

UNIVERSITY *of* HOUSTON

Discovery-Based Learning:
Transforming the Undergraduate Experience through Research



Quality Enhancement Plan
February 2008

Executive Summary

Learning Collaborating Mentoring Connecting Transforming
through **DISCOVERY**

Executive Summary

As the University of Houston prepares to take its place as a Tier One metropolitan research university, we recognize the need to develop a Quality Enhancement Plan (QEP) that will link our research and education missions. We further recognize that we must equip traditional and non-traditional students with the skills necessary to be life-long learners in order to compete in a changing world. We have embraced this opportunity to develop a student-centered QEP that is transformative and addresses the needs of the University's diverse student population. Our *Discovery-Based Learning Initiative* will promote an undergraduate research culture on campus by enriching the quality of education for our students while engaging alumni and the Houston community.

Focus on Undergraduate Research

Our comprehensive *Discovery-Based Learning Initiative* aims to improve student learning by 1) providing research-related skills training and 2) expanding undergraduate research opportunities. The training and research experiences that our QEP fosters will address each stage of the research process, and will lead to improved competencies in several areas of student learning, including critical thinking, information literacy, research ethics, and communication skills (Figure 1). Through participation in research based courses, research-related team projects, and a growing number of interdisciplinary research opportunities, students will learn how to manage projects and work collaboratively. Students will have a fundamental understanding of research and its importance in society through participation in new research awareness core courses and co-curricular activities. Moreover, the *Discovery-Based Learning Initiative* will positively impact student recruitment and retention by engaging students in active learning while building mentoring relationships with faculty and connecting them to the rich resources of vibrant metropolitan Houston.

Institutional Capability

The cornerstone of our QEP initiative is a Research-Supportive Curriculum Development Program designed to encourage faculty, departments, and colleges to initiate curricular innovations focused on research-based pedagogies (Figure 2). Moreover, co-curricular activities and programs, such as a Work-Study Research Internship Program, a guest speaker program, expanded venues for research dissemination, and student workshops and tutorials will provide additional reinforcement of research-related skills. Both curricular and co-curricular programs will enhance the research-readiness of our students - strengthening their research-related skills, preparing them to engage in undergraduate research, and ultimately giving them the skills needed to compete and succeed in today's world. Among the resources that the Office of Undergraduate Discovery Programs will develop are four databases - On-Campus Research Opportunities, Houston Research Internships, Real-World Team Projects Database, and the Reality Chats Speakers Bureau - which will expand access to mentored research experiences on and off campus and also connect

students with local practitioners and scholars (Figure 3). On-campus opportunities for students to participate in research will be augmented through volunteer or credit-bearing research experiences, stipend-supported research fellowships, and faculty grant-supported assistantships. Off-campus undergraduate research opportunities will result from partnering with Houston's assets including its cultural organizations, the Texas Medical Center institutions, the NASA Johnson Space Center and its contractors, and the research and development centers of major energy corporations. Our research-ready students will also be competitive applicants for research opportunities offered through government agencies and higher education institutions across the nation.

The UH Office of Undergraduate Discovery Programs will be established to implement our QEP. The Office will serve students, faculty, and staff by operating as an information clearinghouse and allocating resources for QEP implementation through new competitive grant programs. The Office of Undergraduate Discovery Programs will also play a key role in the coordination of QEP resources and programs among resource collaborators, including the Writing and Communication Skills Center, the UH Libraries, the Office of Educational Technology and University Outreach, the Office of Undergraduate Research, and the Office of Institutional Research and Institutional Effectiveness (Figure 4).

Assessment Plan

In order to assess our QEP, we have identified specific assessment measures that correspond to student learning outcomes linked to the research process. These outcomes are directly related to core competencies of critical thinking, information literacy, research ethics, and communication skills. In addition, the student learning outcomes are tied to and share some measures with the University's undergraduate core competencies assessment program. This close alignment of Discovery-Based Learning outcomes assessment and the University's assessment of core competencies strengthens the ability of the *Discovery-Based Learning Initiative* to improve undergraduate education.

UH Community Involvement

Our QEP has evolved as a result of a campus-wide planning effort involving various constituencies including faculty, staff, students, and alumni. The programs of the *Discovery-Based Learning Initiative* were developed from review of ideas submitted by members of the UH community and consideration of best practices. The broad-based community involvement in the planning process ensures that the programs we plan to implement will benefit all of our students, both traditional and non-traditional, and will receive widespread support and participation.

Transforming the Undergraduate Experience

Our *Discovery-Based Learning Initiative* creates opportunities for students to develop research-related skills and participate in mentored research. Our QEP enables faculty to bring the real world into the classroom - introducing students to the excitement of discovery, innovation, and research, and increasing the opportunities for them to participate in hands-on projects. Through undergraduate research, faculty-student mentoring relationships will help students better understand the research process and develop a deeper appreciation of their area of study. As we embark on implementing the comprehensive *Discovery-Based Learning Initiative* set forth in this report, we are committed to delivering its significant value to our students and convinced that it will transform their educational experience at the University of Houston.

Transforming the Experience

Where we've been:

- ◀ Some courses with research-based learning components
- ◀ Stipend-supported mentored research opportunities for fewer than 300 students annually
- ◀ Limited student awareness of research activities on campus

Where we're going:

- ▶ A University-wide effort to develop a research-supportive curriculum through enhancement of existing courses and creation of new courses
- ▶ An expansion of mentored research opportunities
- ▶ Workshops and online tutorials for students to develop research-related skills
- ▶ A new Work-Study Research Internship Program
- ▶ New opportunities for research internships on campus and in the Houston area
- ▶ Development of graduate student mentors for undergraduate researchers
- ▶ Opportunities for students to learn from guest practitioners and scholars
- ▶ Multiple venues for dissemination of student research and creative activity
- ▶ An online information clearinghouse for research-related resources and research opportunities

Figure 1

Elements of the QEP



Figure 2

UH Discovery-Based Learning Initiative



Figure 3

Connecting to Opportunities

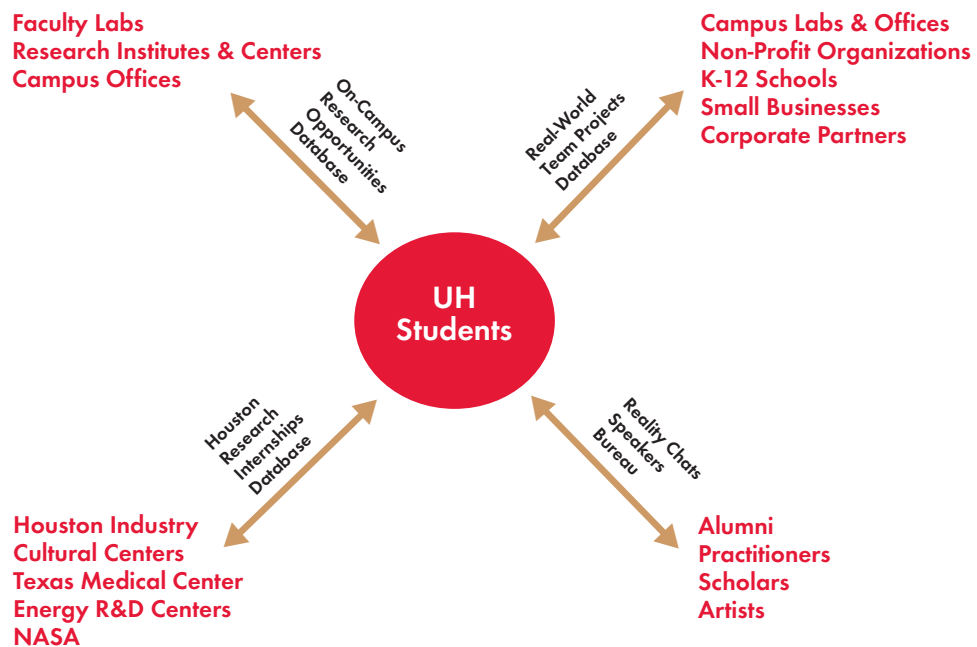
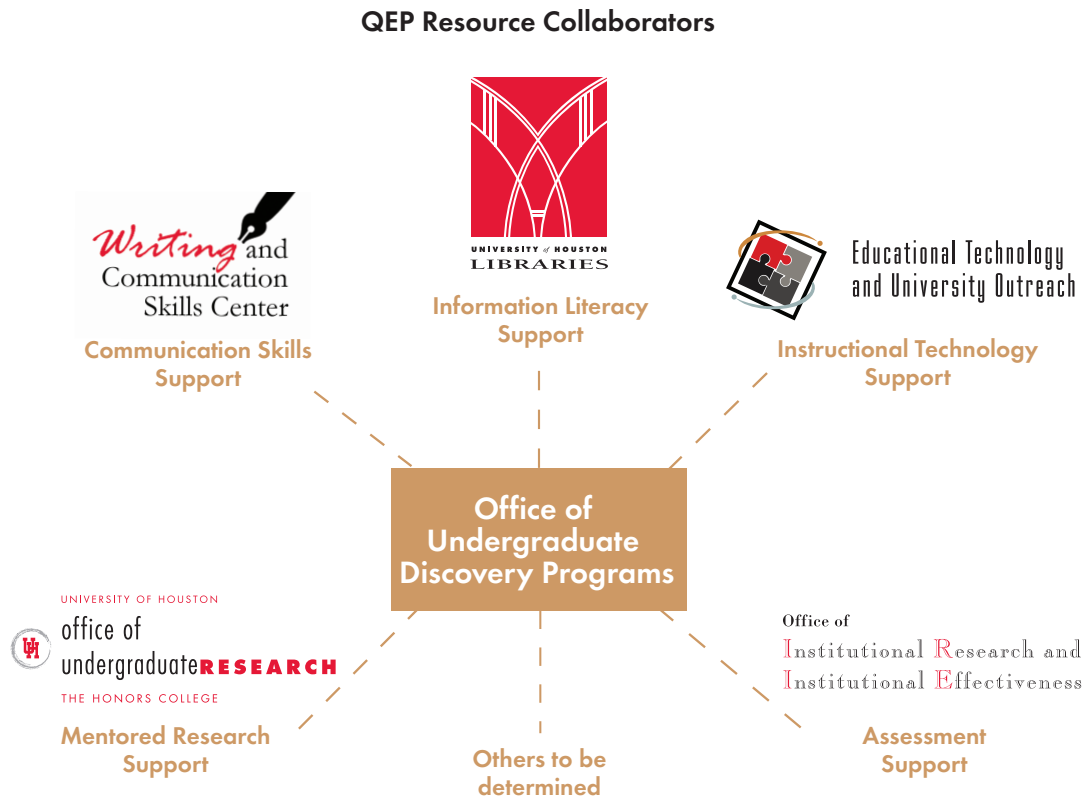


Figure 4



Definition of Research

Research is a diligent and systematic inquiry or investigation into a subject in order to discover facts or principles, and increase the sum of knowledge, enhance design, or enrich artistic ability.

QEP Goals

- Undergraduate research should be a signature program for UH, one that makes the University more attractive to potential students with records of strong academic achievement.
- Undergraduate students at UH will participate in some level of research activity by the time they receive their bachelor's degrees.
- By the time they graduate, UH students will have a fundamental understanding of research and its importance to society.
- The number of students participating in a research-related group project will grow.
- A growing proportion of undergraduate research opportunities will be interdisciplinary in nature.
- The number of students participating in research experiences who are selected for presentation will grow.
- Undergraduate student retention will improve.
- The six-year graduation rate of first-time in college students and the four-year graduation rate of transfers beginning with 60 or more credit hours will improve.
- External funding for undergraduate research will grow.

QEP Student Learning Outcomes

- Students will be able to formulate a research question or problem.
- Students will be able to identify basic principles and knowledge related to their research question or problem.
- Students will be able to develop a research plan to address or resolve a specific question or problem.
- Students will be able to collect and interpret data and information in an attempt to resolve the question or problem.
- Students will demonstrate awareness of the responsible conduct of research.
- Students will be able to articulate their research findings through written, performance, and/or oral presentations.



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