Excellence in Professional Pharmacy Education

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State Boundary
Road
River
National Capital
State Capital
City or Town
0 300 KM
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Some Thoughts…

“Excellence in Professional Pharmacy Education”

Is pharmacy a health care profession?

Overview

- A modern curriculum
- Educational process
- Learning outcomes
- Learning by doing
- Assessment

A Modern Curriculum

A Modern Curriculum…

- Is not a series of courses strung together
- It is a combination of
  - course content,
  - educational strategies,
  - learning outcomes,
  - experiences,
  - assessments,
  - the environment, and
  - students' attributes such as learning style and maturity.

Maine LL, Executive Director, AACP. Letter to ACPE. December 8, 2003

A Modern Curriculum…

- Develops a health care provider,

A Modern Curriculum…

- Develops a health care provider, consequently
  - The curriculum must be designed to improve patient care
  - Foundational sciences are important, but no longer primary

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- Develops a health care provider, consequently
  - The curriculum must be designed to improve patient care
  - Foundational sciences are important, but no longer primary

  - A scientist working in drug discovery is not a pharmacist
  - What purpose does learning to use an HPLC serve for patient care?

A Modern Curriculum…

- Clinician educators must be able to understand, identify, and develop “non-science” topics such as
  - Team work
  - Human behavior
  - Advocacy
  - Health promotion
  - Self-awareness
  - Professionalism

Design Curricula Knowing That…

- When pharmacists are on the team:
  - **Patients benefit** — enhanced satisfaction, care, and outcomes
  - **Communities benefit** — healthier population, increased access to immunizations
  - **The health care system benefits** — quality, access, and costs are improved

Pharmacists clearly contribute to a team-based patient-centered health care system providing improved care and value.

Rochon J, Executive Director, Washington State Pharmacists Association, 2015

The Science of Education

Teaching and Learning…

- Is a science which has evolved greatly over the past 20 years.
- Teaching is not equal to learning, and talking to an audience does not guarantee they will understand, process, synthesize, apply, or retain what is heard.
- We are *educators*. It is our responsibility to seek, understand, and apply new evidence to what we do.

Learning Outcomes

Learning Outcomes

- Designing curricula around terminal ability statements helps move students from knowledge to skills.
- Creating related objectives at the course, and even lecture level, and
- Using hierarchical taxonomies facilitates focus on development of students' problem solving skills

Bloom's Taxonomy

- Developed to serve as a disciplined framework to assist in uncovering and providing the most sophisticated level of problem solving for a given topic.
- It is based on the idea that it is our responsibility to get the student to not just memorize and consequently be assessed on only facts that can be memorized, but to demonstrate the ability to apply the information.

Bloom's Taxonomy

- Ways of stating our intentions (course objectives) can be placed on a continuum of increasing critical thinking to help the student be a better problem solver and the instructor instruct at a more refined level.
- Conceptualized as a pyramid with the idea that lower levels are necessary to the higher levels, so "creating" requires remembering and analyzing, etc.

Bloom's Taxonomy

Cognitive Domain

Anderson LW, Krathwohl DR, editors. New York: Addison, Wesley, Longman, Inc; 2001.

Other Taxonomies

- Krathwohl's Taxonomy for Affective Learning Objectives
- Pierce and Gray's Taxonomy for Psychomotor or Kinesthetic Learning Objectives
- Fink's Taxonomy of Significant Learning

Krathwohl's Taxonomy for Affective Learning Objectives

- **Receiving**: Displays evidence of paying attention
- **Responding**: Reacts appropriately to a stimulus
- **Valuing**: Measures effect or worth of behaviors, skills, or attitudes
- **Organization**: Prioritizes values and resolves conflicts between them
- **Characterization**: Values define behaviors and attitudes to a predictable degree

Pierce and Gray's Taxonomy for Psychomotor Learning

- **Perceiving**: Paying attention or using sensory information to think about the motor activity
- **Activating**: Going through the steps of a task slowly and in response to instruction or trial and error
- **Executing**: Completing steps of a task without instruction
- **Maneuvering**: Skillful and confident performance execution
- **Judging**: Skillful performance of a new task through modification of skills mastered for a different task
- **Creating**: Creating the steps for a new task

Fink's Taxonomy of Significant Learning for Course Design

- **Foundational Knowledge**: Understanding and remembering information and ideas
- **Application**: Skills; critical, creative, and practical thinking; managing projects
- **Integration**: Connecting ideas, people, realms of life
- **Human Dimension**: Learning about oneself, others
- **Caring**: Developing new feelings, interests, values
- **Learning How to Learn**: Becoming a better student; inquiring about a subject; self-directing learners

Implications of Ability Based Curriculum

- Teaching (classroom, lab, experiential) is part of a larger, **community-owned project**
- **Instructional choices** require careful thought and on-going assessment to ensure **match** with curricular **outcomes**
- A **faculty** is responsible for **agreeing** upon the abilities that support its curriculum
- Each **faculty** member is **responsible** for **developing** in each student the **abilities** on which the curriculum is built
- One's teaching activity requires the same commitment to excellence as any other part of one's professional activity

Hobson EH. Assessing Student Performance: Doing it Right & Doing the Right Thing (2003). AACP Institute

Learning by Doing

Learning by Doing

- Higher education seems too concentrated on imparting knowledge and assuming students will be able to use the information
- Active learning techniques bring **relevance**, **context**, and **connections** for students and facilitate academic success more than lectures

Active Learning

PNAS

Active learning increases student performance in science, engineering, and mathematics

Scott Freeman[a,1], Sarah L. Eddy[a], Miles McDonough[a], Michelle K. Smith[b], Nnadozie Okoroafor[a], Hannah Jordt[a], and Mary Pat Wenderoth[a]

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Edited* by Bruce Alberts, University of California, San Francisco, CA, and approved April 15, 2014 (received for review October 8, 2013)

To test the hypothesis that lecturing maximizes learning and course performance, we metaanalyzed 225 studies that reported data on examination scores or failure rates when comparing student performance in undergraduate science, technology, engineering, and mathematics (STEM) courses under traditional lecturing versus active learning. The effect sizes indicate that on average, student performance on examinations and concept inventories increased by 0.47 SDs under active learning (n = 158 studies), and that the odds ratio for failing was 1.95 under traditional lecturing (n = 67 studies). These results indicate that average examination scores improved by about 6% in active learning sections, and that students in classes with traditional lecturing were 1.5 times more likely to fail than were students in classes with active learning. Heterogeneity analyses indicated that both results hold across the STEM disciplines, that active learning increases scores on concept inventories more than on course examinations, and that active learning appears effective across all class sizes—although the greatest effects are in small ($n \leq 50$) classes. Trim and fill analyses and fail-safe n calculations suggest that the results are not due to publication bias. The results also appear robust to variation in the methodological rigor of the included studies, based on the quality

225 studies in the published and unpublished literature. The active learning interventions varied widely in intensity and implementation, and included approaches as diverse as occasional group problem-solving, worksheets or tutorials completed during class, use of personal response systems with or without peer instruction, and studio or workshop course designs. We followed guidelines for best practice in quantitative reviews (*SI Materials and Methods*), and evaluated student performance using two outcome variables: (*i*) scores on identical or formally equivalent examinations, concept inventories, or other assessments; or (*ii*) failure rates, usually measured as the percentage of students receiving a D or F grade or withdrawing from the course in question (DFW rate).

The analysis, then, focused on two related questions. Does active learning boost examination scores? Does it lower failure rates?

Results

The overall mean effect size for performance on identical or equivalent examinations, concept inventories, and other assessments was a weighted standardized mean difference of 0.47 (Z = 9.781, $P << 0.001$)—meaning that on average, student performance increased by just under half a SD with active learning

Active Learning

"The results raise questions about the continued use of traditional lecturing…"

Freeman S. PNAS 2014 111 (23) 8410-8415; doi:10.1073/pnas.1319030111

Active Learning

"The results raise questions about the continued use of traditional lecturing as a control in research studies…"

Freeman S. PNAS 2014 111 (23) 8410-8415; doi:10.1073/pnas.1319030111

Active Learning

"The results raise questions about the continued use of traditional lecturing as a control in research studies, and support active learning as the preferred, empirically validated teaching practice in regular classrooms."

Freeman S. PNAS 2014 111 (23) 8410-8415; doi:10.1073/pnas.1319030111

Experiential Learning

- Causes the student to be physically engaged in professional activities with real consequences.
- The focus is on doing — not just watching — the activity in a real site:
  - With the distractions and interruptions all clinicians experience,
  - Under the guidance of a preceptor who is a combination role-model, coach, teacher, and facilitator
  - Experiential placements must be relevant, rigorous, clinical and “hands on.”

How Important is Experiential Learning?

- In terms of credit hours, experiential courses comprise 1/3 of the entire curriculum
- In terms of relevance to the education of the student pharmacist, they help develop professional competence:
  - *Judgment*: Practice with feedback, reflection of practice
  - *Professional Socialization*: Inculcate attitudes and values
  - *Knowledge & Skills*: Psychomotor and problem solving

Assessment

Assessment

- If you want to change behavior, measure it.
- Intentional and efficient assessments of students' mastery of knowledge, skills, and attitudes over time is critical to:
  - Guide students' development,
  - Document attainment of abilities and
  - Feed them back into the program's decision-making quality improvement system.

Is Pharmacy a Health Profession?

- Do expect our pharmacist to be up-to-date and able to give first aid and CPR?

- Clinical pharmacy is not *where* we practice, it is *how* we practice?