## Concern

Students were not prepared to learn and study at the rapid pace of a 15-month accelerated second-degree program.

### Exam Preparation

- Struggling students identified ineffective study strategies:
  - Crammed study within 24 hrs before exams
  - Reread textbook with extensive highlighting
  - Rewrote textbook as “notes”
  - Individual study only; group study with struggling peers
  - Used NCLEX (licensing exam) test banks exclusively

### Exam Difficulties

- Struggling students identified factors presenting during exam:
  - Preparation - didn’t study tested information, couldn’t remember studied information, couldn’t apply information
  - Test Anxiety - couldn’t concentrate, panicked
  - Test Skills - misread item, didn’t notice qualifiers, changed answer, carelessly marked incorrect answer

### Exam Review

- few students requested to review exams

### Metacognition

- Metacognition is an awareness of one’s own thinking and learning abilities (Medina et al., 2017).
- Metacognitive skills include self-regulated learning, self-directed learning, and self-evaluation (Chen et al., 2019).

## Implementation

### Collaborative Testing

- Formative unit exams (n=3)
  - Students completed an individual formative exam comprised of 40 multiple choice, multiple answer, and short answer items.
  - Immediately after completing the individual exam, students were randomly assigned to a group to complete the exam again.
  - The group was required to have consensus on a group answer.
  - Groups engaged in discussion and considered peer’s rationales to critically think through the application level exam items.
  - The unit exam grade was derived from 70% of individual exam score plus 30% of team score. A cap of 5 points was applied. Unit exams comprised 57% of course grade.

### Exam Wrapper

- Required for grade less than 85%.
  - Students attended the one-hour exam review with exam wrapper session, usually within 3 days of exam.
  - The exam wrapper was identified as a tool for reflection on exam performance. Ineffective exam preparation methods were contrasted with skills based on metacognition:
    - Cramming vs. advance preparation
    - Individual vs. group study
    - NCLEX questions vs. targeted textbook and notes review
    - Rereading textbook vs. handwriting concepts
  - Students reviewed incorrect items for content knowledge gaps and analysed factors influencing answer selection.
  - Students recalled item answer rationales discussed with peers during the collaborative exam.
  - Modifications to study strategies were suggested:
    - Study after class
    - Avoid rereading
    - Draw instead of rewriting
    - Compare and contrast rather than silo content
    - Study with peers: case studies, application, self-generated quizzes, NCLEX questions

## Evaluation

- During Fall 2019 semester, 114 / 114 students preferred individual exam with collaborative testing to individual exam alone.
- 31 students / 114 total students attended an exam review with exam wrapper.
- 26 / 31 students recognized their own ineffective study methods.
- 12 / 31 students identified previously unknown behaviors during exams which negatively impacted grade.
- 1 / 31 students was familiar with metacognition concepts.
- 27 / 31 expressed an interest in revising study strategies
- 6 / 31 students modified study strategies for at least one additional exam (unit or final).
- 0 / 31 students used the exam wrapper template to review exams in other courses

## Proposed for Future

- Continue collaborative testing.
- Introduce metacognition early in the course.
- Assess all students’ metacognition, self-directed learning, and self-regulated learning with existing, validated tool.
- Assist students to develop metacognition skills: setting learning goals, monitoring learning, evaluating learning.
- Foster a culture of exam review as an expectation of student professional practice.