Medication Administration and Math for Nurses: Education or Imagination?
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Persio Pereyra, RN, Senior College Laboratory Technician (Data Collection)
Michael Kent, PhD, Assistant Professor of Mathematics (Bar Graph and Consultant)

INTRODUCTION
Many incoming nursing students who perform strongly in a pre-requisite mathematics course designed to teach medication administration are unable to pass medication math competency exams required by their nursing programs, putting an abrupt stop to their academic progress. Medication Administration is not just math. In order for students to administer medication effectively and fully grasp underlying mathematical principles required for this skill, they must use their imagination. Students must place themselves in the context of where this skill will be performed, visualizing the apparatuses and devices used to administer medication. Knowledge of dimensional analysis math approaches will be readily applicable if they can imagine giving medication instead of merely solving a math problem. What can we do to contextualize this important skill?

AIMS & OBJECTIVES
This project aims to develop an educational tool to assist associate degree nursing programs in improving the process of developing medication administration competencies in their students.

• Investigate factors contributing to low pass rates of the medication math competency exam, using findings to design pedagogical and technological interventions to improve pass rates.
• Improve BMCC nursing faculty ability to teach and support student retention and transfer of quantitative skills for medication administration in a nursing context, thereby decreasing the attrition rate of nursing graduates.

METHODS
Throughout CUNY’s associate degree programs for nursing, math for medication administration is currently taught by math professors. Nurse educators are better suited to provide relevance and context through clinical reasoning and affective learning, providing a clear conceptualization of the methods by which nurses deliver medications in ways that cannot be done by a mathematician. Despite this important role, many nursing instructors do not use the dimensional analysis approach to solve math medication problems.

Step 1
Benchmarks results were set. A math review was provided by a nursing instructor to students enrolled in one nursing course (N=35). Test scores were compared to benchmark goals and to student scores who were not given a review the previous semester (N=29).

Step 2
Nursing instructors (n=15) were surveyed to assess their attitudes and readiness for facilitating math reviews prior to students taking the medication math competency exam.

Step 3
Following analyses of data in Steps 1-2, a computerized math review was administered to a new group of third semester nursing students (n=26) prior to their taking the math medication exam. Results were compared to benchmark goals.

Step 4
At the end of the Fall 2014 semester, a survey assessing student confidence relating to medication administration and preparation for the medication competency exam was administered (N=70).

RESULTS

<table>
<thead>
<tr>
<th>Pass-Fail Frequencies</th>
<th>Fall 2013 (no review)</th>
<th>Fall 2014 (with review)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st attempt</td>
<td>18 (62%)</td>
<td>20 (77%)</td>
</tr>
<tr>
<td>2nd attempt</td>
<td>9 (50%)</td>
<td>9 (50%)</td>
</tr>
<tr>
<td>3rd attempt</td>
<td>2 (22%)</td>
<td>7 (78%)</td>
</tr>
</tbody>
</table>

Step 2. Item analysis of survey questions assessing instructor readiness to provide medication administration reviews: Most nursing professors have learned how to calculate medications using traditional methods and do not feel comfortable teaching using the dimensional analysis method.

Question 1. I felt comfortable teaching dimensional analysis. Most nursing faculty strongly disagree. Significant improvements observed (see chart below)

Question 2. I felt comfortable teaching traditional nursing math: Most nursing faculty strongly agree.

Step 3. In Fall 2014, students given the computerized review (n=26) did not meet benchmark scores and showed lower pass rates compared to students offered a faculty review. Only 58% (15) passed on the 1st attempt.

Step 4. End of Fall 2014 student confidence and preparation assessment (N=70):

<table>
<thead>
<tr>
<th>Mathematical Skill And Problem Analysis</th>
<th>I feel my MAT 104 course prepared me for the math I do in the nursing program</th>
<th>I felt the (CDOT) on-line summer tutorial review helped me do better on my math competency exam</th>
<th>I felt most comfortable using the dimensional analysis method for solving math medication problems</th>
<th>I felt most comfortable during the IV administration and injection drug math during the practicum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>38 (52%)</td>
<td>33 (47%)</td>
<td>42 (61%)</td>
<td>27 (39%)</td>
</tr>
<tr>
<td>Agree</td>
<td>24 (34%)</td>
<td>20 (29%)</td>
<td>10 (14%)</td>
<td>31 (44%)</td>
</tr>
<tr>
<td>Neutral</td>
<td>5 (7%)</td>
<td>11 (16%)</td>
<td>8 (11%)</td>
<td>10 (14%)</td>
</tr>
<tr>
<td>Disagree</td>
<td>5 (7%)</td>
<td>4 (6%)</td>
<td>7 (10%)</td>
<td>4 (6%)</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>2 (3%)</td>
<td>4 (6%)</td>
<td>8 (11%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

CONCLUSIONS
This study reveals several new problematic areas affecting the program’s ability to maintain desired benchmarks, while also uncovering areas that are going well but were thought to be problematic in the past. For example, MAT 104 as currently taught by mathematics faculty yields favorable outcomes; students feel like they are learning in the course and the data confirm high pass rates for the competency exam.

These findings highlight the problem that nurse educators are not comfortable teaching medication administration using dimensional analysis. This method is primarily used to teach students in MAT 104 and is trending with good results in student competency assessment.

The abstract concepts describing the relationships of numbers in dimensional analysis equations or algebraic sentences can be contextualized if nurses reinforce, clarify, and review whenever necessary to address gaps in student performance of calculating and administering medications.

NEXT STEPS
Better technological tools to help nurse educators and students review for the math competency exam could help close the educational gap and lack of conceptualization between mathematical methods of solving math medication problems and methods applied by nurse educators. Doing so would allow students to have their questions answered related to math medication problems without having to learn a new method of problem solving. Also nurse educators will feel comfortable answering questions even if the student is problem solving using dimensional analysis.

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Developing an Exemplary Online Course
Natasha J. Nurse, RN ~ Lehman College, CUNY~ 2014 Transformer

Purpose
The purpose of this project is to develop an online course in a format that can be adapted for any nursing course and meets exemplary status as outlined by the Exemplary Blackboard Course Program.

Objectives
The overall objective of this project is to develop an exemplary online course; specifically, this will be accomplished by creating a course that meets the following objectives:

• To create a course design that includes such elements as structure of the course, learning objectives, organization of content, and instructional strategies
• To develop an online learning community within the course that fosters collaboration, interaction and communication between and among learners and instructors, synchronously or asynchronously
• To create instructional activities designed to assess and measure progress towards learning outcomes and provide high quality feedback to students that shares evidence-based resources, that is more efficient and frequent, consistent, reliable, objective and fair
• Provide support resources to students within or external to the course environment, addressing a variety of student services (library, tutoring services, Blackboard tutorials, etc.).

Methods
This project requires significant research and training. Resources that were used include

• Instructional designing preparation
  • Faculty development workshops through CUNY
  • Online courses though Coursera and Coursera
  • Attendance at the Blackboard World Conference
• Independent research on resources for teaching online
• Research, practice and training to use software such as Camtasia, Voicethread, Glogster, Jing, Prezi, etc.
• Collaboration with content experts at the college department level
• Online Course Development
• A consistent course syllabus was developed alongside the Director of Undergraduate Studies at Lehman College
• Build weekly assignments in Blackboard; launched Blackboard course
• Course format featuring key elements of Blackboard Exemplary Course Rubric

Evaluation
Blackboard Survey used for mid-term and final evaluation of the course

• Mid-Term (13)- weekly content most helpful, spent about 10 hours per week, enjoyed discussion board, enjoyed office hours videos; would like more videos with professors voice, organized and easy to follow
• Final (8)- enjoyed quizzes that reinforced content and office hours; group presentations and interactions were helpful; enjoyed videos; weekly updates/announcements were helpful

Key Features
Course Features
• Welcome email sent 1 week prior to course launce
• Easy to follow tabs developed in Blackboard
• Welcome/Start here tab
• Weekly Content Modules
• Syllabus and Guides section
• Weekly virtual office hours
• Learner support links
• Discussion board Offered multiple assignments to choose from
• Videos of required course films, how-to videos, recorded office hours videos

Lessons learned
• Weekly content and weekly updates/announcements
• Alternate day of office hours to facilitate greater participation
• Good to have various types of assignments for students to chose from
• Learning style activity during first week was helpful to students
• Weekly quizzes over comprehensive final exam (RN students)
• Communication!!!
Capturing the Caring Moment in the Telehealth, Case Management, and Care Coordinator Role

Raquel Webb-Geddes, Millicia Medford, Alicia Schwartz, Saundra Sirmans
Visiting Nurse Service of New York (VNSNY)

<table>
<thead>
<tr>
<th>Project Aims</th>
<th>Learning Objectives</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal care: capturing the caring moment in telehealth, case management, and care coordination</td>
<td>1. Define the concepts caring and the caring moment</td>
<td>1. Recruitment of home care nurses</td>
</tr>
<tr>
<td>Patient-centered care: enhancing caring aspects of telehealth nursing and prevent feelings of isolation</td>
<td>2. Articulate differences between “non-caring” and caring moments in the provision of patient care</td>
<td>2. Pre-test of current knowledge, practices</td>
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<tr>
<td></td>
<td>3. Identify two benefits of the caring moment and explain its importance when providing telehealth, case management, or care coordination.</td>
<td>2. E-learning module</td>
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<td></td>
<td>4. Drawing on prior knowledge and experiences, apply strategies to enhance the caring moment in the telehealth, case management, or care coordinator role.</td>
<td>2. Webinar: Video-based simulation</td>
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<tr>
<td></td>
<td>5. Through reflection and feedback, demonstrate an increase in awareness of their caring presence while providing patient care.</td>
<td>2. Debriefing/Q&amp;A</td>
</tr>
</tbody>
</table>

1. Define the concepts caring and the caring moment
2. Articulate differences between “non-caring” and caring moments in the provision of patient care
3. Identify two benefits of the caring moment and explain its importance when providing telehealth, case management, or care coordination.
4. Drawing on prior knowledge and experiences, apply strategies to enhance the caring moment in the telehealth, case management, or care coordinator role.
5. Through reflection and feedback, demonstrate an increase in awareness of their caring presence while providing patient care.

### Defining Concepts
- Loving Kindness
- Basic Human Needs
- Trusting Relationships

Caring is a central concept of nursing, as it conveys the trust and commitment required to deliver high quality care (Vance, 2003). The challenge however, is how to convey the act of caring using distance communication and telehealth.

### Caring as a Science
- Nurse Theorist – Jean Watson
- Empirical, clinical, subjective, reflective, and interpretative data collection
- Facilitate partnership between nurse and patient
- Integrate patient values and needs into clinical decision-making and care delivery (IOM, 2001)

### Therapeutic Communication
- Developing rapport
- Warmth and positivity
- Tone and choice of words
- Unhurried

Patient satisfaction increases when nurses display a genuine interest in their well-being. Communication should be warm, non-judgmental, and unhurried. Primary care nurses who maintain a caring presence enhance patient satisfaction.
Introduction

While there is growing support to adopt interprofessional education (IPE) in pre-certification health professional programs, a number of barriers remain in the way of full integration in the curriculum, including insufficient learning resources to provide a basic framework for IPE core competencies.

Purpose

The authors designed four interactive e-learning modules to be used as an open learning resource for faculty interested in integrating interprofessional teamwork and collaboration competencies into their existing curriculum.

Case Matrix

<table>
<thead>
<tr>
<th>Module</th>
<th>Video Case Synopsis</th>
<th>Primary Issues/Topics</th>
<th>Secondary Issues/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Values &amp; Ethics for Interprofessional Practice</td>
<td>Maria Garcia is a 52 YO Latina woman with a medical history of diabetes mellitus (DM) and hypertension. Maria is brought by ambulance to the ED after suffering a stroke at work that morning. The nurse recognizes that the patient has been treated in the ED multiple times for uncontrolled hypertension.</td>
<td>Patient-centered care</td>
<td>Ischemic stroke, Chronic Illness, Rehospitalization, Confidentiality, Joining a team, Goliath humor in medicine, ESL</td>
</tr>
<tr>
<td>Roles &amp; Responsibilities</td>
<td>After spending an evening in a neurological intensive care unit for treatment and monitoring of an ischemic stroke, uncontrolled hypertension, Maria Garcia is transferred to a neurology step-down unit on another floor. Her daughter, Tania Jacquez and son-in-law, Miguel Jacquez, arrive to coordinate her care.</td>
<td>Health care provider roles</td>
<td>Medical errors &amp; near misses, Role specialization, Role shifting, Task shifting, Hierarchical relationships</td>
</tr>
<tr>
<td>Teams &amp; Teamwork</td>
<td>After a few days in the hospital being treated and monitored after an ischemic stroke, Maria Garcia, her daughter, Tania Jacquez and son-in-law, Miguel Jacquez, meet with Ms. Garcia’s health care team to discuss her discharge planning. The meeting is about to begin.</td>
<td>Team dynamics and team development</td>
<td>Re-hospitalizations, Patient noncompliance, Care transitions and discharge planning, Insurance coverage and eligibility, Rehabilitation</td>
</tr>
<tr>
<td>Interprofessional Communication</td>
<td>After being treated and discharged from the hospital for an ischemic stroke a few weeks ago, Maria Garcia arrives for a routine follow-up appointment at an outpatient stroke rehabilitation center. Maria's rehabilitation team is very enthusiastic about her recovery.</td>
<td>Communicating for patient understanding</td>
<td>Medical errors, Cultural competence, Communication tools and technology, Research and informed consent</td>
</tr>
</tbody>
</table>

Next Steps

- Focus Groups: Instructors and Students
- Piloting: Face-to-face and/or online delivery
- Improvements and “crowd-sourced” additions to faculty guide (e.g., suggested follow-up and extension activities)
- Repackage modules as SCORM-compliant learning objects for importing into Blackboard
- Mobile/Tablet-friendly versions (HTML5)
- Ongoing feedback and evaluation data collection using embedded surveys (faculty and students)
- National dissemination strategy using Creative Commons licensing (Non-commercial, derivatives allowed)

Contact

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The City University of New York (CUNY)
Background

Traditional, instructor-led course lecture activities have been shown to be an ineffective form of “passive” learning. Flipped classroom (FC) models entail assigning instructional content (e.g., videos, quizzes, podcasts, and articles) outside of class, enabling students to independently review material before meeting face-to-face for more engaging and collaborative learning facilitated by an instructor.

The FC model uses active learning methodology, which enables educators to “move from the robotics of memorization of knowledge and facts known as surface learning, towards a deep learning, hence being able to apply the knowledge learned into a more active, developed process.”

According to Educause (2012), “The value of a flipped class is the repurposing of the class time into a workshop where students can inquire about lecture content, test their skills in applying knowledge, and interact with one another in hands-on activities.”

Purpose

To utilize the flipped classroom (FC) model in an associate degree nursing course and evaluate its effectiveness.

Objectives

- Design and deliver instructional content using a flipped classroom approach in the Art of Science LPN course
- Enhance student learning, achievement, and critical thinking skills

What is a Flipped Classroom?

- Blended learning in which students learn traditional ‘lecture’ content remotely and complete activities in class with instructors and peers in order to apply their learning and solidify their understanding of key concepts.

Role of Instructors

To facilitate activities, guide students, and clarify understanding of material. Responsibility is placed more on students in regards to their own learning and studying of content, individually or in groups, prior to attending class. This enables instructors to promote higher order levels of thinking and skill development.

Role of Students

- Responsible for their own learning and review of course readings and other lecture-based material
- To apply their knowledge and skills and enhance their critical thinking skills and higher order level of thinking.

Method

A clinical group comprising of 23 student nurses in the ‘Art of Science’ in the Licensed Practical Nursing throughout the semester participated in a flipped classroom style course.

Students were offered various topics, quizzes and discussions, to read/perform prior to lecture.

Resources utilized were:
- Articles, Journals and Magazines.
- Videos/Podcasts
- Quizzes
- PowerPoints

Results

The results demonstrate that the flipped classroom supports a sound pedagogical model that can be used to develop highly competent nurses due to its immense benefits, which include enabling students to gain confidence in their independent learning and to develop skills in critical thinking, creativity, communication, engagement, collaboration, and team-based operations.

Conclusions

FC supports a sound pedagogical model that can be effectively used in associate degree nursing schools to develop highly competent nursing professionals due to its immense benefits. It enables students to gain confidence in their independent learning developing skills, enhance critical thinking, creativity, communication, engagement, motivation, collaboration, and team-based operations.

Contact

- Faith Armstrong, farmstrong@lagcc.cuny.edu
- Margarita Israilova, misrailova@lagcc.cuny.edu
- Kyaw Naing, knaing@lagcc.cuny.edu
**Issue:** Nurses have voiced, during and after orientation, difficulty in understanding the intent of OASIS data collection questions.

**Project Description**

Invitations to join the Wavicle platform and play the game were accepted by 30 VNSNY nurses. Participants were first shown a review of M2020 and M2030 OASIS questions presented as they are seen in the OASIS data collection area. Answers are provided for each question and the intent behind all provided answers are explained. Learners were then presented a choice of 3 games to test their understanding of the content, each allowing multiple attempts to earn a high score.

Participants were given a pre-test using a scenario and a series of OASIS questions M2020 and M2030. A post-survey was given following a set time period given to play the games.

**Feedback**

Participants reported positive feedback on the use of realistic scenarios in the games while expressing a clearer understanding of the intent of OASIS questions. However, many found navigating the Wavicle platform to be challenging, citing the inability to review explanations of the purpose and intent of OASIS questions as a main concern. Once the games began, learners were unable to navigate back to the OASIS information initially provided.

**Lessons Learned**

Nursing educators at VNSNY are always seeking innovative ways to enhance staff knowledge, skills, and confidence in OASIS data assessment. Prior strategies included an overview of the content, discussion of the OASIS questions, and post-test questions of the presentation. Game-based learning may serve as an additional learning resource for staff needing more training and support. The use of mobile-friendly platforms like Wavicle to reinforce learning and retention of staff development training is promising.

**Next Steps**

We plan to continue to develop OASIS specific collection assessment games for use by Home Health Care nurses at VNSNY during and after orientation and will explore other gaming and mobile friendly platforms to support their delivery to nursing staff.

**Game-based Learning**

Literature indicates that the use of games and serious games in nursing education promotes active learning, encourages critical thinking, and makes learning exciting while simulating real-life scenarios. Research has shown gaming to be effective for improving nursing learning outcomes, enhances the retention of knowledge, and motivates the nurse to become more engaged in their learning.
NURSING SKILLS VIDEO “SELFIES”
INCREASE PRACTICE TIME, ENHANCE PERFORMANCE AND CONFIDENCE IN THE ABILITY TO LIST SKILLS PER CHECKLIST
Cynthia Sterling-Fox, RN, MSN, FNP-C, Pamela Charles, RN, Ophalyn Gariando, RN, Julius Smith, RN

PURPOSE
The purpose of the study is to use mobile technology in the Skills Lab to (1) increase the length of time student spend practicing skills, (2) enhance the ability to list skills in order in which they are performed and (3) increase confidence in performance of skills.

PROBLEM
Students: (a) practiced skills 1-2 weeks before the practicum; (b) spent less than 10 hours practicing skills; (c) lacked confidence in performing skills; and (d) lacked confidence in listing skills in correct order performed (new NCLEX test plan).

Faculty: No effective system to (a) determine the quality or length of time spent practicing; (b) assess performance of skills during the semester; (c) verify participation or attendance of practice sessions; and (d) give feedback on performance improvement.

DESIGN
This is a quasi-experiment research design involving students in Med-Surg II Skills Lab Classes. A pre and post test was given to the treatment group of 15 students. They were not randomly assigned to groups of 3. The control group included all other students (55) in the Med-Surg II nursing program.

POPULATION, SAMPLE, SETTING, TIME FRAME
The population is 2nd year nursing students in Med-Surg II. A non-randomized sample of 21% of nursing students (n=15) were selected as treatment group out of a total population of 70. The control was the other 55 students. The study was conducted over the 15-week Fall Semester 2014 in the Nursing Skills Lab.

METHODS
Students in the treatment group attended skills Lab taught by an Instructor and received a scrambled Pre-test checklist. They were required to “list skills on the check list in the order in which they should be performed”, “practice skills for the mandated total 10 hours” during the 15-week semester, “make nursing skill video “selfies” of the skills using smart phones” and send to instructor, and tested on skills at the end of the semester (Practicum).

The control group, however, received the traditional conditions; they attended skills lab with Lab instructor, practiced the skills for total of 10 hours during the semester and tested on skills performance at the end of the semester (Practicum).

FINDINGS
100% Practiced 1st & 2nd weeks after learning skills
80% = doing selfies were fun & enjoyable
90% increased self confidence to perform skills
90% increased ability to list skills
100% recommend selfies
50% spent > 3-4 hrs practicing skills
50% spent >4 hrs practicing skills
100% recommend inclusion in curriculum

CONCLUSIONS
Nursing Videos “Selfies”:
(a) forced students to practice skills during the 1st and 2nd week after learning it with the instructor (not the week before practicum).
(b) Increased length of time spent practicing skills thru out the semester.
(c) Increased students’ confidence to perform skills in the clinical setting and
(d) Improved students’ performance of skills during practicum.
(e) Increased confidence in listing skills in correct order performed.

IMPLICATIONS
Nursing Skills Video “Selfies”
1. Provide evidence that students are continually practicing nursing skills
2. Provide platform for student self-assessment to improve skills performance
3. Facilitate peer evaluation/critique to refine and perfect skills
4. Faculty use to enhance learning
5. Implemented across the curriculum in nursing schools
6. Potentially improve NCLEX scores.
The creation and implementation of innovative curricula is essential for supporting student centered learning, promoting active engagement and to assist the student in developing a deeper level of understanding of complex nursing concepts. Nursing school faculty are utilizing various forms of innovative technology to assist students in meeting these goals and foster success.

For nursing students, mastering the concept of fluid and electrolytes is not just important but extremely ESSENTIAL! A good understanding of this subject matter is fundamental to comprehending the pathophysiologic process encountered in clinical practice. As evidenced by faculty and student interviews and evaluated data, it is apparent that fluid and electrolytes is, hands down, the most challenging subject taught in nursing school.

In an effort to engage the student, encourage participation, prepare for the NCLEX exam and put the “FUN” back in learning, we utilized SoftChalk e-learning software to create a dynamic, interactive learning module on fluid and electrolytes to use as a pre-class review session for a group of first level (NU101) nursing students.

In addition to interviewing various faculty members regarding their pedagogical practices related to fluid and electrolytes, we also evaluated 8 exams. These high stakes assessments were given over 4 semesters, with a total of 56 questions pertaining to fluid and electrolytes. We found that 30% of the students answered more than half, or 52%, of the fluid and electrolyte questions incorrectly.

The students have 10 days to complete this pre-semester course work, at which point it will be removed from the access site. A post-test, containing questions pertaining to the collection of both quantitative and qualitative data, will then be administered to the students.

The students will be given a quantitative pre-test to ascertain their baseline level of understanding regarding the various topics of fluid/electrolytes. We will also ask a small number of qualitative assessment questions to best understand their attitude toward their comprehension of this “dreaded” topic. Once the pre-tests are completed, students will be granted access to a designated site where an interactive SoftChalk presentation on fluid and electrolytes is available to them.

Once all post-tests are completed, data will be collected, evaluated and compared to pre-test data to determine the effectiveness of the SoftChalk program as evidenced by the student’s increased ability to correctly answer post-test questions. Students will again have access to the program so that they may use it for future reference.

Subject to the results of our outcome data, we anticipate introducing and sharing this unique, innovative, pedagogical presentation with our nursing colleagues for utilization across the curriculum.

This utilization need not be limited to this chosen subject but has the ability to be applied to endless topics as an adjunct in promoting active engagement and supporting student centered learning.

References