learners (cont’d)

• Interactive quizzes

This SDLC framework is linear, ideal for supporting less experienced project teams/managers, and inflexible, slow and costly.
Teaching the EHR

- Highly dependable on availability to your own institution
- At UMN: SimChart via Elsevier
- Other options: DocuCare
- Issues with embedding in a universal informatics course
- Proprietary materials
EHR

• Open-EMR hands-on activity

• Access OpenEMR Demo

• Login as clinician
  • UserID: clinician  Password: clinician

• Explore following areas:
  • add new pt (use own name)
  • Update demographic info
  • Update pt stats
  • Create an appointment

• Take screen shot of the summary you created and upload the image to discussion forum
Knowledge Management Questions

Reflective learning after exploring EHR

• Did the activity make sense?
• What caught your attention/liked the most?
• Why?
• How would you apply it as a future nurse
• Why do you care?
• Discuss with other students
Knowledge Work

Data
- statistics, financial data, metrics
- procedures, standards, user guides, specifications, regulations, audits, filing and classification, order processing

Information (Procedural)
- workflow planning, priorities, graphs, engineering, historical data, tracking, database design & management

Knowledge (Functional)
- business plans, goals, objectives, budgets, resources, roles, culture, managing variables, developing projects

Meaning (Managing)
- strategic planning, systemic mapping, competitive analysis, market forecasts

Philosophy (Systems)
- values, vision, future trends

Wisdom (Renewing)
- social, environmental & global issues, activism, ecological values work

Union
- © 2002 Verna Allee, used with permission
Evidence-Based Practice Competence

• Laibhen-Parkes (2014)
  • Concept analysis and proposed definition:

  “the ability to ask clinically relevant questions for the purposes of acquiring, appraising, applying, and assessing multiple sources of knowledge within the context of caring for a particular patient, group, or community.” (p. 180)

• Fits well with the knowledge work model
Evidence-Based Nursing & the EHR

Standardized Languages permeate all levels
- Nursing diagnoses: NANDA
- Interventions: NIC
- Nursing sensitive outcomes: NOC

Data
- Raw numbers
- Terms
- Meaningless without context

Information
- Observations
- Vital Signs

Knowledge
- Interventions

Meaning and Philosophy
- How the experience influences the nurse

Wisdom
- Lessons learned
- Future practice guidelines

Union
- Global perspective
## Standardized Languages

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time and distance measurement</td>
<td>1 minute in USA = 1 minute in China</td>
</tr>
<tr>
<td>Units to measure things in daily life</td>
<td>Weight in Kilos or Pounds</td>
</tr>
<tr>
<td>Financial transactions</td>
<td>Credit cards</td>
</tr>
<tr>
<td>Electronic Health Record (EHR)</td>
<td>Demographic, billing information, ICD-10, LOINC, NIC</td>
</tr>
</tbody>
</table>
Standardized Languages

- International Classification of Disease (ICD-9)
- Health Level Seven International Messaging (HL7)
- Problems, Interventions, & Outcomes (Omaha System)
- Lab results (LOINC)
- Nursing Diagnoses (NANDA)
- Nursing Interventions Classifications (NIC)
- Nursing Outcomes Classifications (NOC)
What a Teaching Strategy of Patient Case Should Include:

- Embed within the lesson plan
  - Questions in each lesson/module
  - Students discuss the new ideas, concepts, and skills they were exposed to
  - After learning about something new, Students reflect on
    - What they liked
    - Why is it useful
    - and how it could be applied
- Go beyond what will be on exams and quizzes
- Subject matter, does matter! But that is not all there is to it.
Molding the Learner Knowledge:
Beyond Traditional Nursing Education

- Data
- Information
- Union
- Knowledge
- Wisdom
- Meaning

Patient/Population
Example: Child with diarrhea

• What are examples of the following?
  • Data: 
  • Information: 
  • Knowledge: 
  • Meaning: 
  • Wisdom: 
  • Union:
Technology Tools at the Bedside

Data Input
• Monitors and probes
• Smart pumps
• VS equipment
• Barcode scanners
• Blood glucose monitors
• Patient input

Measureable outcomes

Standardized terminologies

Clinical Decision Support

Evidence-based Practice

Nursing actions aligned with evidence
Clinical Decision Support (CDS)

Parameter guidance to Safe, Timely Nursing Practice
Clinical Example with Students

Administering Gabapentin
- Neurological Pain Scale 8/10
- Drug interaction knowledge base
- CDS pop-up
- Side Effect: Fall risk
- SE Acknowledged

Medication dispensing Sys

Nursing Knowledge
- Integration of Evidence
- Transforms into wisdom

Interventions
- Timely/Appropriate
- Initiate Fall Precaution
- Patient Education re: safety

Outcome:
- Patient pain managed
- Safety

Meaning Philosophy
- Lessons learned
- Future applicability
- Shaping of Future Practice

Outcome: Patient pain managed

Interventions
- Timely/Appropriate
- Initiate Fall Precaution
- Patient Education re: safety

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Administering Gabapentin
- Neurological Pain Scale 8/10
Questions!

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