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Tomorrow's Professor Msg.#773 Why Problem-Based Learning?

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Folks:

The posting below takes a brief look at the key attributes of problem based learning. It is from Chapter 1, Why Problem-Based Learning? A Case Study of Institutional Change in Undergraduate Education by Barbara J. Duch, Susan E. Groh, and Deborah E. Allen in the book, The Power of Problem-Based Learning A Practical "How To" for Teaching Undergraduate Courses in Any Discipline, edited by Barbara J. Duch, Susan E. Groh, and Deborah E. Allen.

Regards,

Rick reis
reis@stanford.edu
UP NEXT: Without Followers, Leaders Are Just Out for a Walk

Tomorrow's Teaching and Learning

----------1,196 words ----------

Why Problem-Based Learning?

Why Change the Way We Teach?

What worked in the classroom a decade (or two or three) ago, however, will no longer suffice for the simple reason that past approaches fail to develop the full battery of skills and abilities desired in a contemporary college graduate. In June of 1994, a Wingspread Conference brought together state and federal policymakers, and leaders from the corporate, philanthropic, higher education, and accreditation communities to discuss quality in undergraduate education. This conference was sponsored by the Education Commission of the States (ECS), the Johnson Foundation, the National Governors' Association, and the National Conference of State Legislatures. The discussion that took place was based on the assertion that substantial improvement in American undergraduate education is needed to prepare students to function successfully in current business and industrial environments. The Conference developed the following list of important characteristics of quality performance of college and university graduates (Wingspread, 1994):

* High-level skills in communication, computation, technological literacy, and information retrieval to enable individuals to gain and apply new knowledge and skills as needed

* The ability to arrive at informed judgments-that is, to effectively define problems, gather and evaluate information related to those problems, and develop solutions

* The ability to function in a global community through the possession of a range of attitudes and dispositions including flexibility and adaptability, ease with diversity, motivation and persistence (for example, being a self-starter), ethical and civil behavior, creativity and resourcefulness, and the ability to work with others, especially in team settings

* Technical competence in a given field

* Demonstrated ability to deploy all of the previous characteristics to address specific problems in complex, real-world settings, in which the development of workable solutions is required

Survey results (Czujko, 1994) of all physics baccalaureates who were employed in either the private sector or government/national labs confirmed the Wingspread Conference conclusions. With approximately 80 percent response to the question, "What skills have you found to be the most useful in your work?", problem-solving, interpersonal skills, technical writing, and management skills were cited (greater than 60 percent) over physics knowledge. More recently, the Carnegie Foundation's report, Reinventing Undergraduate Education: A Blueprint for America's Research Universities (1998) stated that "traditional lectures and note-taking were created for a time when books were scarce and

costly and lecturing to large numbers of students was an efficient means of transferring knowledge." Lecturing is still efficient and has persisted as the traditional teaching method largely because it is familiar, easy, and how we learned. It does little, however, to foster the development of process skills to complement content knowledge.

There are teaching practices, however, that do foster such skill development without forsaking content. Quoting John Dewey's observation that "true learning is based on discovery guided by mentoring rather than the transmission of knowledge," (Boyer, 1998, p. 15) the Boyer report urged universities to Šfacilitate inquiry in such contexts as the library, the laboratory, the computer, and the studio, with the expectation that senior learners, that is, professors, will be students' companions and guidesŠ. The research university's ability to create such an integrated education will produce a particular kind of individual, one equipped with a spirit of inquiry and a zest for problem solving; one possessed of the skill in communication that is the hallmark of clear thinking as well as mastery of language; one informed by a rich and diverse experience. It is that kind of individual that will provide the scientific, technological, academic, political, and creative leadership for the next century. (Boyer, 1998)

Student-centered, inquiry-based instruction, particularly problem-based learning, falls right into line with this philosophy; indeed, the Boyer Commission pointed to the PBL efforts at the University of Delaware as one example of how to help students reach the important goals highlighted in the report.

What is Problem-based learning?

We believe that problem-based learning (PBL) provides a forum in which these essential skills will be developed. The basic principle supporting the concept of PBL is older than formal education itself; namely, learning is initiated by a posed problem, query, or puzzle that the learner wants to solve (Boud & Feletti, 1991). In the problem-based approach, complex, real-world problems are used to motivate students to identify and research the concepts and principles they need to know to work through those problems. Students work in small learning teams, bringing together collective skills at acquiring, communication, and integrating information. Problem-based instruction addresses directly many of the recommended and desirable outcomes of an undergraduate education: specifically, the ability to do the following:

* Think critically and be able to analyze and solve complex, real-world problems
* Find, evaluate, and use appropriate learning resources
* Work cooperatively in teams and small groups
* Demonstrate versatile and effective communication skills, both verbal and written
* Use content knowledge and intellectual skills acquired at the university to become continual learners

The PBL Cycle

PBL in the sciences traces its roots to the medical school setting where small groups of intellectually mature, highly motivated medical students work in small groups with a dedicated faculty tutor to learn basic science concepts in the context of actual clinical cases. The process of problem-based instruction (Boud & Feletti, 1997) follows:

* Students are presented with a problem (case, research paper, videotape, for example). Students working in permanent groups organize their ideas and previous knowledge related to the problem and attempt to define the broad nature of the problem.

* Throughout discussion, students pose questions called "learning issues" that delineate aspects of the problem that they do not understand. These learning issues are recorded by the group and help generate and focus discussion. Students are continually encourage to define what they know and-more importantly-what they don't know.

* Students rank, in order of importance, the learning issues generated in the session. They decide which questions will be followed up by the whole group and which issues can be assigned to individuals, who later teach the rest of the group. Students and instructor also discuss what resources will be needed to research the learning issues and where they could be found.

* When students reconvene, they explore the previous learning issues, integrating their new knowledge into the context of the problem. Students are also encouraged to summarize their knowledge and connect new concepts to old ones. They continue to define new learning issues as they progress through the problem. Students soon see that learning is an ongoing process and that there will always be (even for the teacher) learning issues to be explored.

PBL fosters the ability to identify the information needed for a particular application, where and how to seek that information, how to organize that information in a meaningful conceptual framework, and how to communicate that information to others. Use of cooperative working groups fosters the development of learning communities in all classrooms, enhancing student achievement (Johnson,

Johnson, & Smith, 1991). Students who learn concepts in the context in which they will be used more likely to retain that knowledge and apply it appropriately (Albanese & Mitchell, 1993). They will also recognize that knowledge transcends artificial boundaries since problem-based instruction highlights interconnections between disciplines and the integration of concepts.

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