A Basic Science Pre-Test to Assess Academic Risk of First Year Nursing Students

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Background

- High attrition of first year baccalaureate students
  - Focus on program completion
- Science, pre-requisite grades predict program completion
  - Robert (2018)
  - Seago et al (2012)
  - Newton et al. (2007, 2009)
  - Simon, McGinnis & Krause (2013)
- High school preparation varies widely!
Who needs help? Project goal…

- Target students who may struggle in sciences
- Early connection to tutoring and supplemental instruction
- Premise: A student starting “from scratch” or who has poor recall skills will have greater difficulty
Collaboration with science faculty on key questions

- Who struggles?
- Who is “starting from scratch”?
- Which students have poor recall or lack of exposure to science?
- Can we make an easy to administer screening test?
Development of a screening “pre-test”

• 3 science faculty collaborated
• 25 multiple choice items developed
• Item analysis reviewed
• Items slightly revised in 2017
Sample item

- Electrically charged atoms are called
  A. Ions
  B. Isotopes
  C. Molecules
  D. Elements
Sample item

• Which step of gene expression results in the production of a messenger RNA molecule?
  A. RNA replication
  B. DNA replication
  C. Transcription
  D. Translation
Sample item

• In mitosis, which of the following is true?
  A. One haploid cell and one diploid cell are formed
  B. Two haploid cells are formed
  C. Two identical diploid cells are formed
  D. Four haploid cells are formed
Sample item

- The basic building blocks of proteins are:
  
  A. Nitrogenous bases
  B. Amino acids
  C. Triglycerides
  D. Monosaccharides
Administration

• Orientation weekend
• 30 minutes scheduled
• Paper and pencil
• Assistance by Academic Support Center staff
Results

• Mean score for nursing students
  16/25 (64%)
• KR20= 0.60 (Years 2014-16, n= 485)
• KR20 = 0.67 (Revised 2017, n= 187)
Results: Correlation of Pretest and Grades

- Statistically significant, $p < .05$
  - Positive correlation: Science pre-test scores and:
    - Separate science course grades across freshman year
    - Cumulative science GPA
  - Higher pretest scores, higher science grades
Results: Pretest score (Hi/Lo) and Eligible to Progress

- Pearson Chi-Square:
  \[ X^2 (2, \ N=485) = 8.967, \ p = .003 \]

- Students with low scores less likely to be eligible to progress
Action

• Score 12 or lower shared with students
  • Notified of risk
  • Advised to utilize resources
• Goal = Raise student awareness & mobilize to action
Next steps

• Track utilization of resources in Academic Success Center
• Interviews to assess qualitative feedback about transition to collegiate science study
• Development of early interventions to support science learning
Questions?

• Thank you for your attention!

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