Discovery-Based Learning:
Transforming the Undergraduate Experience through Research

Quality Enhancement Plan
February 2008

Executive Summary
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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 lifelong 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

Core Competencies
- Critical Thinking
- Information Literacy
- Research Ethics
- Communication Skills
**UH Discovery-Based Learning Initiative**

**Research-Related Skills Training**
- Research-Supportive Curriculum
  - Core Courses
  - Major Courses
  - Research-Intensive Courses
- Co-Curricular Programs
  - Workshops and Tutorials
  - Real-World Team Projects Database
  - Work-Study Research Internship
  - Research Dissemination Venues
  - Reality Chats

**Research Opportunities**
- Credit-Bearing Research
  - Undergraduate Research
  - Independent Study/Project
  - Senior Honors Thesis
  - Research Internship
- Volunteer Research
- Stipend-Supported Research
- Faculty Grant-Supported Research
- On-Campus Research Opportunities Database
- Houston Research Internships Database

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**Connecting to Opportunities**

Faculty Labs
Research Institutes & Centers
Campus Offices

Campus Labs & Offices
Non-Profit Organizations
K-12 Schools
Small Businesses
Corporate Partners

On-Campus Research Opportunities Database
Real-World Team Projects Database
Houston Research Internship Database
Reality Chats Database

Houston Industry
Cultural Centers
Texas Medical Center
Energy R&D Centers
NASA

Alumni
Practitioners
Scholars
Artists
Figure 4

QEP Resource Collaborators

Writing and Communication Skills Center
Communication Skills Support

UNIVERSITY OF HOUSTON LIBRARIES
Information Literacy Support

Educational Technology and University Outreach
Instructional Technology Support

UNIVERSITY OF HOUSTON
Office of Undergraduate Discovery Programs

Office of Undergraduate Research
Mentored Research Support

Others to be determined

Office of Institutional Research and Institutional Effectiveness
Assessment Support
**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.
Quality Enhancement Plan — FAQs

Discovery-Based Learning: Transforming the Undergraduate Experience through Research

What is SACS?
The Southern Association of Colleges and Schools (SACS) is the regional body for the accreditation of higher education institutions in the southern United States and Latin America. SACS accredits over 1,500 colleges and universities at the baccalaureate, master's, professional, and doctoral degree levels. Reaffirmation of accreditation occurs every 10 years.

Why is accreditation important?
Accreditation is important to the maintenance of our reputation and essential for access to federal grants such as funding for student financial aid. SACS accreditation assures that UH and its programs meet or exceed the same minimum requirements or standards as other regionally accredited institutions.

http://www.sacs.org

When will SACS visit UH?
The SACS Reaffirmation Team will be on campus April 7-9, 2008. You may be selected to answer questions and provide feedback about the UH QEP.

What is a QEP?
As part of the reaffirmation process, SACS requires that we develop a Quality Enhancement Plan (QEP) that will improve student learning.

How was the UH QEP developed?
The UH QEP planning process involved:
• Broad-based university committees
• 526 online submissions of ideas/feedback
• 145 preliminary plans submitted by faculty, departments, and colleges
• 16 student forums across all colleges
• Consideration of best practices

What is the focus of the UH QEP?
The UH QEP topic is undergraduate research with elements of writing-in-the-disciplines and mentoring. The UH QEP is named the Discovery-Based Learning Initiative.

Why undergraduate research?
Students who engage in the research process will develop core competencies in critical thinking, information literacy, research ethics, and communication skills. Proficiency in these skills will benefit students in their future studies and careers.

What are the key elements of the plan?
1. Programs and resources to support research-related skills development:
   • Research-Supportive Curriculum - enhancing existing courses or developing new courses with research-based components
   • Co-Curricular Programs - resources and programs to support research skills development include: workshops and tutorials, expanded venues for research dissemination, a Work-Study Research Internship Program, a Real-World Team Projects Database, and a Reality Chats guest speaker program

2. Expansion of undergraduate Research Opportunities on and off campus:
   • Credit-bearing research, volunteer research, stipend-supported research, faculty grant-supported research, an On-Campus Research Opportunities Database, and a Houston Research Internships Database

Who are the implementation partners?
Faculty, departments, and colleges will be key partners in proposing and implementing curricular enhancements. The Office of Undergraduate Discovery Programs will collaborate with partners to develop resources for students and faculty. Resource collaborators include: 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. Other partners include: UH alumni, the Houston community, non-profit organizations, local industry, etc.

When will implementation begin?
The Office of Undergraduate Discovery Programs will be established to coordinate implementation of the QEP. Resources and programs will be launched beginning in fall 2008.

For more information or to submit feedback, please visit: www.uh.edu/discovery