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### v. Learning Strategies that Support Undergraduate Research

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## V. Learning Strategies that Support Undergraduate Research

This section provides an excellent overview of learning strategies that are conducive to supporting undergraduate research in the classroom. Whitfield opens with an overview of the value of a problem-based learning curriculum. Although it is couched in terms of the College of Medicine, the paper is applicable to many disciplines as well as undergraduate and graduate students. She highlights some of the pitfalls, practical tips, and problem development strategies so as to derive the maximum benefit from problem-based learning methods. Williams, Sederberg and Eddins describe research-based learning (RBL) and illustrate the learning strategy with the Marine and Aquatic Research Experience project at the University of South Carolina. RBL presents an alternative educational model that blends research activity, instruction, and curricular offerings to expand the research opportunities for undergraduate student teams while rejuvenating the curriculum. Chaszar focuses her attention on the value of interdisciplinary research. Not only do many research advances occur at the intersection of disciplines, but also honors curricula often carry the distinction of being interdisciplinary and attracting students who integrate fields of study. In their Issue Reaction, Lane and Cawley provide a working definition of “inquiry-based learning” and an accompanying list of resources for further study. The final paper emphasizes the importance of libraries in the successful implementation of either inquiry-based or problem-based learning. Wright makes the point that libraries provide the infrastructure to support the inherent elements of research found in these active learning strategies. She also describes one course designed and offered by the library to support undergraduate thesis research. The course includes a breadth of relevant topics such as database manipulation, identification of appropriate resources, portfolio development, information literacy, and Internet navigation and evaluation.

Two innovative learning strategies have been suggested by a recent graduate who was himself a very successful undergraduate researcher. Ken Urish described the educational value of (a) students mentoring students in research, and (b) student researchers applying for outside resources to fund their own projects.

(a) *During my junior year I had an internship away from school and commuted back on the weekends to finish a series of repetitive experiments. Progress was slow, but I wanted to keep the project moving. The experiment itself was simple so I recruited three underclassmen to help finish the work. During the week, they would complete the experiments, and on the weekends, I would help them analyze the data and explain the theory in depth. After a semester of working with my project, they moved on to their own projects in the lab.*

*This student mentoring relationship worked exceptionally well. It forced me to take more responsibility for the project and give it direction at a time when I was frustrated with its lack of results. It oriented the other students to the lab, training them in techniques and giving them experience to handle their own projects. The student mentoring turned a difficult part of the project into something a little more enjoyable. It also became an excellent source of recruitment for talented and motivated lab rats.*

(b) *When I needed an expensive piece of equipment and had no funds, I found company vendors would temporarily loan pieces of equipment. To purchase the equipment, company recruiters would donate small grants. This worked well for both parties because they were looking for ways to help support the department to increase their recruiting ability. An undergraduate can leverage the influence of a large university with corporate contacts and equipment salesmen to secure funds through non-traditional means. Finding their own sources of funding gives the students more ownership of the project and a larger vested interest in its completion.*