Medical School Hotline

Recent Changes to the Basic Science Curriculum at JABSOM

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A basic tenet of currently accepted adult learning theory, is that adults learn and retain information best when solving problems.[1,2] The challenge of JABSOM's new Basic Science Foundation Program (BSF) is to integrate materials traditionally taught via didactic lectures and laboratories into JABSOM's Problem Based Learning (PBL) curriculum that emphasizes active problem-solving, independent learning, self-initiative, and peer instruction.

During the preclinical years, the core curriculum at JABSOM centers around the study of cases about people, their families and community. These cases are called "health care problems (HCPs). Students in small group tutorials examine the HCPs from 4 educational domains: clinical, biological, behavioral and populational. After reviewing the HCP, students generate and research learning issues which are presented back to their group members for discussion. A JABSOM faculty member is present to help facilitate the group learning and to assure the integrity of the PBL process. It is in this setting that the biological learning issues offer the opportunity to explore the basic sciences. It is generally accepted that the use of PBL in medical education results in improved long-term retention of learned material, improved clinical performance, and greater student satisfaction when compared with other curricular models.[3]

While students have been doing an excellent job applying the principles of PBL to learn about the basic sciences, some faculty members and students have expressed the need for a more coordinated and structured approach to the basic sciences. The challenge to the faculty was how to best blend the independent learning style of PBL with the didactic approach of the basic sciences to prepare the students for a career in medicine.

To understand the difficulty of this challenge, it is helpful to look back at the history of basic science instruction at JABSOM. Before the implementation of PBL, students spent long hours in discipline specific lectures and laboratories (approximately 30 hours of instruction per week). Even after the adoption of PBL in 1989, some students and faculty suggested that providing basic science lectures and laboratory session might insure that all students understood the underlying concepts being illustrated in the HCPs. The Unit Chairs coordinated these basic science presentations on Wednesday and Friday mornings. On average the students spent 7 hours per week in didactic instruction. These sessions were mainly designed to enhance student understanding of the on-going or recently completed HCPs.

This system had its limitations. For example, some students were concerned about truncated laboratory sessions that lacked student involvement. Some faculty members felt there was insufficient time to present their discipline in enough breath or depth to feel confident of student mastery. To meet these concerns, elective courses were developed in anatomy, pathology, pharmacology, microbiology and other basic science disciplines. Elective courses quickly became a popular option for student learning, sometimes with more than 90% of the class taking an elective course. Students, who approached PBL with intellectual enthusiasm and the initiative to take advantage of new learning opportunities provided by the elective courses, found this self-directed style of education both rewarding and fun.

A criticism to this approach was the variability of the educational experience among the students. In 2001, the Curriculum Committee created the Basic Science Ad-hoc Committee to explore ways to better integrate the basic sciences into the PBL curriculum. Each basic science discipline was asked to review the themes of the sub-units and to develop a longitudinal plan to present their discipline across Units 1 through 5. The Ad-hoc Committee felt that under this curricular revision, all students, by the end of their second year of medical school, would have received sufficient exposure to the basic sciences to not only feel confident about successfully completing Step 1 of the USMLE but also confident about entering their clinical years with sufficient grounding in the basic sciences. The Curriculum Committee accepted the Committee's recommendations and the Basic Science Foundation Program was implemented in the Fall of 2003.

The Basic Science Committee (BSC) assists the Curriculum Committee in overseeing the objectives of the BSF program. The BSC is made up of faculty representatives from each of the basic science disciplines, Chairs from the five preclinical Units and student representatives from each of the classes. Assessment of BSF is based on an end unit examination that includes both written and laboratory practical examinations. The students' scores on these exams are incorporated into their PBL assessment measures.

Under the BSF umbrella, basic science faculty members have chosen to use Unit 1 as an introduction to their discipline with detailed and in-depth lectures occurring in subsequent units. For example, the immunology faculty in the Department of Tropical Medicine and Pharmacology give introductory lectures in Unit 1 followed by lectures on hypersensitivity and allergies in Unit 2; lectures on autoimmunity and immunodeficiency disorders in Unit 3; and, lectures on vaccinations in Unit 5.

Typically, pathology lectures and laboratories are given on Wednesday mornings, anatomy lectures and laboratories on Friday afternoon. Embryology and histology lectures and laboratories are given at the beginning of each sub-unit. The students spend 11 hours each week attending BSF lectures and laboratories.

The Program Evaluation team in the Office of Medical Education collects and analyses student opinions about the effectiveness

of BSF. Anonymous questionnaires on student satisfaction are administered twice per Unit. The results are shared with the Basic Science Department Chairs. Department Chairs, in turn, discuss the results with their teaching faculty and make adjustments in their discipline's curriculum accordingly.

Students have shared interesting ideas about the union of self-directed and didactic learning. Some student are puzzled by the perceived dichotomous teaching approaches to learning. A Unit 1 student summed up the feeling of many students; "It doesn't make sense to encourage independent, student-directed learning for everything else and then emphasis rote memorization of unconnected facts for the BSF examination. The two philosophies do not complement each other". The BSF program has changed the students approach to studying. Some students feel the need to split their independent learning time between PBL and BSF material. This time management issue is illustrated by this quote from a Unit 2 student, "The BSF matched our learning in PBL much more closely this unit which was very useful, however we do not have enough time to study for both BSF and tutorial effectively." Overall, student ratings of the BSF have improved steadily since the inception of the program. This statement by a student in Unit 4 typifies this; "Integration of PBL and BSF this unit was excellent. The anatomy lectures and laboratories were excellent. They show that BSF can work."

Integrating basic science instruction into the PBL curriculum may be viewed as a work in progress. To date, one class of students (Class of 2007) has completed a full two years of the BSF program. Early experience suggests promise, and the faculty is optimistic that the BSF Program will prove to be a useful adjunct to the PBL curriculum.

JABSOM is committed to providing the best possible educational experience for our students. PBL will continue to be the central educational methodology utilized in our preclinical curriculum. The development and implementation of the BSF Program represents JABSOM's ability to recognize and appreciate the value of different educational approaches to learning, and its responsiveness to student and faculty feedback and suggestions. While still in its early years of development, the BSF Program holds promise as an effective and valuable addition to the curriculum, and another mechanism to ensure JABSOM students are provided every opportunity to learn about the basic sciences.

References

1. Hmelo, C and Eversen, D. 2000. Problem-Based Learning: Gaining Insights on Learning Interactions Through Multiple Methods of Inquiry. In Eversen, D. & Hmelo, C. (Eds) Problem Based Learning. Pp 1-16. (New Jersey: Lawrence Erlbaum)
2. Zemke, R. and Zemke, S. 1996. Adult Learning: What Do We Know for Sure? In Zielinski, D. (Ed.) Adult Learning in Your Classroon. (Minneapolis: Lakewood Books)
3. Albanese, M and Mitchell, S. 1993. Problem-based learning: a review of literature on it outcomes and implementation issues.