Teaching the Teachers
The Vesalius Program and Teaching Biomedical Sciences

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Introduction and the Challenge

A key to successful educational reform is the development of the appropriate expertise of the instructors in both content and pedagogical areas. Traditionally neither basic science nor clinical instructors receive any formal training in pedagogy and yet they are expected to design, implement, teach and assess coherent curricula in the biomedical sciences from pre-doctoral through CME levels.

The Vesalius teaching program was conceived at Boston University School of Medicine in order to provide formal training in curriculum design and teaching techniques for masters and doctoral candidates who would go on to teach biomedical sciences in medical and graduate schools. Over the last several years a curriculum of instruction and training has been developed to foster both skills and scholarship in the art and science of teaching in the biomedical sciences.

Objective of the Program

A foundational course in the Vesalius Program is GMS 806 Teaching in the Biomedical Sciences. The Performance Objective of this course is to provide the student with a systems approach to organizing and teaching knowledge and to transform them into an active and creative teacher with the skills to design and implement classroom and curriculum educational programs.

The Approach

The course builds on the central concept from educational neurobiology that information and knowledge handling in the human nervous system depend on modeling processes that abstract certain features from a stimulus set to ultimately change knowledge and behavior (learning). The Vesalius program and GMS 806 makes this applies this concept in the classroom through the use of the Cycle of Pedagogy.

Cycle of Pedagogy

The Cycle of Pedagogy codifies three interlinked model systems that interact during learning. Each of these must be explicitly addressed by the teacher:
- the "mechanistic" structure of knowledge production (the developing brain or the brain as represented by learning preferences and talents),
- the knowledge structure of a field, i.e., the systemic organization of facts and their theoretical interactions,
- the path of pedagogical growth from naive to expert practitioner and communicator in a field of inquiry.

Description of GMS 806

GMS 806 is structured for students to actively explore and discover how the cycle of pedagogy is used to prepare lesson plans, courses and teach in lecture, small group, seminar and laboratory settings. Each modeling cycle in turn is explored:
1) with a focus on learning styles and the concepts of differentiated learning;
2) by describing knowledge structures with a systems approach, (the 3Cs=content:concepts:context);
3) To build learning paths or trajectories by using an assessment design framework model of curriculum development and an instructional tool of the 5Es (Engagement, Exploration, Explanations, Elaboration, Evaluation).

Assessment Design Framework Model

The ADFM is the central framework that structures both classroom planning and ongoing assessment of the success of teaching in the classroom.

Performance Objective: Overall outcome measure that reflects how their knowledge and new abilities will show. What will the lesson plan achieve in the student.

Learning Elements (Learning Objectives): What new knowledge or added content, concepts and context students are expected to know or do in order to achieve the performance objective.

Learning Path or Trajectory: The arrangement and order of the individual elements of information (as content, concepts or context) to achieve the learning and overall performance objectives.

Assessment: What evidence is used to judge that the students achieved the desired objectives. These include: Formative: What "dipstick" measures will be used in real time to know the student is following on the path that is laid out in the lesson? Summative: Tests vocabulary, facts, concepts and techniques of the knowledge structure to be taught. Authentic: What real world test shows that the students have changed behavior by incorporating new knowledge into their internal model of the topic?

Conclusions

The course is now in its fourth iteration of refinement and will be taught for the fifth time this spring. Formative and authentic assessment of the students through multiple teaching opportunities has supported the general attainment of the Performance objective as set forth.