Developing Study Plans for NAPLEX Board Preparation Based on Regression Analysis

Karen L. Kier, PhD, MSc, RPh, BCPS, BCACP, CTTS, FASHP

Professor of Pharmacy Practice

Director of Assessment

Director of Drug and Health Information

Raabe College of Pharmacy

Ohio Northern University

Ada, Ohio

k-kier@onu.edu

Slide Availability

- Slides will be available on the IUPUI Assessment Institute website
- See program for details
- Slides are due by November 15th to IUPUI
- Feel free to email me at k-kier@onu.edu

Learning Objectives

At the end of the presentation, the participant will be able to:

-describe the factors that can be utilized to predict board examination scores

-discuss the use of study plans for preparation for board exams

Introduction

- ACPE accredited college of pharmacy
- 0-6 program
- Private, rural
- 6th year is APPE rotations
  - 90% of students rotation over 60 miles away any given month
  - Rotations available across country
- PCOA since 2016 (5th year spring semester)
- NAPLEX prep boot camp since 1991
- College Assessment Committee
- University Assessment Committee
- Curricular revision in 2018-2019 with new P1 start (2019)

Curriculum

- Profession of Pharmacy sequence (1-3 years)
- IPPE
  - Community IPPE (after 2nd year)
  - Institutional IPPE (after 3rd year)
  - Elective IPPE (during 4th year)
    - Interactive patient-professional experiences
- Team-based instruction
- Module-based curriculum
  - Combines pathophysiology, pharmacology, pharmacogenetics, pharmacokinetics, medicinal chemistry, therapeutics
- Capstone course prior to APPE

Assessment Measures

- ExamSoft (3-5)
- Assessment Days mapped to ACPE standards, PPCP, and Entrustables
  - Each semester
  - Faculty involvement
  - Rubric-based assessment
- PCOA
  - NABP validated exam
  - Divided into 4 major areas
- Capstone pre-test

Assessment Measures

- NAPLEX board results
  - NABP validated exam
  - Change in format in 2016
  - 92-96% passing since format change
- Course active learning projects data collection
  - Examples: SCHOLAR MAC, Business Plan
- Internship data collected
- Co-curricular implementation in 2018
- APPE rotation rubric/standardized among Ohio schools
- ACPE surveys through AACP national

PCOA

- Spring semester (P5 year analogous to P3)
- April exam (almost all didactic curriculum completed)
- Students sent results in June by ONU email
- Mandatory exam
- No consequence for performance or score for matriculation
- Concern for motivation for highest performance

PCOA in the Literature

- Literature on correlation of PCOA with NAPLEX finds correlations from mild to moderately strong correlation
- NABP was recently asked on a webinar if they have the correlation data –response was they are still working on it
- Different colleges of pharmacy handle PCOA very differently

Published Studies

Correlation of P3 PCOA scores with future NAPLEX scores

- Naughton CA, et al   *Currents in Pharmacy Teaching and Learning,* Nov/Dec 2014

- Author Conclusion: "NDSU pharmacy students in their P3 year who scored higher on the PCOA exam were more likely to score higher on the future NAPLEX exam. Students may be able to use formative assessment data from the PCOA to correct any possible deficiencies prior to taking the NAPLEX."

Published Studies

Identifying Best Practices for and Utilities of the Pharmacy Curriculum Outcome Assessment Examination

Timothy Y. Mok, et al.   *AJPE*   Dec 2016

- **Authors "Conclusion.** Administering the PCOA to students after they have completed their didactic coursework may yield scores that reflect student knowledge. Predictive utility regarding the North American Pharmacy Licensure Examination (NAPLEX) and potential applications is limited, and more research is required to determine ways to use the PCOA."

Published Studies

A Study of the Relationship Between the PCOA and NAPLEX Using Multi-institutional Sample

- Michael J. Rudolph, et al *AJPE* March 2019
- 6 colleges of pharmacy data
- Author Conclusion: "Student PCOA and NAPLEX total and content area scores were significantly correlated,which is consistent with the findings of previous research. The somewhat modestproportion of variancein NAPLEX scores accounted for by PCOA scores illustrates the need for use of additional performancemeasures when evaluating student preparedness for the NAPLEX."

Published Studies

Correlation of the Pharmacy Curriculum Outcomes Assessment and Selected Pre-pharmacy and Pharmacy Performance Variables

Brad Hein, et al.   *AJPE* April 2019

Authors: "Results. There was a moderate correlation between PCOA and PCAT (r=0.60), P3 pre-APPE GPA (r=0.60) and the NAPLEX (r=0.64). The multivariate regression analysis explained 60% of the variance of the total PCOA score, with PCAT making the largest unique contribution.

Conclusion. The PCOA was moderately to strongly correlated to the pre-APPE GPA, thus providing an acceptable assessment of student learning. The PCOA was also moderately to strongly correlated to the NAPLEX, making it a useful tool in predicting performance and identifying students in need of further remediation before the NAPLEX."

Capstone Pretest

- Given since conception of course
- Change in timing and structure of exam
- High percentage of clinical (therapeutic) questions
  - Only 1 of 4 domains in PCOA
- Review of materials based on results in capstone
- Post-test given for improvement

Regression Analysis

Variables based on data that already existed—no new variables created

- Capstone pre-test score
- Capstone post-test score
- PCOA score
- NAPLEX first-time pass rate (yes/no—dichotomous variable)
  - Not all actual scores released by candidates
- GPA
- Exam scores for each P4-P5 modules
- Internship experience (yes/no)
- Three different POP math scores (exams)—pharmaceutical calculations

Discussion Question

What variables would you like to measure/include in the regression analysis?

Regression Analysis

- SPSS v22 (IBM)
- Stepwise multiple logistic regression
- Dependent variable—NAPLEX pass (yes/no)
- Variables removed that were not predictive or improved model
- Goodness of Fit
- Model predicted 74%
- Variables ranked by R^2: capstone pre-test, PCOA, GPA, and math scores (pharmaceutical calculations)

Cut Scores

- Regression analysis allowed for cut scores
- 3 groups
  - Low risk, intermediate risk, high risk
- Intermediate risk and high risk all notified via email of status
- High risk divided among college administrators (associate dean, department chair, assessment director, experiential director)
- Monthly request

Question

What type of information would you want to see from students to know they are working on their weaknesses?

Requirements

- All students could participate via email
- High risk were required to report (no consequence if they did not)
- Provide study plan for the 9 months of rotations for both intermediate and high risk
- High risk required to provide snapshot of quizzes
- In addition, to monthly quizzes required for all students through experiential office
- No requirements on what they had to use for materials
- Students could match study material and quizzes with rotation materials
- Students could use NAPLEX prep materials

Program

- Students were asked to think about their weaknesses based on PCOA and capstone pre-test
  - Based on student's self-awareness of weaknesses (no assurance)
- Admin assigned could provide some feedback to plan
- 99% of students over first 2 year complied with no consequences
- Highest risk students were assigned to Director of Assessment
- Students continue to rely on RxPrep book
- Quizzes were done mostly in NAPLEX review as part of MaGraw-Hill AccessPharmacy

Question

What could be potential issues? What could be improved?

Concerns/Issues

- Consequences?
- Better preparation materials?
- Evidence-based boot camp?
- MJPE?
- What should happen before APPE rotations?
- Only late indicators
- Only potential early risk factor would be GPA and pharmaceutical calculations? How do we leverage this information? Do we try to identify other earlier indicators?

Future Improvements

- Add MJPE
- Purchased ExamMaster test banking
  - Mock PCOA prior to PCOA
  - Mock NAPLEX for evidence-based boot camp
  - Could it be used for high stakes or benchmarks for earlier curriculum?
  - Could this provide earlier indicators?
  - Could this be a way to assess new curriculum prior to ACPE self-study and accreditation visit in 2023?
- Moved PCOA to earlier in curriculum
- Provide some consequences prior to APPE rotations

Thoughts/Questions

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