

and 93% of students answered the question correctly on the final exam. Student feedback was solicited using an anonymous survey. Ninety-three percent of the students who completed the survey found the reading worksheets helpful and ninety-seven percent recommended that I continue to use reading worksheets in the future offerings of the course. Improved student learning, content retention, and satisfaction support the continued use of instructor-designed reading worksheets.

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#### **Competency-based assessment of doctoral student progress in a problem-based learning curriculum in biomedical research**

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Van Andel Institute Graduate School (VAIGS) in Grand Rapids, Michigan, is a PhD training program housed within an independent biomedical research institute. The mission of this school is to train future leaders in the cellular, molecular and genetic biology of human disease with an emphasis on translating such research into effective clinical applications. The graduate school began operations in 2007, and four cohorts now include 17 active students. The first students graduated in 2012.

To more effectively and efficiently prepare students to be scientific leaders, the PhD program at VAIGS features a unique problem-based curriculum with eight modules focused on current research questions relevant to specific diseases. These modules integrate the traditionally separate disciplines of biochemistry, genetics, pathology, immunology, and microbiology, upon a foundation of cellular, molecular, and developmental biology. For each module, the students draft an abbreviated NIH-style research proposal outlining a plan for addressing the given research question. Advanced coursework accompanies the dissertation research in years two through five to develop additional skills and abilities critical to leadership in scientific research.

To assess student development over content areas and across semesters, VAIGS developed a set of Core Competencies for use throughout the five-year doctoral training program. These measures of student learning focus on discrete areas: knowledge, research, translation, innovation, ethics, and professionalism. In addition, we devised a detailed rubric for faculty and students to use in assessing the student's educational progress and scientific maturity. These Core Competencies provide both clarification of the expectations of scientific development and a standard for assessment of student learning. Initial implementation demonstrates engagement by faculty and students, and current evidence includes faculty satisfaction with the Core Competencies and associated rubric. Future efforts with the Core Competencies intend to assess the success of this graduate program in training scientific leaders.

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#### **Application of concept mapping for histology and system immune learning**

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The main objective of this work in University Teaching, National Technological University, Cordoba Regional Faculty, Argentina, was to characterize the implementation of the strategy of concept mapping for learning Histology and the Immune System in the School of Medicine, Faculty of Medical Sciences, National University of Cordoba, Argentina, in 2009. Secondary objectives were to investigate the students' opinions about the usefulness of concept maps and analyze their learning through the production of concept maps, conceptual integration. The results of the application allow characterizing it as a strategy that contributed to the ranking, conceptual relation and integration, training and facilitation of the study, which visual image, reflective thinking and expression of the error, the relevant aspects were noted. Given the significant learning theory based on the concept maps could be considered to be contributed to the meaningful learning of the subjects, Histology and Immune System-on strategy was applied and a contribution to human resource training. We propose a modification of the criteria for scoring concept maps.