

Discovery-Based Learning:
Transforming the Undergraduate Experience through Research



Quality Enhancement Plan
February 2008

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The University of Houston Quality Enhancement Plan
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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. 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. 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. 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.

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.



Introduction



1 The University of Houston – A Metropolitan Research University

1.1 Introduction to the University of Houston

The [University of Houston](#) is the flagship public metropolitan research and teaching institution in Texas, distinguished by nationally recognized faculty and programs and the most ethnically diverse student body of any research university in the country. This diversity reflects the demographics of Houston, the fourth most populous city in the nation. Vitaly connected to its urban environment since its founding in 1927, the University has awarded more than 200,000 degrees. Seventy-five percent of alumni remain in the Houston metropolitan area to live and work, making a substantial impact on the socio-economic life of the city.

Currently, more than 34,500 students attend UH in twelve academic colleges and an interdisciplinary [Honors College](#). The academic colleges include the [Gerald D. Hines College of Architecture](#), the [C.T. Bauer College of Business](#), the [College of Education](#), the [Cullen College of Engineering](#), the [Conrad N. Hilton College of Hotel & Restaurant Management](#), the [College of Liberal Arts and Social Sciences](#), the [College of Natural Sciences and Mathematics](#), the [College of Technology](#), and four graduate colleges: the [Law Center](#), the [Graduate College of Social Work](#), the [College of Optometry](#), and the [College of Pharmacy](#). Collectively, these colleges offer 278 undergraduate, graduate, and professional degrees.

The University of Houston pursues an ambitious agenda to become one of the nation's leading Tier One research universities and a model for the public metropolitan universities of this century. UH has made research a priority with recent efforts to catalyze interdisciplinary research through the development of six research clusters: Arts & Human Enrichment, Bio-Med Sciences & Engineering, Community Advancement & Education, Complex Systems/Space Exploration, Energy & Natural Resources, and Nano-Materials. These clusters are designed to enable scholars to exchange ideas, to explore emerging research areas, and to work more effectively with industry, the community, and other research organizations. Powerful centers of creativity enabling collaboration across traditional disciplinary boundaries, our

research clusters bring research knowledge to bear on issues of intellectual, scientific, social, economic, environmental, and cultural importance. The clusters build on our faculty research strengths as well as Houston's regional assets. Houston – home to the Texas Medical Center (the largest medical center in the world) and the NASA Johnson Space Center – is also known as the “Energy Capital of the World,” with over 5,000 energy-related firms. Furthermore, our city is among a handful of U.S. cities with resident companies in theatre, ballet, symphony, and opera. The museum district is one of the largest in the country with 18 institutions within walking distance of one another.

We plan to increase significantly the annual research expenditures from the current \$90 million per year, and to expand our 43 research centers and institutes, by leveraging our regional assets and supporting interdisciplinary research efforts. Moreover, the Framework Master Plan adopted by the Board of Regents in 2006 will double the academic and research space on campus over the next 15 years.

Currently, our 550-acre campus includes multiple parks, fountains, plazas, sculptures, and recreational fields surrounding modern classrooms and high tech laboratories. When fully implemented, the Master Plan will double the research and learning space, increase parking, and expand residential housing to accommodate 12,000 students. The University also recently completed construction of a 200,000-square-foot Science and Engineering Research and Classroom Complex (SERCC) that features five floors of laboratory space accommodating an estimated 40 research laboratories, particularly in the Bioscience and Bio/Nano-technology areas.

Beyond our commitment to education and research, the University of Houston has also taken the lead with service. UH supports more than 600 partnerships with government and private industries, and our students log more than 920,000 volunteer hours each year. The University serves the Houston community as the home of KUHT, the nation's first Public Broadcasting Service station, and KUHF, Houston's National Public Radio station.

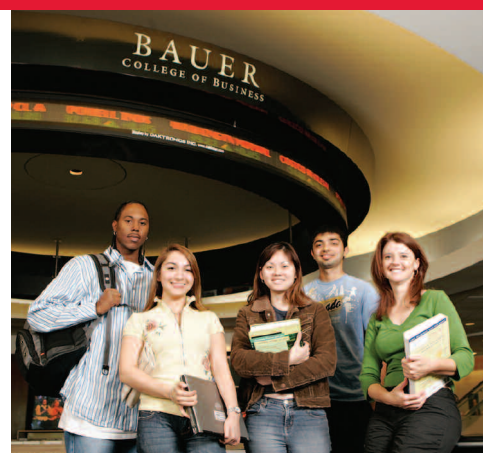
According to “[The University of Houston System Impact Study](#),” a 2006 study by the Institute for Regional Forecasting, the UH System (UHS) makes a significant financial impact on the Houston area, producing \$3.126 billion in annual economic benefits. The UH System annually contributes more than \$1 billion new funds to the local economy. In addition to the 12,500 UHS graduates entering the Houston workforce each year, the funds generated by UH produce 24,000 local jobs.

The UH System (UHS) encompasses four universities (UH, UH-Downtown, UH-Clear Lake, UH-Victoria) and two multi-institution teaching centers (UHS at Cinco Ranch and UHS at Sugar Land) that offer courses in partnership with the universities. The University of Houston is the largest and most comprehensive institution of the System and is a nationally recognized doctoral degree-granting, comprehensive research university.

1.2 Our Faculty

The faculty at the University of Houston includes renowned scholars, among them a Nobel Peace Prize laureate, Tony award winners, a National Medal of Science recipient, members of the National Academies of Science and Engineering and the American Academy of Arts and Sciences, and winners of numerous national and international awards for works in the arts, humanities, sciences, engineering, business, law, education, and social work.

Our faculty contribute significantly to research in areas such as superconductivity, space commercialization, chemical engineering, petroleum exploration, biological sciences, health care, environmental studies, as well as the arts, humanities, business, law, and education. UH faculty generate more than 1,000 peer-reviewed papers and 100 books each year, and faculty artists produce more than 80 commissioned projects and museum or gallery shows annually. Faculty musicians perform in more than 200 national and international recitals and concerts per year. In addition to the more than 1,200 full-time faculty members, students are introduced to professional fields through part-time faculty from Houston-area industries and cultural organizations. More than 1,000 lecturers and visiting or adjunct faculty members support the University's teaching efforts each year.



1.3 Our Students

Our 34,500 students, including 6,800 graduate and professional students, make up the most diverse student body of any research university in the nation (Table 1). Diversity at UH means that no single ethnic group holds a majority on campus, but it is also evident in the data about our students' age, socio-economic status, and academic background. Students come to UH primarily from Texas, although nearly 10 percent are international students. More than 50 percent of UH students are women. The average age of our students is 24.4, and UH graduates have been as young as 17 and as old as 93.

Table 1

Student Demographics

	% of All Students
Caucasian	38.5
Asian American	19.5
Hispanic	19.3
African American	13.2
International	7.3
Unknown	1.8
Native American	0.4

Note: Fall 2006 Data from the UH Office of Institutional Research and Institutional Effectiveness

UH provides a valuable learning experience for first-time-in-college (FTIC) and transfer students. "The University of Houston Persistence Study" (2005) indicated that approximately two-thirds of FTIC students live at home and over half work off-campus. As of Fall 2007, close to half of our undergraduate students began their education at UH as transfer students. Concurrent with our commuter students, our non-traditional student population also includes first generation students, those tied to Houston for economic or familial reasons, and older students returning at mid- or post-career. Regardless of their backgrounds or circumstances, our students are attracted to UH because of the quality of our nationally ranked programs and the wide range of degree programs we offer.



Focus on Undergraduate Research



2. Why Undergraduate Research?

2.1 QEP Topic Selection

In September 2006, a broadly representative QEP Topic Selection Committee was appointed to recommend a topic for the University's Quality Enhancement Plan (QEP). Throughout that fall, the UH community shared their ideas online about areas that would enhance student learning. The Committee developed a list of topics through discussions with colleges, academic committees, and student groups. Ideas were also discussed in both the Faculty Senate and Deans' annual retreats. Using the SACS guidelines as a framework, the Committee reviewed suggested topics and explored their feasibility and applicability at UH. Based on feedback from the university community, the Committee recommended that we pursue **undergraduate research** as our QEP topic, and further recommended that mentoring and writing in the disciplines be addressed within the context of undergraduate research. In January 2007, the UH SACS Leadership Team accepted the Committee's recommendation and began planning to develop, implement, and assess the QEP. The work of the QEP Topic Selection Committee is further described in Appendix B.

2.2 QEP Planning

The QEP Planning Committee also represented a broad cross-section of the University community including administrators, faculty, staff, and students. During the data gathering phase, constituencies shared their ideas on how to integrate research into the undergraduate experience, using channels including online surveys (generating several hundred responses), 16 open student forums, numerous faculty and staff meetings, and 145 preliminary faculty plans. Subcommittees were formed to review the community input within the framework of four broad categories:

1. Course-Based Research
2. Mentored Research
3. Resources and Workshops for Students and Faculty
4. Other Co-Curricular Activities

Best practices from other institutions were also considered. Appendix C further describes the work of the QEP Planning Committee, various subcommittees, and the involvement of the UH community in producing our plan.

In their own words...

"Integrating research into the undergraduate experience is an important topic if UH is to achieve its goal of becoming a top-tier research institution....UH students are fortunate to be surrounded by a wealth of opportunity in the medical, scientific, arts, and government fields."

*Nakia T. Alexander, Staff, Academic Advising
"Call for Ideas" Online QEP Survey*

2.3 Transforming the Undergraduate Experience through Research

The mission of the University of Houston is to discover and disseminate knowledge through the education of a diverse population of traditional and non-traditional students, and through research, artistic and scholarly endeavors, as it becomes the nation's premier public university in an urban setting.

Drawn to UH by its strengths as a diverse metropolitan research university, or tied to the area by social or economic factors, our students seek above all else a useful education – one that will prepare them for today's workplace and serve as a cornerstone for professional growth throughout their careers. In order for UH to secure our students' full commitment to the learning process, they must believe that what they are learning can be applied in the real world. Our student-centered Quality Enhancement Plan, the **Discovery-Based Learning Initiative**, will provide opportunities for students to develop the research-related skills they need in order to adapt and succeed – and to equip them to do so at their fullest potential.

In their own words...

"I have only one condition in making this gift. The University of Houston must always be a college for working men and women and their sons and daughters. If it were to be another rich man's college, I would not be interested."

*Philanthropist Hugh Roy Cullen,
on the occasion of the first of many Cullen
family contributions to the University*

Whether through course-based assignments or mentored projects, our plan to expand undergraduate research experiences includes a robust interdisciplinary approach to study and inquiry, beginning early in our students' academic careers and continuing throughout, so that upon graduation they are equipped with the broad range of skills necessary to compete in an unpredictable world. The research experiences that our QEP fosters will enhance student learning by challenging them to think critically, creatively, and ethically; to explore topics that interest them; to manage projects; to work collaboratively; and to communicate using a variety of media to diverse audiences. Our QEP facilitates the practice and refining of these skills by encouraging faculty to engage students in research projects on and off campus. By their very nature, research projects require students to familiarize themselves with university resources through interaction with faculty, fellow students, and institutional resources in a way that fosters engagement, camaraderie, and a sense of belonging – the very elements that are often cited by transfer students as missing in their university experience.

Our QEP connects the education and research missions of our university. In keeping with our mission, the QEP provides resources and opportunities for all students – traditional and non-traditional – regardless of academic background or social circumstances. Moreover, our QEP reinforces the link between UH and our dynamic and vibrant metropolitan city, connecting students to Houston's many resources while engaging corporate and community organizations. By renewing our commitment to student learning and increasing student engagement with faculty and the community, our QEP will help us deliver the education students seek and employers value.

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



2.4 Definition of Research

Working from commonly accepted dictionary definitions, and placing special emphasis on its outcomes, we define research for the purposes of our QEP:

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.

2.5 QEP Goals & Student Learning Outcomes

In pursuing undergraduate research as the topic for our QEP, the University of Houston has identified the following 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.

Based on our QEP goals, we have identified the following 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.

These learning outcomes directly translate to the commonly recognizable core competencies of critical thinking, information literacy, research ethics, and communication (Table 2).

Table 2

Mapping Student Learning Outcomes to Core Competencies

QEP Student Learning Outcomes	Core Competencies			
	Critical Thinking	Information Literacy	Research Ethics	Communication Skills
1. Students will be able to formulate a research question or problem.	•			
2. Students will be able to identify basic principles and knowledge related to their research question or problem.	•	•		
3. Students will be able to develop a research plan to address or resolve a specific question or problem.	•			
4. Students will be able to collect and interpret data and information in an attempt to resolve the question or problem.	•	•		
5. Students will demonstrate awareness of the responsible conduct of research.		•	•	
6. Students will be able to articulate their research findings through written, performance, and/or oral presentations.				•



2.6 Addressing Significant Needs Related to Student Learning

When in 1998 the Boyer Commission on Educating Undergraduates in the Research University recommended – and its 2001 follow-up report reaffirmed – that major universities could address some of their most persistent and profound problems through “research-based learning” (p. 4), it provided a leading voice in an ongoing dialogue about the state of American higher education and how it can be improved. By providing opportunities and resources to support research-based learning, our QEP will encourage ethical behavior and improve student competencies in critical thinking, information literacy, and communication skills. Recent studies have highlighted these competencies as major areas of focus for universities:

- **Critical Thinking Skills** – The definition of critical thinking established by the National Council for Excellence in Critical Thinking Instruction indicates how central it is to the research endeavor:

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. (Scriven & Paul, 2007, para. 1)

The Greater Expectations National Panel (2002) called for “higher education to help college students become intentional learners who can adapt to new environments, integrate knowledge from different sources, and continue learning throughout their lives” (p. xi).

- **Information Literacy** – The Association of College and Research Librarians (2000) defines information literacy as “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” (p. 2). The ACRL report highlights faculty’s key role in establishing the context for learning. The ACRL further emphasizes that collaboration between faculty, librarians, and administrators is required to effectively incorporate information literacy across curricula and in all programs and services. (p.4).
- **Research Ethics** – Recent national and international scandals of scientific misconduct demonstrate the need to educate students about responsible research in areas such as data acquisition, management, sharing and ownership; human subjects and animal welfare protection; and other areas of potential misconduct. Research misconduct also frequently arises in the form of plagiarism – defined by the ACRL as “taking someone else’s work and passing it off as one’s own without proper acknowledgment or documentation” (Simmonds, 2003, para. 4). Plagiarism is pervasive in academia, a reality underscored in a 2003 study surveying 18,000 undergraduates at 23 campuses throughout the country. Forty percent of the students surveyed admitted to plagiarizing written sources within the last twelve months, and, like Internet plagiarists also identified by the study, viewed their practices to be inconsequential (Rimer).
- **Written Communication Skills** – Calling their 2004 report on writing “Writing: A Ticket to Work...or a Ticket Out,” the National Commission on Writing, a panel established by the College Board to study the impact of written communication in the workplace, found employers frustrated with their employees’ writing skills. The report surveyed CEOs of 120 major corporations who collectively spent over \$3.1 billion annually on remedial writing training for their employees (p. 4). A

major point of consensus was that good, clear writing is a sign of clear thinking. The roundtable of business leaders urged educators to encourage writing as an activity “calling for extended preparation across the disciplines...so that students can later connect the dots in their careers” (p. 20).

- **Oral Communication Skills** – In 2001, the Boyer Commission’s follow-up to its 1998 report on undergraduate education found that “although faculty and administrators as well as potential employers express concern about students’ lack of good oral communication skills, few universities have implemented campus-wide requirements to develop these skills” (p. 20). In addition, the 2004 report of the National Commission on Writing identified oral presentations as one of the most common forms of communication in the workplace, reinforcing the need to equip college graduates with strong oral communication skills.

The strong positive interrelationships between these competencies in the practice and dissemination of research mean that our QEP has the potential to successfully address multiple areas of significant demonstrable needs related to student learning.

2.6.1 Strategic Assessment of Core Competencies at UH

As part of our institutional effectiveness practices, UH has begun strategic, purposeful assessments to determine the status of our students’ core competencies and how our faculty, administration, and staff can be directed to ensure that we make progress toward achieving our general education student learning outcomes. One of these assessments, the “[Undergraduate Writing Assessment](#)” (UWA) provided us with an appropriate starting point for developing our Quality Enhancement Plan.

The Undergraduate Council at UH is committed to assessing student learning in the core competencies (reading, writing, and critical thinking) on a regular basis. In 2004, this process commissioned the UWA, which was completed in 2006. Subsequently, the planning process for the assessment of critical thinking has begun, and the rating of student work will commence in early 2008.



2.6.2 The UH Undergraduate Writing Assessment (UWA)

The UWA included a review of writing from 419 students in junior-level classes in 23 departments, and also incorporated survey data from 187 faculty members and 523 students. Based on analysis of the data, the UWA assessment team identified three areas for improvement.

- *Help students understand more clearly and address more effectively what is expected of them on writing assignments.* The data suggest that when students understand both the assignment and the rhetorical situation, they produce higher quality written work.
- *Help students develop knowledge and strategies for effective editing and improving writing quality.* Quality writing employs technical skills in accomplishing the larger task of communicating what the writer knows.
- *Help faculty communicate assignment expectations to students clearly.* While students need more highly developed skills for understanding expectations, their chances of success are enhanced when the assignment is suitably explicit about what and how to write.

These recommendations can be effectively addressed in our QEP focused on undergraduate research and its culmination in communication, publication, presentation, and performance.



2.7 Review of Best Practices in Undergraduate Research

Early in the planning process, we reviewed existing UH undergraduate research programs as well as best practices in research-based learning at other institutions. From this review, we concluded that if our QEP is to impact a high number of students, we will need to expand both mentored and course-based research opportunities.

2.7.1 Best Practices in Mentored Research

Mentored Research at UH

Currently, the Office of Undergraduate Research administers three mentored research programs: the Senior Honors Thesis program, the Provost's Undergraduate Research Scholarship (PURS), and the Summer Undergraduate Research Fellowship (SURF). Students may also participate in mentored research through externally funded programs. Three programs support underrepresented minority student participation in undergraduate research in the sciences, technology, engineering, and mathematics (STEM) fields. These are administered by the offices of the Houston Louis Stokes Alliance for Minority Participation (H-LSAMP) and UH Alliances for Graduate Education and the Professoriate (UH-AGEP). Moreover, the Departments of Computer Science, Electrical & Computer Engineering, and Civil Engineering each host active National Science Foundation Research Experience for Undergraduates programs (NSF REU). Table 3 summarizes student participation in our existing stipend-supported programs for mentored undergraduate research in faculty laboratories. The table does not include students who 1) volunteer as research assistants, 2) are supported directly by faculty research grants, or 3) participate in independent study or other mentored research experiences for academic credit. Fifty-one students, for example, completed a Senior Honors Thesis in the 2005-2006 academic year and another 69 students are thesis candidates for 2006-2007.

Although these programs have successfully engaged students in mentored research, there are many more qualified applicants than there are fellowship positions. Since our faculty, staff, and students indicated that expanding mentored research opportunities should be one of the elements of the QEP, we reviewed best practices at other institutions to determine some possibilities for expanding and supporting mentored research at UH.



In their own words...

“One of the best parts about the SURF program was that it gave me the opportunity to work one on one with my faculty mentor, whom I admire greatly. SURF is one of the best ways for an undergraduate to be able to have this kind of experience.”

*Participant
2007 Summer Undergraduate Research
Fellowship (SURF) Program*

Table 3

Stipend-Supported Mentored Research Opportunities on the UH Campus (2006-2007)

Mentored Research Opportunity	Administered by	Reporting ^a Period	UH Student Participation
Provost's Undergraduate Research Fellowship (PURS)	Office of Undergraduate Research	AY06-07	45
UH Summer Undergraduate Research Fellowship (SURF)	Office of Undergraduate Research	SU07	42
AGEP Summer Research Program	UH Alliances for Graduate Education and the Professoriate (UH-AGEP)	SU07	21
AGEP Summer Research Program	UH Alliances for Graduate Education and the Professoriate (UH-AGEP)	AY06-07	3
Scholars Enrichment Program (SEP)	Houston Louis Stokes Alliance for Minority Participation (H-LSAMP)	AY06-07	50
NSF REU Site: Undergraduate Research Experience in Computational Science and Cybersecurity ^b	Department of Computer Science	SU07	4
NSF REU Site: Nanotechnology at the University of Houston ^b	Department of Electrical and Computer Engineering	SU07	2

167 Total

^aAcademic Year (AY) or Summer (SU)^bNSF REU sites are encouraged by the National Science Foundation to seek participants from other institutions across the nation.

Mentored Research at Other Institutions

The QEP Planning Committee initially reviewed eight institutions offering active undergraduate research programs: Stanford, MIT, the University of Delaware, SUNY Stony Brook, the University of Nebraska-Lincoln, the University of North Carolina at Chapel Hill, the Georgia Institute of Technology, and the University of South Florida. While each program is distinguished by its own unique features, they also share common elements such as program administration by a central office; a mechanism for matching students to faculty; research projects that are student or faculty defined; awards of stipend, course credit, or salary to the student; and a university-wide showcase for student dissemination of their research.

When we compared these best practices with existing mentored research programs at UH, we found that our programs include all of these basic elements to varying degrees. A second review of best practices at other institutions, particularly those recommended by the Council on Undergraduate Research (CUR), suggested additional programs that could further support and expand mentored research at UH (Table 4). These best practices were considered by the QEP Planning Committee and subcommittees along with the many ideas submitted by faculty, staff, and students during the data gathering process described in the Appendix C.

Table 4

Best Practices in Mentored Undergraduate Research at Other Institutions

Program or Practice	Description	Model Institution(s)
Database of Faculty-Mentored Research Opportunities	Searchable comprehensive database of faculty research interests and available projects for credit or compensation and volunteer opportunities	University of Texas (EUREKA Database)
Multi-Semester Research Experiences	Funding for multi-semester or multi-year research experiences; incoming freshmen or current students	University of Nebraska - Lincoln Rice University
Research Work-Study	Listing of research assistantship among available work-study jobs; funded by faculty member or research program office	Harvard College
Mini-Grant Program for Travel or Research Supplies	Funding for student travel to present their work at regional and national conferences; funding for student research materials and supplies	SUNY Stony Brook
University Showcase of Student Research and Creative Activity	Annual campus-wide event featuring student poster and oral presentations, performances, project demonstrations, and art exhibits; also includes competitions and challenges	Carnegie Mellon (Meeting of the Minds)
Journal of Undergraduate Research	Compilation of student abstracts and/or research papers	Multiple Institutions; listing available at http://www.cur.org/ugjournal.html

2.7.2 Best Practices in Research-Based Courses

The QEP Planning Committee realized early in its process that expansion of mentored research opportunities alone would not impact student learning for the broader UH student population. Given approximately 900 tenured and tenure-track faculty on campus, it would not be feasible for each of the 27,400 undergraduates to participate in mentored research in faculty laboratories. The Committee sought a broad-based solution for engaging students in the research process. Thus, the idea of supporting the development of a research-supportive curriculum began to emerge. Moreover, as was shown in Table 3, there are fewer stipend-supported mentored research opportunities in the humanities compared to those in the sciences. This highlighted the need to utilize research-based courses as a way of addressing this difference.

Enhancing student learning through a research-based curriculum was advocated by the Boyer Commission's 1998 report and has been successfully implemented at various institutions. We reviewed best practices as summarized in two Council on Undergraduate Research (CUR) publications, *Reinvigorating the Undergraduate Experience: Successful Models Supported by NSF's AIRE/RAIRE Program* (2004) and *Developing & Sustaining a Research-Supportive Curriculum: A Compendium of Successful Practices* (2007). Following is a summary of these research-supportive curricular approaches:

- **Problem-Based Instruction** – Students, working in cooperative groups, are given a problem or case study to address that reflects complex, real-world situations. Students learn to analyze the problem, find appropriate resources and locate needed information, share their findings, and formulate and evaluate possible solutions. Research-focused variations for problem-based instruction include using classic published research papers as sources for problems.
- **Project-Oriented Laboratory** – Students, working in cooperative lab groups, are given an open-ended problem to solve. Over the course of the semester, students review literature, design experiments within material and equipment constraints provided by the instructor, perform the experiments, collect the data, analyze the results, and write a research laboratory report formatted as a scientific paper. An extension of this concept is an interdisciplinary investigative laboratory course that allows students from different majors to collaborate on projects.
- **Writing-Intensive Instruction** – Students learn to write according to the stylistic conventions and contexts of a particular subject area in order to communicate effectively in a manner appropriate to the discipline. Research-related writing assignments usually require at least 3,000. Students at the junior and senior level may also be involved in grant proposal development for research projects.
- **Research Methods** – Students learn about research methods used in a particular field or discipline. Research methods courses in the sciences may include computational data analysis, statistics and experimental design. In the social sciences, a research methods course might involve students developing their own research projects - selecting a research topic and writing a research proposal. Once the proposal is approved by the institutional review board, students will then collect and analyze the data, write a paper, and present the results.

- **Culminating Experience** – Research-based capstone or culminating experiences involve seniors in independent research with a faculty mentor. As in an honors thesis project, students can develop their own research questions or undertake a project in their mentors' laboratory.

The QEP Planning Committee and its subcommittees considered the above best practices in conjunction with ideas proposed by faculty, staff, and students during the data gathering process described in the Appendix C.

2.7.3 Best Practices Conferences

To learn more about best practices and assessment strategies for the QEP, members of the QEP Planning Committee also participated in three conferences:

- The SACS Commission on Colleges 112th annual meeting in New Orleans, LA, December 9-11, 2007.
- An audioconference hosted by Inside Higher Education on December 12, 2007 featured Dr. Kerry Karukstis, professor of chemistry at Harvey Mudd College and president of the Council on Undergraduate Research, who presented a seminar and hosted a question-and-answer session on "Promoting an Undergraduate Research Culture."
- The CUR/NSF regional workshop on "Institutionalizing Undergraduate Research" in El Paso, TX, January 18-20, 2008.





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Institutional Capability



3. Our Quality Enhancement Plan

3.1 Overview: The Discovery-Based Learning Initiative

Our Quality Enhancement Plan, named the *Discovery-Based Learning Initiative*, provides opportunities for students to develop research-related skills and engage in research, as well as making available the resources to support both students and faculty. As shown in Figure 1, our plan includes a variety of means to integrate research into the undergraduate experience, ranging from college-wide initiatives involving many students to mentored research projects that focus on a select group of students. Our QEP aims to improve student competencies in critical thinking, information literacy, research ethics, and communication skills.

Our *Discovery-Based Learning Initiative* incorporates research-related skills training through curricular and co-curricular programs to better prepare our students to take advantage of expanded opportunities for undergraduate research (Figure 2). To encourage the development of a research-supportive curriculum, we will initiate a new grant program to support faculty in enhancing existing courses or in developing new courses that focus on research-based learning. Colleges and departments will also be encouraged and supported in their efforts to implement skills training in the core competency areas, such as discipline-specific information literacy training. Co-curricular programs that contribute to the research-readiness of our students include workshops and tutorials developed by resource collaborators, a compilation of real-world team projects for faculty and student teams to access for their courses, a Work-Study Research Internship Program offering opportunities for research-related skills training in campus labs and offices, expanded venues for dissemination of student research and creative works, and a Reality Chats guest speaker program that connects students with practitioners and scholars. Mentored research opportunities will be broadened so that in addition to existing traditional research fellowship programs, students will also benefit from research internships on and off campus and mentored research for course credit.

In their own words...

“If this plan is followed I can see that students will recognize the benefits of being involved in a research institution. UH will attract and retain more academically driven students....Students will see that UH offers real skills and opportunities to prepare for the future jobs that don’t even exist now. I am so excited about all this and hope to be a part of it.”

*Karen W. Parker, Staff
QEP Online Feedback*

Figure 1

Elements of the UH Quality Enhancement Plan

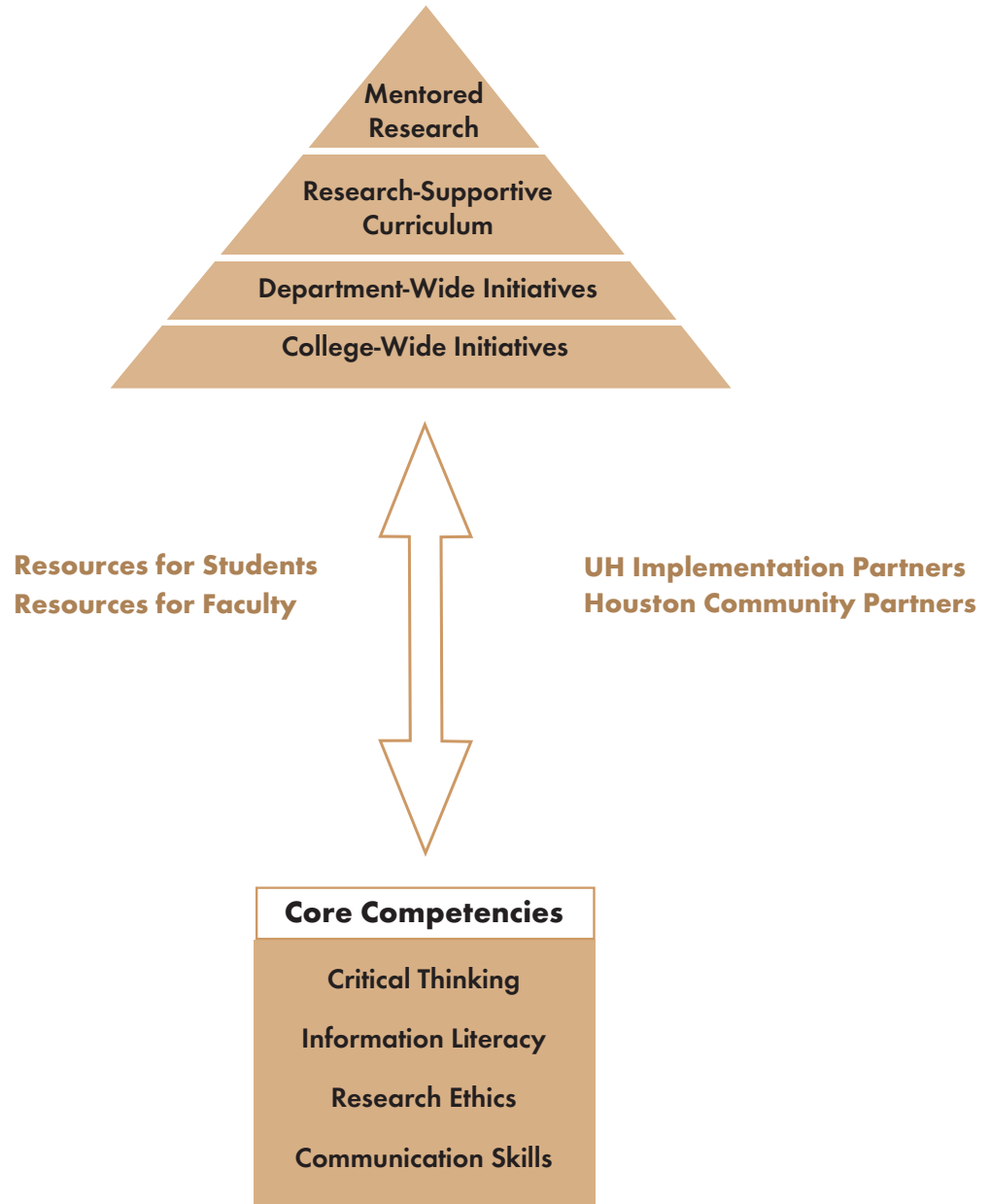
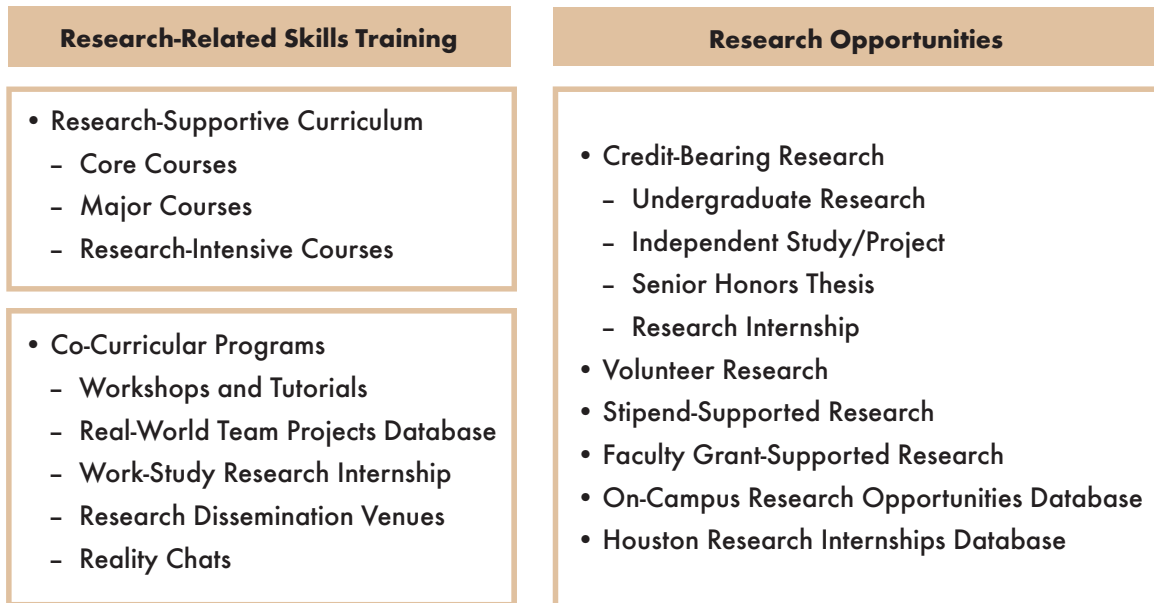


Figure 2

UH Discovery-Based Learning Initiative

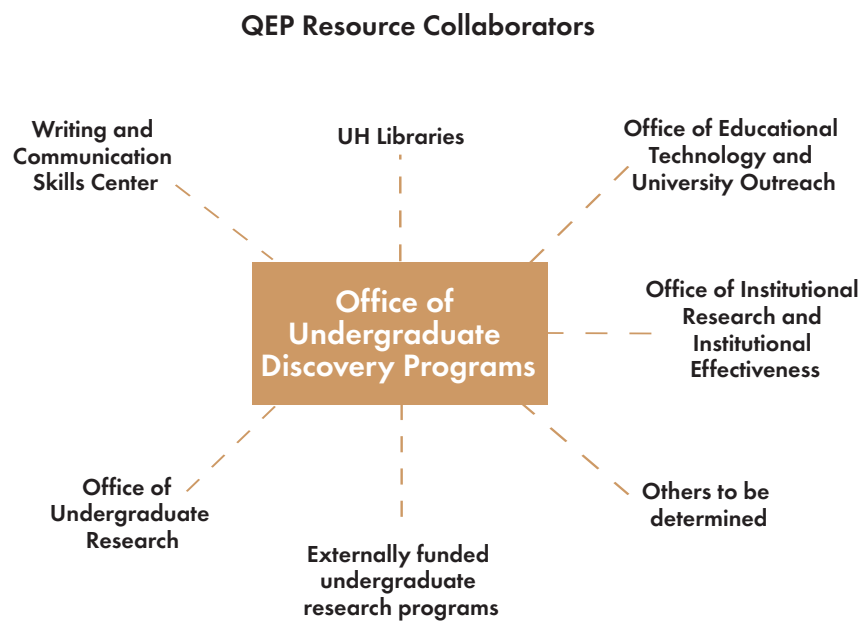




3.2 Creation of the UH Office of Undergraduate Discovery Programs

To ensure effective implementation of the QEP and to provide maximum benefit to our students, the University will establish the Office of Undergraduate Discovery Programs, which will function under the aegis of the UH Office of the Provost. This alignment will facilitate central coordination among QEP Resource Collaborators and will centralize support for students, faculty, and staff. Resource Collaborators who will play key roles in supporting both students and faculty include the Writing and Communication Skills Center, the UH Libraries, the Office of Educational Technology and University Outreach (ETUO), the Office of Undergraduate Research, and the Office of Institutional Research and Institutional Effectiveness (Figure 3). Two new grant programs, Resources for Student Development and Resources for Faculty Development, will be established to fund innovative and relevant workshops and online tutorials.

Figure 3



The Office of Undergraduate Discovery Programs will serve as a central information clearinghouse for students, faculty, and staff so that they can easily avail themselves of the various research-based learning opportunities and resources. The Office will partner with operate as a point of contact for campus offices, alumni, local industry, and community organizations who wish to engage our students in real-world research projects or serve as guest speakers.

Through the management of new competitive grant programs and central programs and services, the Office of Undergraduate Discovery Programs will facilitate the development of research-related skills training and research opportunities, and thereby provide access to discovery-based learning for students of all academic backgrounds (see Table 5 and 6).

Other Supportive Functions of the Office of Undergraduate Discovery Programs

In addition to its administrative and managerial functions, the Office of Undergraduate Discovery Programs will actively participate in the collection of data, assess the extent to which annual performance criteria are met for each of the programs, and recommend adjustments as needed. The Office of Undergraduate Discovery Programs will also collaborate with the Office of Institutional Research and Institutional Effectiveness in the assessment of program goals and student learning outcomes.

The Office of Undergraduate Discovery Programs will coordinate with the Office of University Relations to market discovery-based learning programs to both on- and off-campus constituents. Collaboration with the Office of Development will lead to opportunities for increased funding of QEP-related programs. These include submission of proposals with broad campus impact to federal agencies, philanthropic and corporate foundations, and other funding agencies or individuals. In addition to these University-wide proposals, the Office of Undergraduate Discovery Programs will also provide information to faculty about available student and institutional resources to strengthen their grant proposals to federal funding agencies.

The Office of Undergraduate Discovery Programs will also partner with the Office of Admissions and college recruiting directors in leveraging the discovery-based learning programs to attract and retain high-achieving prospective students.

In their own words...

“I am very pleased with the direction that the QEP is taking; the needs of UH students seem to be the true basis for the plan’s design.”

*K. Bracy, Alumni
QEP Online Feedback*

Table 5
Summary of QEP Competitive Grant Programs
Administered by the Office of Undergraduate Discovery Programs

Grant Program	Mentored	Course-Based	Department	College	Description
1. Research-Supportive Curriculum Development Program	•	•	•	•	Grant program for curriculum development provides funding for faculty release time or partial summer salary support, TA and RA stipends, Writing Center and Library consultations, data collection equipment for field studies, software, research project supplies. Grant program will have three levels of support: individual faculty, faculty team, and colleges/departments.
a. Core Courses		•	•	•	Funding for core course development or enhancements in service courses at the freshman/sophomore levels to incorporate active learning, research awareness/appreciation, and research-related skills training
b. Intermediate Courses		•	•	•	Funding for integration of research-related skills training or reinforcement in major courses. Colleges and departments may also develop courses in series (vertical integration) or multi-disciplinary courses which span several majors or involve interdisciplinary linked courses (horizontal integration)
c. Advanced Research-Intensive Courses	•	•	•	•	Funding for development or enhancements of research-intensive courses that involve collaborative research projects or culminating experiences for course credit such as service-learning, industry, and campus projects
2. Resources for Student Development	•	•	•	•	Grant Program to support training and development of student research-related skills.
a. Student Workshops and Tutorials	•	•	•	•	Funding for resource centers to develop co-curricular workshops and online tutorials to support mentored or course-based research. Colleges and departments can also propose research-related skills training for a particular discipline or field
b. Reality Chats: Conversations with Practitioners and Scholars			•	•	Funding for departments and colleges to develop a Reality Chat series or host individual guest speakers/artists from out-of-town. Individual faculty members will be encouraged to use the free Houston Reality Chats Speakers Bureau for their courses
c. College and Department Undergraduate Research Showcases			•	•	Funding for departments and colleges to develop and host showcases for their undergraduates to disseminate work from mentored research experiences or research-based course projects
d. Student Travel Fellowships for Undergraduate Research	•	•			Funding for undergraduates whose research or creative activity has been selected for presentation at a regional or national venue. Research can result from mentored research or research-based course projects.
e. Graduate Student Near-Peer Mentors	•	•			Funding for professional development workshops for graduate students such as how to mentor undergraduates, inquiry-based pedagogy, teaching tools and resources
3. Resources for Faculty Development		•			Grant program for development of resources to support faculty curricular enhancement efforts such as pedagogy, curriculum, and assessment workshops.

Table 6

Summary of QEP Central Programs and Services Administered by the Office of Undergraduate Discovery Programs

Program or Service	Mentored	Course-Based	Department	College	Description
1. Databases					Multiple searchable databases accessible to students, faculty, staff, alumni, and area practitioners and scholars
a. On-campus Research Opportunities Database	•				Provides students with a listing of faculty research interests and faculty-mentored research projects. Also includes work-study internship positions and mentored research projects in institutes, centers, and campus offices
b. Houston Research Internship Database	•				Provides students with a listing of available paid and unpaid internship programs or positions in the Houston area. Positions may be posted by research centers and institutes, campus offices, local businesses, the Texas Medical Center institutions, NASA, and others
c. Real-World Team Projects Database	•	•			Resource for faculty and student teams who are seeking real-world team projects for their courses. Campus offices, community organizations, small businesses, industry sponsors, etc. can post projects for students teams to address
d. Reality Chats Speakers Bureau		•	•	•	Provides faculty and student organizations with a listing of available practitioners and scholars from the Houston area who are available to share their experiences with students. Local alumni, professionals, campus faculty and staff can join the speakers bureau
2. Work-Study Research Internship Program	•				Provides new opportunities for students who qualify for federal work-study aid to work as research interns in faculty laboratories, institutes, centers, or campus offices. The Office of Undergraduate Discovery Programs would provide funding for the employer's portion of the student's salary
3. Undergraduate Research Summit	•	•			Annual university-wide event will provide a venue for individual students and teams of students to present their research or creative work resulting from faculty mentored experiences or course-based projects
4. Undergraduate Research Journal	•	•			Annual Journal for Undergraduate Research and its associated electronic portal will provide another venue for students and teams of students to present their research or creative works in print or digital formats (podcast, website, etc.)
5. Grant Recipients Best Practices Conference		•	•	•	Annual best practices conference will provide faculty an opportunity to learn from colleagues who have successfully implemented curricular enhancements. Colleges, departments and resource collaborators will also share student and faculty resources that have been effective
6. Recognition Awards for Faculty and Students	•	•	•	•	Annual awards program will recognize faculty for research-based curricular innovations and mentoring. Students will be honored for research innovation and excellence



3.3 Existing Resources to Support the Implementation of Our QEP

The five key Resource Collaborators - 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 - have been deeply involved in the QEP development process and will play major roles in supporting both faculty and students upon implementation of our Quality Enhancement Plan. Their roles will be further elaborated in Section 3.7. The following is a brief overview of some of the current services each partner offers.

Writing and Communication Skills Center

The UH Writing Center, also known as the Writing and Communication Skills Center, has quintupled in size since it was established in September 2000. Its mission is to provide writing instruction across the curriculum that supports the academic, professional, and personal needs of our diverse student population. In 2006 alone, the Writing Center served over 7,000 students through more than 30 college, departmental, and course collaborations. The Writing Center's website received more than 3 million visits in 2006. In order to meet the demand for its services, the Center currently employs over 63 people and occupies nine rooms, including six computer classrooms fully equipped for multimedia and web-based instruction.

The Writing Center defines and teaches writing strategies, values, and conventions in all subject areas, helping students connect abstract writing theory to concrete application in their specific fields of study. Most of the Writing Center's initiatives, courses, and programs include multi-tiered assessment and evaluation, and target the unique needs of our students, including the large number of transfer students and the many who speak and write English as a second language. Many of the Writing Center's programs and instructional models employ writing consultants - undergraduate peer tutors or writing coaches - who support students at all levels of the writing process in small group meetings and in one-on-one tutorials.

The Center's Writing in the Disciplines (WID) partnerships with faculty, departments, and colleges have provided a broad array of writing assistance to thousands of UH students. Three of our colleges - the C. T. Bauer College of Business, the UH Law Center, and the Conrad N. Hilton College of Hotel and Restaurant Management - require their majors to matriculate through a Writing Center "assess and address" program designed according to their writing specifications. Other college partners working within the Writing Center's WID program include the Cullen College of Engineering, the College of Pharmacy, and the College of Liberal Arts and Social Sciences. In addition to the students participating in the Center's **ENGL 1300: Fundamentals of English** and walk-in consultation programs, the Writing Center expects to serve approximately 6,000 students through its WID initiatives in the coming academic year, bringing the total number of students served to more than 8,000.

Through the experience and understanding gathered from its WID program, the Writing Center has developed a variety of writing support services that will be available for implementation in college, department, and course-level QEP initiatives.

UH Libraries

The UH Libraries include the M.D. Anderson Library (the central library), and its four branches: the William R. Jenkins Architecture and Art Library, the Music Library, the Weston A. Pettey Optometry Library, and the Pharmacy Library. Other libraries on campus are the O'Quinn Law Library and the Conrad N. Hilton Library. Together, these libraries provide access to a wide range of quality information resources and instruction in information literacy to support teaching, learning, and research.

The UH Libraries house 2 million volumes and 15,000 journal and other serial subscriptions, while providing access to over 300 bibliographic databases and large quantities of microforms, maps, and other materials. A comprehensive collection of electronic resources makes it convenient for remote access by students at off-campus sites or to those enrolled in distance education courses. The Special Collections Department houses rare books, manuscripts, and primary source materials along with the University archives. In recent years, our libraries have provided more than 200 course-related instruction sessions and approximately 50 open workshops to facilitate the use of these resources. Currently, information literacy instruction sessions at the Libraries are offered in response to faculty requests and as open workshops.

The UH Libraries strive not only to acquire and provide access to information resources, but also to impart the knowledge and skills that will enable students to choose and effectively use resources. By partnering with the Libraries, faculty and academic units will be able to meet information literacy teaching and learning goals through local QEP initiatives.

Office of Educational Technology and University Outreach

The Office of Educational Technology and University Outreach (ETUO) works with colleges, faculty, and other administrative units to coordinate course and program delivery, student support services, and faculty development opportunities. As part of the QEP implementation, instructional designers will be available to develop technology-based solutions for research-intensive courses or research skills modules. This can be accomplished through direct support to faculty from college and central ETUO instructional designers or through the ETUO-administered *Faculty Development Initiative Program* (FDIP), which provides competitive grant funding for faculty engaged in innovative teaching with technology (see Section 3.4.5).

The university outreach function of ETUO includes the Distance Education Office that coordinates the delivery of distance education courses. A survey of graduating seniors for 2006 indicated that 60 percent took at least one distance education course while an undergraduate at UH. Distance education courses are considered to be any course taken entirely online, through purchased media such as DVDs, via broadcast media, or by attending face-to-face or live-interactive courses at one of the Multi-Institution Teaching Centers located in outlying areas – the UH System Sugarland, UH System Cinco Ranch, The University Center at the Woodlands or the Texas Medical Center. Hybrid classes that combine face-to-face instruction with substantial online requirements are scheduled through the Distance Education office but are not considered distance education courses. Distance education courses extend the reach of UH, and address the commuting problem of many students at our metropolitan university.

Since the majority of distance education students also take courses on the main UH campus, they will benefit directly from the various QEP initiatives. Distance education students will also be able to access online tutorials and other resources remotely or through WebCT modules. Furthermore, with the help of instructional designers, faculty can integrate research-based enhancements into their distance education and hybrid courses.

Office of Undergraduate Research

The Office of Undergraduate Research was created in 2004 to organize, facilitate, and enhance opportunities for students to conduct undergraduate research on campus. The Office of Undergraduate Research is dedicated to helping students find and secure research opportunities and carry out creative projects conducted under the guidance of UH faculty. Housed within the Honors College, the Office assists UH undergraduates from any college or major who meet minimum GPA requirements. Students may apply to participate in the three programs offered by the Office of Undergraduate Research:

Summer Undergraduate Research Fellowship, or SURF program, provides stipends to students and faculty to collaborate on full-time, 10-week summer research projects, and to showcase their work through presentations at the annual Undergraduate Research Day.

Provost's Undergraduate Research Scholarship, or PURS program, offers juniors and seniors scholarships to conduct part-time semester research projects with a faculty mentor.

Senior Honors Thesis program offers students up to six hours of credit during their senior year to conduct a thesis project either within or outside of their major.

During the 2006-2007 academic year, over 150 students representing various colleges participated in the SURF, PURS, and Senior Honors Thesis Programs (see Table 3). Stipend-supported mentored research will be expanded as part of the QEP and administration of these faculty mentored research programs will remain in the Office of Undergraduate Research. The Office of Undergraduate Research will also assist the Office of Undergraduate Discovery Programs in promoting awareness about travel fellowship and recognition award opportunities to students who have participated in mentored research.

Office of Institutional Research and Institutional Effectiveness

The Office of Institutional Research and Institutional Effectiveness provides research-based information regarding the University and its role in higher education in order to support strategic planning and institutional effectiveness. The primary responsibilities of the Office of Institutional Research and Institutional Effectiveness include official university reporting, institutional research and analyses, database design and maintenance, and comparative resource materials maintenance. The institutional effectiveness function provides general academic assessment support, assists UH academic and administrative units in the institutional effectiveness planning process, and facilitates general education assessment. Staff with expertise in institutional research and effectiveness will be key partners in the assessment of QEP student learning outcomes and program goals evaluation.

3.4 Building a Research-Supportive Curriculum

By building a research-supportive curriculum, our QEP addresses how faculty can bring the real world into the classroom. Faculty will be supported in their efforts to introduce students to the excitement of innovation and research as well as increase opportunities for them to participate in hands-on projects that require research-related skills.

The new *Research-Supportive Curriculum Development Program* will encourage faculty, departments, and colleges to enhance research-related skills training and to offer course-based research experiences to undergraduates. Since our students come to us with differing levels of interest in and aptitude for research, UH will develop a research-supportive curriculum at three levels: core, intermediate, and advanced. Co-curricular activities will be developed to complement these curricular opportunities through the coordination of the Office of Undergraduate Discovery Programs and Resource Collaborators (see Section 3.7).

In their own words...

“I commend the mission and goals of this program. As a recent committee member of PURS and SURF it has been very encouraging to mark the growth in undergraduate research as an essential element of our curriculum.”

*Dr. Leonard Bachman, Faculty
Gerald D. Hines College of Architecture
QEP Online Feedback*

3.4.1 Research-Supportive Curriculum Development at the Core Level

Faculty, departments, and colleges may propose new introductory courses or enhancements to existing core courses that include research. These courses will provide students with a fundamental understanding of and appreciation for the research process as well as introduce them to research practices. Courses and curricular activities for faculty development and implementation at the freshman or sophomore level are summarized in Tables 7 and 8.



Table 7

Research-Related Curricular Activities for Existing Core Courses

Category	Activity
Critical Thinking	Incorporating problem-based learning exercises for teams of students; requiring individual or team introductory research assignments, field-study assignments, or design projects that have research components
Information Literacy	Introducing the use of primary sources, secondary sources, and electronic resources; learning about discipline-specific information resources; reading and interpreting frequently cited scholarly research papers; assigning Internet-based research exercises that include evaluation of reliable sources; incorporating myth busters or fact-checking assignments based on TV shows, movies, or live performances
Research Ethics	Introducing responsible conduct of research principles; reviewing ethics case studies or engaging in ethics debates
Communication Skills	Requiring individual or team dissemination through written, oral, digital, or performance presentation; writing or presenting to different types of audiences
Research Awareness	Sharing faculty's own research in class or through lab tours when appropriate; inviting guest speakers into the classroom; incorporating a class field trip, off-campus tour, or virtual tour; using electronic "clickers" to teach and model survey research methods
Research in the Popular Press	Using features from television programs, news magazines, newspapers, or online news outlets as sources for cross-disciplinary research papers or in-class discussion
Invention and Discovery	Tracing the history of the discovery process for modern products; incorporating virtual dissection assignments to explain how common devices work; using UH professor John Lienhard's <i>Engines of Our Ingenuity</i> radio episodes as sources for research papers

Table 8

Options for New Research-Related Introductory Courses

Course	Description
Introduction to Research Methods	Introduces research methods used in the sciences, business, social sciences, humanities, fine and performing arts, etc.
Discipline-Specific Research Methods	Introduces discipline-specific research methods to non-majors
Introduction to Applied Research at UH	Includes live talks and podcasts from UH faculty about their research and real-life application of their work
Introduction to Interdisciplinary Research at UH	Introduces the six UH research clusters and includes presentations from teams of faculty who collaborate within each cluster
Cutting-Edge Research	Highlights exciting state-of-the-art research in all disciplines including interdisciplinary research
Grand Challenges of the 21st Century	Reviews the grand challenges in various areas to be addressed by innovative interdisciplinary research (e.g., energy, health and medicine, information technology, environmental sciences, urbanization, etc.)

3.4.2 Research-Supportive Curriculum Development at the Intermediate Level

At the intermediate level, faculty may incorporate activities that reinforce research-related skills into courses in students' major fields of study. Examples include discipline-specific incorporation of problem-based or case-study assignments, enhancements in information literacy skills, and reinforcement of student mastery of various forms of communication, whether written, oral, visual, or digital.

Faculty will also be encouraged to propose additional innovative courses that make use of critical thinking skills and possibly span multiple disciplines. For example, *Historiography of Research* courses could be developed to engage students from various disciplines in reviewing and critiquing major research breakthroughs of the past century.

Writing in the Disciplines Courses

UH recently received approval from the Texas Higher Education Coordinating Board to institute a Core Curriculum change, designating Writing in the Disciplines (WID) as a requirement replacing the Social Sciences Writing Intensive option. This change in the Core Curriculum will provide faculty, departments, and colleges with an additional option for locating and enhancing the communication outcome for research as well as fulfilling discipline-specific degree requirements.

Research Assignments in Courses

Funding will be provided for initiatives to improve the quality of course-based research assignments or student work performed on such assignments. The majority of assignments supported in this category fall under the heading of information research.

Resources and support available to faculty and students during the development and teaching of courses includes reduced teaching assignments, summer support, student workshops, additional equipment, and targeted library acquisitions. The *Research-Supportive Curriculum Development Program* will also support teaching and research assistance (in the form of TAs, RAs, Writing Center consultants, or librarians), to expand the range of materials available to students for their research activities, or to improve the feedback given to students during their research and dissemination process. Some examples of these activities are:

- **Graduate Teaching Assistants** - Graduate TAs may be trained to provide important feedback and direction for students engaged in group or individual research projects, and to assist instructors in developing and grading writing assignments, literature reviews, and annotated bibliographies. These TAs could also assist in maintaining class or project blogs and websites.
- **Assignment Consultants** - Writing and Communication Skills Center staff or UH librarians may assist instructors by adapting pre-existing "modules" (on topics such as information literacy and research ethics), and by making themselves available for additional assistance to students. Writing Center staff can also provide faculty consultations on research assignment design and the development of grading rubrics.





- **Embedded Consultants** - Writing and Communication Skills Center staff or UH librarians could also engage in more extended, course-specific collaborations that would entail “embedding” librarians or Writing Center staff in courses. Librarians and Writing Center staff could assist faculty during the development phase and students (individually and in groups) during the teaching phase. Staff can also provide additional assistance with discipline- and course-specific information literacy training and feedback on students’ research and writing process.
- **Tools for Peer or Instructor Feedback** - Faculty may employ tools to enhance peer or instructor feedback, such as electronic portfolios, videotaped interviews, and breakout discussion groups.

3.4.3 Research-Supportive Curriculum Development at the Advanced Level

The research-intensive course designation will be used for advanced courses offering students the opportunity to engage in research projects that will improve their competencies in the six QEP student learning outcomes enumerated in Section 2.5. At the advanced level, the *Research-Supportive Curriculum Development Program* will accept faculty proposals to enhance existing courses or to develop new courses using one or more of the following research-based learning models:

- Research Methods
- Project-Based Laboratory
- Investigations in the Community
- Research Service Learning
- Capstone and Practicum Courses
- Collaborative Industry Projects
- Interdisciplinary Projects

These categories are not mutually exclusive and may be combined in the design of course enhancements or development of new courses. Students will be required to present their investigation results or recommendations in written, oral, digital, or performance presentation. Each of these research-based teaching models can also be adapted for team-oriented instruction. Faculty may draw upon existing partnerships or other sources of projects for their research-intensive courses. Faculty and student teams may also search the *Real-World Team Projects Database* for potential research-related projects. Interdisciplinary projects will be encouraged to give students a broader perspective reflective of the real world.

Research-intensive activities or courses to be supported by the *Research-Supportive Curriculum Development Program* are summarized in Table 9. Faculty will also be encouraged to propose their own innovative curricular approaches to integrating research. Grants for research-intensive courses will fund instructional support such as reduced teaching assignments, TA support, or partial summer support for faculty course development. The program will also underwrite faculty contracting with the Writing and Communication Skills Center, collaborating with the UH Libraries, or developing mentors from off campus to assist in the courses. Funds could be used for purchasing equipment for field measurements as well as project materials and supplies. Development of course-specific workshops or online resources will also be supported.

In addition to the research-intensive courses supported by this curriculum development grant program, departments will be encouraged to offer credit-bearing mentored research opportunities for students as elaborated in Section 3.6.1.

In their own words...

“To mimic real-world industrial research projects, which typically involve engineers from multiple disciplines working over several years, a need exists for a subject-based, multi-year, multi-disciplinary engineering research program that can be used to attract talented engineering students for the research in selected subject area.”

*Dr. Thomas Chen, Faculty,
Cullen College of Engineering
“Call for Ideas” QEP Online Survey*

Table 9

Research-Intensive Activities or Courses

Activity or Course	Description
Research Methods	Provides opportunities for students to learn and practice research methods through data collection and analysis
Project-Based Laboratory	Engages students in the research process – reviewing the work of others, designing experiments, collecting data for analysis, and disseminating the results. Laboratory courses may also engage students in collecting and analyzing data for a real-world project or contribution to a large dataset
Investigations in the Community	Makes use of off-campus locations as laboratories for student research projects. Off-campus sites include Houston communities, businesses and industries, K-12 schools, and the Texas Medical Center
Research Service Learning	Engages students in collaborative projects that address a need or problem faced by a community client or partner (campus offices, small businesses, K-12 schools, government offices, non-profit organizations, etc.)
Capstone and Practicum Courses	Engages senior students in a culminating, synthesizing experience. Students will integrate their knowledge and skills learned in previous courses and apply them to a research problem, design problem, or creative activity. Multidisciplinary design courses that involve students from more than one major are encouraged as are multi-semester courses, allowing more time for teams to fully develop their projects
Collaborative Industry Projects	Engages teams of students in capstone research projects originating from industry partners. Projects can be carried out on campus or at the industrial partner's facility
Interdisciplinary Projects	Engages teams of students in interdisciplinary projects. Students must present to an audience of students and faculty from different academic majors – preferably from two or more departments. Teams of faculty may also collaborate on developing interdisciplinary projects linking several courses from different departments





3.4.4 Levels of Support for Research-Supportive Curriculum Development Program

As summarized below, three levels of funding will be provided by the *Research-Supportive Curriculum Development Program* to foster curricular innovation at all levels to maximize student benefit. This multi-level grant model has been used successfully in our existing Faculty Development Initiative Program (FDIP) described in Section 3.4.5.

Individual Faculty - Support for faculty to enhance existing courses or develop new courses at the core, intermediate or advanced research-intensive levels. Multi-semester courses are encouraged as they allow students to fully develop their projects.

Faculty Team - Support for teams of faculty who collaboratively develop a plan to adopt a research-based pedagogy in several or all sections of a particular course. Faculty may also propose development of student interdisciplinary projects which span several linked courses from different departments.

Department or College - Support for departmental or college initiatives that include research-based enhancements in multiple courses from freshman/sophomore through junior/senior levels. This vertical integration could involve introducing a training module or research-based learning model in several courses. College-wide curricular enhancements could also involve horizontal integration across the disciplines of training modules or research-based learning model (e.g., college-wide implementation of information literacy training or a capstone course in all majors).

3.4.5 Faculty Development Initiative Program

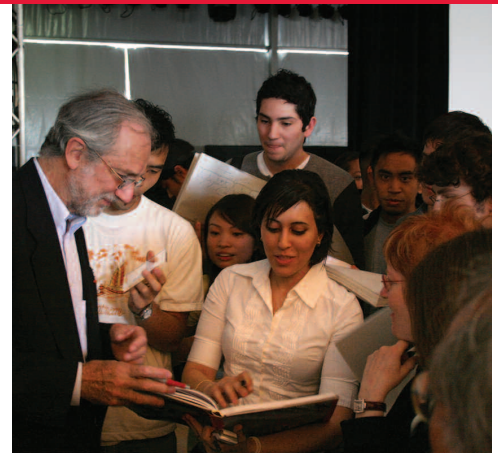
The *Faculty Development Initiative Program* (FDIP) is an existing program that offers faculty another opportunity to receive support for curricular innovations using technology. The FDIP has provided approximately \$350,000 to \$450,000 annually, as well as instructional assistance to faculty engaged in innovative teaching with technology. Administered by Educational Technology and University Outreach, FDIP awards faculty up to \$4,000 for FDIP A awards, and up to \$25,000 for FDIP B awards. The awards are based on proposals submitted by either an individual (FDIP A) or team of faculty (FDIP B), which are then reviewed and evaluated by a committee of peers. The funding can be used for course development, salaries for graduate assistants and support staff, instructional equipment, hardware and/or software, or to acquire other necessary academic technology materials. Instructional design and technical resources are also available for faculty as they develop and implement their projects.

Faculty may submit an FDIP proposal in addition to a QEP curriculum development proposal if course enhancements involve technology. Using both the FDIP and the QEP research curriculum development grant programs, faculty will be able to take full advantage of the power of combining research-based learning with instructional technology.

3.5 Co-Curricular Opportunities for Research-Related Skills Training

In addition to the curricular enhancements described in Section 3.4, our *Discovery-Based Learning Initiative* will provide co-curricular opportunities for students to practice and refine their research-related skills and learn about research in other disciplines. These include:

- The Work-Study Research Internship Program
- The Reality Chats Program
- Programs for Research Dissemination
- Student Workshops and Tutorials
- Graduate Student Near-Peer Mentor Development Program



3.5.1 Work-Study Research Internship Program

A new Work-Study Research Internship Program will offer on-campus research opportunities to students who qualify for the Federal Work-Study Program. The Office of Undergraduate Discovery Programs will fund the employer's portion of the student's salary. The Work-Study Research Internship Program will provide research internships to students who might not otherwise engage in research or pursue on-campus employment. Rather than performing clerical and administrative duties, interns will learn research-related skills in a pre-independent research experience. Students who have completed their Work-Study Research internships will be better qualified and more inclined to pursue independent research projects.

Work-Study Research interns may be employed on campus in faculty laboratories, core facilities, or research centers and institutes. In addition to research laboratories, other offices such as the Office of Institutional Research and Institutional Effectiveness, Intellectual Property Management, college and university communications offices, and the Texas Institute for Measurement, Evaluation, and Statistics (TIMES) may also mentor Work-Study Research interns. Psychology or education students, for example, will have hands-on experience in survey design and assessment. Business or engineering students will conduct patent searches and perform market research.

To match prospective interns with research opportunities, the Office of Undergraduate Discovery Programs will develop and maintain a database of available on-campus work-study research internship positions. The Office of Undergraduate Discovery Programs will collaborate with the resource centers to present a series of workshops providing additional training in professional and research-related skills for Work-Study Research interns. Work-Study Research interns will also have access to the full spectrum of online training modules that will be developed during implementation of the QEP.

3.5.2 Reality Chats Program

The Office of Undergraduate Discovery Programs will provide funding for guest speakers through a new program named *Reality Chats: Conversations with Practitioners and Scholars*. Organized at the university, college, or departmental level, the chats will provide students with an understanding that cannot typically be conveyed in the classroom. Practitioners, prominent speakers and artists will share their professional and career experiences in an informal setting, and discuss contemporary trends and opportunities for research internships and projects. Students will learn how research-related skills are used in practice from professionals in their chosen fields.



In the case of Reality Chats with scholars, students will learn about contemporary trends in research and scholarship.

The Reality Chats may be coupled with viewing a performance or participating in an observational tour. Honoraria will also be available for invited speakers to participate in a Reality Chat with students in addition to delivering their scheduled lectures or seminars hosted by campus offices, colleges, and departments.

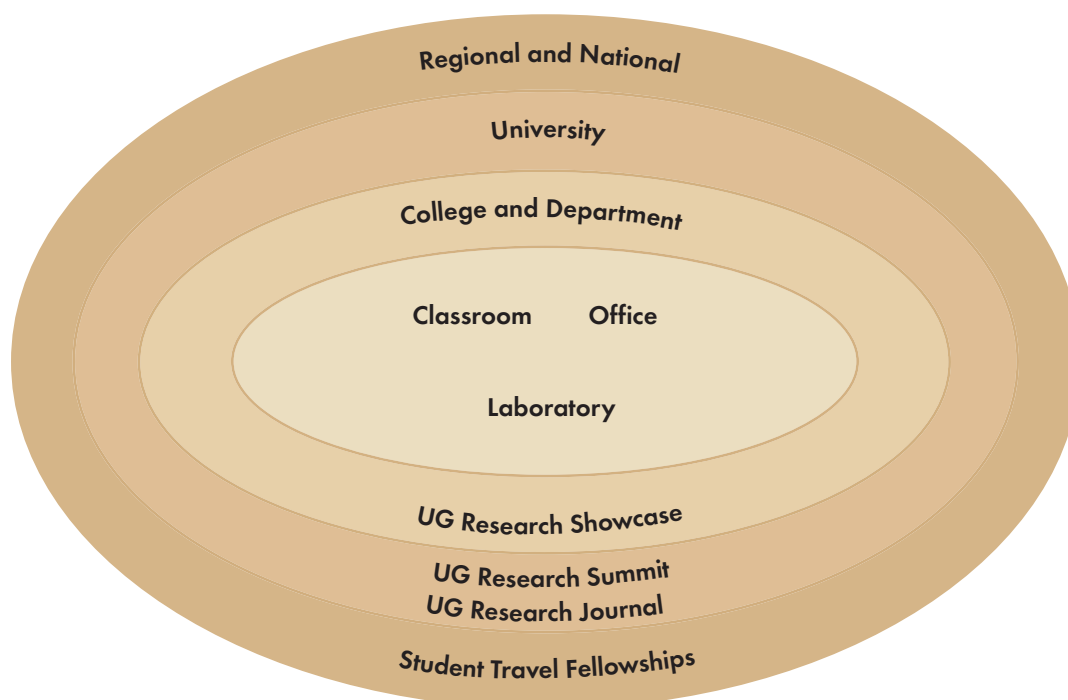
Funding for the *Reality Chats Program* will require the opportunity for students to participate in additional enrichment projects before or after the Chat. Such activities may consist of the submission of a short written or orally presented synopsis of the forum, critique of the performance/exhibit, or class assignment relating to the speaker's research or publications. The *Reality Chats Speakers Bureau* will enable faculty and student organizations to access local speakers (see Table 10).

3.5.3 Programs for Student Dissemination of Research

New programs will provide students with venues to disseminate their course-based or mentored research projects or creative works (Figure 4). These range from individual or group presentations in classrooms or laboratories to broader and more prestigious venues such as national conferences.

Figure 4

Expanding Venues for Student Dissemination of Research



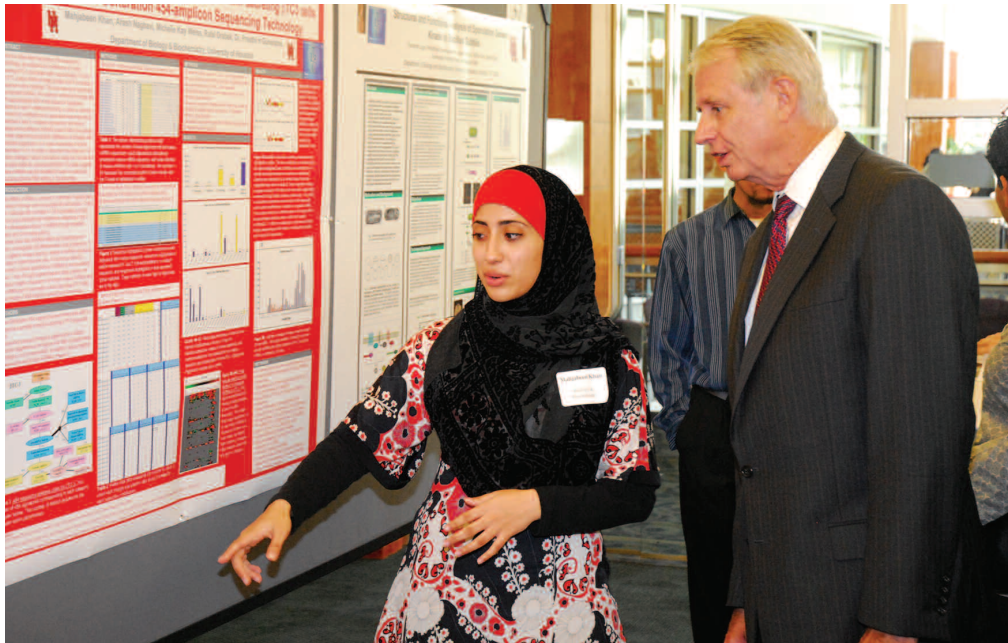
College and Department Undergraduate Research Showcase

Showcases are meant to be inclusive of all students who wish to present their individual or team's work in their department or college. Presentations can be the result of course assignments/projects, mentored research projects, or work-study research internships. *College and Department Undergraduate Research Showcase* grants will provide awards for students and honoraria and travel expenses for keynote speakers. Academic units will submit proposals to the Office of Undergraduate Discovery Programs to fund their student showcases.

Undergraduate Research Summit

The campus-wide annual **Undergraduate Research Summit** will enable individual and groups of students from a variety of academic disciplines to present, perform, or exhibit their research endeavors. Team-based showcases may include capstone design projects or group and ensemble performances. Prizes, including travel to professional conferences, will be awarded for activities such as writing contests, poster competitions, and other challenges. Judges will be local alumni, professionals, and researchers from other area institutions.

The **Undergraduate Research Summit** will give students the opportunity to learn more about research within and outside their disciplines, as well as connect with faculty to discuss available research positions. The Office of Undergraduate Research will be a key partner with the Office of Undergraduate Discovery Programs in the planning and implementation of the annual **Undergraduate Research Summit**. On-campus resources and institutions, such as the UH Libraries and Writing and Communication Skills Center will also collaborate with the Office of Undergraduate Discovery Programs to support the event.





In their own words...

“My first instructor at UH...made me feel welcome and inspired me to do things I hadn’t even considered doing, like publishing, presenting at conferences, and earning an advanced degree.”

UH Alumnus
2005 Alumni Attitude Survey

Undergraduate Research Journal and Online Portal

In 2007, a group of UH students launched an undergraduate literary journal, *Glass Mountain*, focusing on student creative writing and art.

Similarly, the UH *Undergraduate Research Journal* will be established to provide a university-wide venue for students to publish their original research or creative work through a jury review process. Students will also have an opportunity to write, edit, design, and publish articles on research taking place at UH. Through the Undergraduate Research Journal, students will have hands-on experience with all aspects of the publication process.

The journal will be available online with expanded interactive menus, photo galleries, and video clips. The online portal will also serve as an ongoing archive for student research and creative achievements. Students will also be able to submit podcasts or video for posting on the online portal.

Student Travel Fellowships for Undergraduate Research

The *Student Travel Fellowships for Undergraduate Research Program* will provide students with the opportunity to present their research or creative work to a community of scholars and peers, and to network with individuals from their chosen fields. To qualify for funded travel, students must present, compete, exhibit, or perform at a regional or national conference. In addition to presenting at annual meetings of professional organizations, students will also be supported for presentation at general conferences such as the National Conference on Undergraduate Research (NCUR). Such conferences provide students information about research programs at other institutions and thus broaden their knowledge of opportunities available to them during their undergraduate career and beyond.

3.5.4 Student Workshops and Tutorials

As further elaborated in Section 3.7, the Resource Collaborators will develop student workshops and tutorials in partnership with the Office of Undergraduate Discovery Programs, and with colleges, departments, and course instructors. These range from general information literacy training to hands-on writing workshops. For broader student access, online tutorials will be delivered via the Discovery-Based Learning website and embedded modules in WebCT course sites.

3.5.5 Graduate Student Near-Peer Mentor Development Program

The *Graduate Student Near-Peer Mentor Development Program* will support the professional development of graduate students who serve as near-peer mentors to undergraduate students pursuing research projects in faculty-run laboratories. Graduate near-peer mentors will help coach, advise, encourage, inspire, serve as positive role models, and, most importantly, instill a sense of confidence in their undergraduate apprentices. Workshops will be developed by the Office of Undergraduate Discovery Programs and the Resource Collaborators covering topics such as the process of mentoring undergraduates, the responsible conduct of research, and methods for inquiry-based teaching. Graduate students who plan to pursue careers in academia will benefit from the professional development afforded by the near-peer mentoring experience and associated workshops.

3.6 Expansion of Mentored Research Opportunities and Resources

The Council on Undergraduate Research reports that students who have engaged in faculty mentored undergraduate research are more likely to pursue graduate education and be employed in major-related fields (2005). Other studies have indicated retention rate benefits. For example, data from the University of Michigan's Undergraduate Research Opportunity Program (1996) show that attrition rates for underrepresented minorities who participated in mentored research were significantly lower than those students who did not participate in the program.

As students learn about research and become better trained in research-related skills, more students will want to engage in mentored research projects. While mentored research in faculty labs will be expanded as part of the QEP, so too will opportunities be increased for students to address real-world problems and perform mentored research in other settings. Our *Discovery-Based Learning Initiative* will include the following mechanisms to expand mentored research opportunities for our students:

- Credit-Bearing Research Opportunities
- Stipend-Supported Mentored Research Fellowships
- Faculty-Supported Research Assistantships
- Houston Research Internships

The *On-Campus Research Opportunities Database* will be a resource for students seeking paid or unpaid research experiences in faculty labs, institutes and centers, or campus offices. In addition, the *Houston Research Internship Database* will connect students with local off-campus opportunities (see Table 10).

3.6.1 Credit-Bearing Research Opportunities

Students may participate in mentored research projects for course credit. Two-semester Senior Honors Thesis courses already exist for all majors and are available for those students who meet a minimum GPA requirement. The Office of Undergraduate Discovery Programs will provide incentives to colleges and department that propose creative ways to provide course credit for expanding research experiences. For example, some departments may want to add opportunities for individual instruction courses such as independent study or project, special topics, or undergraduate research courses that provide students opportunities to earn course credit for mentored research. In addition, some degree plans already have a credit-bearing internship requirement. Departments may choose to broaden the scope of qualifying internship experiences to include research as well.

Research courses in which faculty collaborators co-mentor a team of undergraduate researchers from two or more disciplines will also be encouraged. Such research teams reflect evolving real-world interdisciplinary research groups and provide a means for our undergraduate students to participate in faculty research cluster projects.

In their own words...

"[The opportunity to work in a research lab] gave me a wealth of training that simply cannot be received in the classroom...and gave me critical training and knowledge that in and of itself will help me in my professional career and aid me in obtaining future graduate studies."

UH Alumnus
2005 Alumni Attitude Survey

In their own words...

"[The] opportunity to do research in [my Chemistry Professor's] lab during my senior year...helped shape my desire to attend graduate school and pursue a career in research."

UH Alumnus
2005 Alumni Attitude Survey



3.6.2 Stipend-Supported Mentored Research Opportunities

Students of all majors who meet minimum GPA requirements may apply for two campus-wide programs, the Summer Undergraduate Research Fellowship (SURF) and Provost Undergraduate Scholarship (PURS) programs (Section 3.3). Currently, there are more than twice as many eligible applicants as are selected for these programs. As part of the QEP, funding will be increased for the PURS program administered by the Office of Undergraduate Research.

As summarized previously in Table 3, several colleges and departments administer externally funded programs that offer additional opportunities for students to participate in stipend-supported mentored research. To further increase the number of such positions for our students, academic units will be encouraged to apply for external funding for mentored undergraduate research programs. The Office of Undergraduate Discovery Programs will provide assistance in leveraging the various QEP-initiated programs in the development of grant proposals to external agencies.

3.6.3 Faculty-Supported Research Assistantships

Faculty will be encouraged to include undergraduate research assistantships as part of their proposals submitted to external funding agencies. The National Science Foundation and other such agencies encourage faculty to participate in these mentoring opportunities by providing supplemental funding. To support proposals that include undergraduate assistantships, the Office of Undergraduate Discovery Programs will provide information about available research-related training resources.

The Office of Undergraduate Discovery Programs will also work closely with the Division of Research to include support for undergraduate training in multi-investigator or center grant proposals. Such proposals are expected to increase with the University's recent effort to catalyze interdisciplinary research through the research clusters described in Section 1.1. Inclusion of undergraduate research assistants in interdisciplinary research or training grant proposals would provide our students the exciting opportunity to work at the frontier of discovery.

In their own words...

"...developing such a program is an excellent idea. Students at this University deserve to be exposed to as much field material as possible, and research and Undergraduate Internship Programs are excellent ways of making this happen."

*Phillip Bannon, Undergraduate Student
Cullen College of Engineering
QEP Online Feedback*

3.6.4 Houston Research Internships

The Office of Undergraduate Discovery Programs will build partnerships with Houston-area clients looking to employ our students for real-world learning experiences that focus on research or have a strong research component. **The Houston Research Internship Database** will serve as a repository for these local opportunities (see Table 10). Potential off-campus employers include energy industry research centers, the Texas Medical Center institutions, the NASA Johnson Space Center and its contractors, local biotechnology and medical device companies, law firms, advertising agencies, etc. Both undergraduate and graduate students will benefit from this compilation of opportunities for experiential learning.

3.7 Infrastructure and Resources to Support Students and Faculty

Our QEP also entails developing infrastructure and resources to support students and faculty that can be divided into two major categories:

- Databases for the *Discovery-Based Learning Initiative*
- Infrastructure Support from Resource Collaborators

3.7.1 Development of Databases for the Discovery-Based Learning Initiative

In addition to administering the various grant programs, the Office of Undergraduate Discovery Programs will coordinate central services for students and faculty, including developing and maintaining four databases (Table 10). The searchable databases, coupled with an online repository of research-related training modules and tools, will provide a mechanism for the Office of Undergraduate Discovery Programs to make resources available campus-wide and remotely. The Office will serve as a match-maker between research project sponsors and prospective student participants.

Table 10

Databases of the Discovery-Based Learning Initiative

Database	Description
On-Campus Research Opportunities	Database allows faculty, campus offices, institutes and centers to post available research opportunities including work-study research internship positions. On-campus opportunities may be voluntary, credit-bearing, or stipend-supported research positions. Students will also be able to post their resumes for potential mentors to review.
The Houston Research Internship Opportunities	Database provides a means for posting research internship positions offered by Houston-area industry and research institutions. Off-campus internships include mentored research opportunities at local institutions, the Texas Medical Center, NASA, or local companies. Both undergraduate and graduate students will benefit from this resource.
The Real-World Team Projects	Database enables campus offices, local industry, community clients, non-profit organizations, and K-12 schools to post team projects that students can address under the guidance of a course instructor. This will serve as a central repository for campus projects, collaborative industry projects, service learning projects, and capstone projects.
Reality Chats Speakers Bureau	Directory enables local professionals or scholars to volunteer to share their research and career experiences with students. Since 75 percent of our alumni remain in the Houston area, the Reality Chats provide an opportunity for them to re-engage with their alma mater, helping bring the real world to our students. Faculty or student organizations will coordinate scheduling registered speakers through the Office of Undergraduate Discovery Programs.



3.7.2 Infrastructure Support from Resource Collaborators

The *Discovery-Based Learning Initiative* will increase available infrastructure for students and faculty. The key to this support is teamwork among the QEP implementation partners: the newly created Office of Undergraduate Discovery Programs and our existing resources and agencies – including the Writing and Communication Skills Center, the Libraries, the Office of Educational Technology and University Outreach, the Office of Undergraduate Research, and the Office of Institutional Research and Institutional Effectiveness – which already provide substantial facilities, resources, and programs. The enhancement comes in the synergy of Office of Undergraduate Discovery Programs coordination of resources, linking the implementation partners and other resources into an interconnected infrastructure that supports students and faculty. The processes for allocating resource support will, among other alternatives, be through three grant mechanisms:

Research-Supportive Curriculum Development – In collaboration with the QEP Resource Collaborators, faculty or academic units can include custom-designed resources or modules in their proposals as part of existing or new courses. Some degree programs may choose to concentrate their research requirements and opportunities in select courses, while others may distribute research as widely as possible, but any course at the core, intermediate or advanced levels will benefit from curricular review and enhanced assignment design.

Resources for Student Development – Academic units can include custom designed resources in their proposals as a key component of department- and college-wide student training programs in skill areas such as research ethics, information literacy, and oral and written communication. This horizontal delivery of research-related skills will be encouraged since it has the potential to impact a high number of students. In addition, the QEP Resource Collaborators or other offices on campus can initiate proposals which provide funding to develop stand-alone course modules, workshops, or online tutorials for student research-related skills development.

Resources for Faculty Development – The Resource Collaborators and other offices on campus can develop proposals that provide resources and workshops for faculty in the areas of curriculum design, implementation of research-based pedagogy models, instructional technology, and assessment.

Resource Collaborators Index

Examples of the types of support that the implementation partners can provide are outlined in Tables 11-15. They include support for the improvement of student communication and information literacy skills, use of instructional technologies, mentored research programs, and assessment of QEP student learning outcomes and goals.



Table 11

Communication Skills Development Support

Support for Research-Supportive Curriculum Development	
College Writing Programs	All majors in the college matriculate through the Writing Center in multi-staged writing programs. Participating Colleges: UH Law Center, C. T. Bauer College of Business, College of Pharmacy, and the Conrad N. Hilton College of Hotel and Restaurant Management. A future option for all colleges
Writing in the Disciplines Courses (WID)	Institutionally Designated Option (IDO) core requirement: three credit hours "Writing in the Disciplines." Colleges and departments can increase writing instruction in their discipline while adding content coverage by designating courses as WID
Discipline-Specific ENGL 1304: Freshman Composition II Courses	Discipline-specific course that fulfills the ENGL 1304 Core requirement, contextualizes the second-semester composition course
Linked Course Partnerships	Cohorts of students simultaneously enrolled in content area courses and English composition courses
Curricular Mapping	Review college curricula and identify opportunities for increased writing practice and instruction
Support for Student Development	
Undergraduate Research Writing Workshops	Familiarize students with literature review, research report writing methods, styles, formats, and conventions for publishing within their discipline
Writing Workshops	Instruction on general writing topics and hands-on student exercises. Examples: Academic Honesty: Working Ethically with Sources, Revision Strategies for Non-Native Speakers, Entering the Conversation: Learning the Language of Scholarship
Assess and Address Writing Support	Assessment of discipline-specific writing and follow-up program of writing tutorials for selected students
Writing Studios	Small groups of students meet weekly with a writing consultant to discuss the writing process for course assignments
Assignment-Specific Writing Consultations	One-on-one consultations with peer tutors provide support in writing and revision process for course writing assignments
Oral Communication Support	Group or individual practice and consultation sessions utilizing technology and practice rooms available at the Writing Center
Support for Faculty Development	
Research-Based Assignment Design	Experts in pedagogy consult with faculty on writing assignments, ensure expectations and evaluation criteria effectively communicated
Evaluation Rubric Design	Staff assists faculty to establish appropriate expectations, and to clearly state them in the flexible and practical form of rubrics
Oral Communication Support	Input on the design of oral presentation assignment prompts and evaluation rubrics
Teaching Assistant Training	Training for teaching and instructional assistants, to support the application of consistent standards for grading



Table 12

Information Literacy Skills Development Support

Support for Research-Supportive Curriculum Development	
Assignment Consultations for Faculty	Research librarians collaborate with faculty on assignments to help build students' information literacy skills
Course-Embedded Librarian Consultant	Research librarians keep faculty current on relevant resources
Course Library Instruction	Information resource instruction tailored to content and assignments
Information Literacy Skills Training for Research-Intensive Courses	Students in capstone or practicum classes learn to pull together information from many sources, synthesize, and apply it to solving a problem in an ethical and legal manner
Support for Student Development	
Special Collections Library Instruction	Special Collections librarians introduce students to rare books and archival materials
Subject Portal/Websites	Research librarians build electronic subject portals for courses and/or disciplines, increase access to research tools, resources, and library services
Open Workshops for Students	Including basic introductions to library resources and services, use of specific databases, patent research, and use of reference management tools
Online Tutorials	Online tutorials – text-based or multimedia videos – demonstrate research concepts, information resources
Support for Faculty Development	
Faculty Development Workshops	Workshops covering topics such as Special Collections, information literacy-based assignments, assignments that help students avoid plagiarism, EndNote and other reference and citation management



Educational Technology and University Outreach

Table 13

Instructional Technology Support

Support for Research-Supportive Curriculum Development	
WebCT Vista	Course management system supported by the University, over 1,200 sections and 28,000 student enrollments, includes learning modules to develop QEP core competencies. Platform for delivering QEP assessment instruments for research-intensive courses
Electronic Portfolio System	ETUO and Writing Center recently piloted iWebfolio, an electronic portfolio system. With WebCT, e-portfolios can showcase student research projects and provide vehicle for program-wide assessments
Wimba Virtual Classrooms	With the best elements of face-to-face and online instruction, Wimba Classroom provides a fully featured live classroom environment, supports audio, video, application sharing, and content display
Turnitin.com/GradeMark	GradeMark tools extend functions beyond plagiarism detection, supporting teaching, facilitating consistent and clearly-communicated evaluation of writing
Student Response Systems (Clickers)	eInstruction Classroom Performance System ("clickers"): remote-controlled, real-time classroom polling system, enables instructors to check student understanding, make lectures more interactive
Podcasting	Inexpensive, easy-to-produce multimedia instructional tool to deliver lectures and disseminate course materials
Support for Student Development	
Student Podcasting	Students disseminating their research work and findings via podcasts to the University community and beyond
Wimba Virtual Classroom - Study Rooms	Students create private online study rooms, meet to plan presentations, complete team assignments, prepare group documents/reports
Support for Faculty Development	
Instructional Designers	Instructional designers provide consultations with faculty on best practices for developing course material and using instructional technologies
Faculty Development Workshops	Workshops and training on instructional technologies and tools in classroom instruction, hybrid, or online courses
Faculty Development Initiative Program (FDIP)	Grant program for faculty enhancements of courses using instructional technology
Faculty Showcase	Events give faculty opportunity to present their work utilizing technology
Graduate Technology Assistants	Graduate students provide immediate support with scanning, creating PowerPoints, WebCT, etc.



Table 14

Mentored Research Support

Support for Student Development	
University Stipend-Supported Mentored Research Programs	Administration of the University's stipend-supported mentored research programs (SURF and PURS). Offers student advising and help with matching to faculty mentors
Senior Honors Thesis	Administration of the Senior Honors Thesis programs, coordinating review of thesis proposals, tracking student progress, compliance to thesis requirements
Lecture Series for Mentored Undergraduate Research	Lecture series for students participating in mentored research, presentations on conducting a literature review, research ethics, research activities taking place at UH, applying to graduate and professional school, student panels
Undergraduate Research Summit	Collaboration with the Office of Undergraduate Discovery Programs, to implement University-wide showcase of student research and creative activities

Office of
Institutional **R**esearch and
Institutional **E**ffectiveness

Table 15

Assessment Support

Support for Research-Supportive Curriculum Development	
Data Access	Extraction and use of appropriate institutional data related to QEP assessment
Assessment Instruments	Assessment staff work with faculty teams, develop instruments for assessing QEP student learning outcomes
Data Analysis	Quantitative and qualitative data analyses and associated reports
General Education Assessment	Coordinate assessment of general education core competencies in critical thinking, information literacy, and writing skills, facilitate alignment of general education assessment with QEP assessment
Support for Faculty Development	
Assessment Training	Workshops, training sessions for faculty who develop new research-intensive courses to include course-based assessments
Rubric Development Support	Facilitate rubric development with faculty committees charged with identifying standards for QEP outcomes



UNIVERSITY OF HOUSTON



4 Implementation of the Discovery-Based Learning Initiative

4.1 Relation of the QEP to Institutional Planning and Budgeting Activities

As a major undertaking at the University of Houston, the Quality Enhancement Plan has been included among the high priority initiatives expressed in the UH System Strategic Principles. For Fiscal Year (FY) 2008, Strategic Principle 1 (Institutional Excellence), Initiative 6 states that the University will “develop a plan for and fund a new undergraduate research program at the University of Houston.” In August 2008, the Board of Regents will review the progress of the Quality Enhancement Plan.

At UH, all planning and budgeting decisions are made in the spring. Since implementation of the QEP will require a significant investment of new resources, QEP planning has been aligned with the institution-wide annual planning and budgeting process for FY 2009 and will be part of the UH FY 2009 Annual Plan and Budget, scheduled to be approved by the Board of Regents in August 2008 and annually thereafter. Based on preliminary budget estimates, we anticipate that the University will invest approximately \$5 million over the five-year implementation of the QEP.

4.2 QEP Implementation Schedule

Implementation for the first five years of our QEP is summarized in Table 16. In the preliminary phase (Spring 2008), the Office of Undergraduate Discovery Programs will begin to coordinate and administer the proposed programs. The Discovery-Based Learning Initiative website and its associated databases will be developed during the summer and will serve as an information and resource clearinghouse beginning in early Fall 2008. In collaboration with University Marketing, a comprehensive plan will be developed to communicate the initiative’s opportunities and resources to our students, faculty, staff, alumni, and prospective community and corporate partners.

Faculty committees representing a broad cross-section of disciplines will develop the guidelines and funding criteria for the three grant programs based on preliminary descriptions provided in this report and recommendations of the QEP subcommittees. The inaugural “Call for Proposals” will take place in summer of 2009. Subsequent proposal solicitations will occur bi-annually. Since funds will become available for the QEP programs in FY 2009, the first grants will be awarded effective September 1, 2008. The **Research-Supportive Curriculum Development Program** and the development of workshops and tutorials for students will be the primary focus of the first year of the program. Development workshops for graduate student near-peer mentors and faculty will also begin in the first year.

Increased funding for the Provost’s Undergraduate Research Scholarship (PURS) program will begin the first year and continue each year thereafter. Additional external support for mentored research and other Discovery-Based Learning programs will be sought through grant proposals and fund-raising throughout the five-year period.

During the second year, two campus-wide programs for research dissemination will be initiated, the Undergraduate Research Summit and the Undergraduate Journal with its Online Portal. The Work-Study Research Internship Program will also begin in the second year.

Proposals for the remainder of the QEP programs will be considered beginning in year two, including requests for funding for college/department Reality Chat Series, college/department Undergraduate Research Showcases, and Student Travel Fellowships.

4.3 Operation of the Office of Undergraduate Discovery Programs

The Office of Undergraduate Discovery Programs will include a director, an administrative assistant, and other support staff. The director will work closely with faculty, departments, colleges, Resource Collaborators, and other University offices to realize the vision of the **Discovery-Based Learning Initiative**. Because of the key role that assessment will play in assuring that our QEP goals and improvements in student learning outcomes are achieved, additional resources will be allocated to the Office of Institutional Research and Institutional Effectiveness. The Writing and Communication Skills Center will also receive additional support. The databases and website will be developed with assistance from Information Technology Services.

A broad-based, interdisciplinary Faculty Advisory Committee will be appointed to provide consultation to the Office of Undergraduate Discovery Programs. The Committee will provide ongoing advice and recommendations regarding the scope and priorities of the programs. Task-specific committees composed of faculty, staff, and/or students will be organized as needed. For example, a faculty committee will be involved in recommending standards for assessing the student learning outcomes as described in Section 5.1. A staff committee will perform a gap analysis on existing learning resources to recommend areas to be addressed by new workshops and tutorials that complement curricular enhancements.

In their own words...

“I had not realized that undergraduates could even be eligible for these opportunities....I would hope that if you start students thinking early in their career, it would be possible to encourage innovation. If you assume that you aren’t allowed then you will not even imagine the possibility. Let’s have doors open for those that want to dream a better world.”

*Jana Sharooni, Undergraduate Student,
College of Liberal Arts & Social Sciences
“Call for Ideas” Online QEP Survey*

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Assessment Plan



5 Assessing the Effectiveness of the Discovery-Based Learning Initiative

The plan for assessing the effectiveness of the *Discovery-Based Learning Initiative* is designed primarily to establish evidence that our undergraduate students are acquiring the skills and knowledge expected, and secondarily to gather information that will allow the University to effectively target adjustments and improvements to the QEP program components. The Office of Institutional Research and Institutional Effectiveness and the Office of Undergraduate Discovery Programs will partner with faculty to implement the assessment plan.

5.1 Assessment of Student Learning Outcomes

Faculty participation will be a critical part of a successful assessment programs, from identification of standards through administration of assessment instruments and consideration of results. Evidence of students' research skills can be quickly translated to curricular change by faculty, and can be evaluated by the Office of Undergraduate Discovery Programs for possible modification of the course funding criteria. In addition, the course-based measures will lay the groundwork for discipline-specific research measures to be developed over time.

The assessment plan focuses on the student learning outcomes framing the *Discovery-Based Learning Initiative*, referenced in Section 2.5 and reiterated below:

- 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.

Our QEP provides multiple educational and research opportunities to address these student learning outcomes. Table 17 maps each student learning outcome to the program component in which the outcome is introduced, reinforced, or emphasized. The primary experiences are shown in the shaded area at the left of the map; the secondary experiences are reflected in the area to the right. As the *Discovery-Based Learning Initiative* progresses and student learning outcome data are analyzed, the map will indicate the primary program components where improvement might be needed, or the supporting components to be reviewed for expansion or elimination.

Integrated Assessment Planning

In the spirit of integrated assessment, the *Discovery-Based Learning Initiative* assessment plan is designed to examine data meaningful to UH faculty, who are ultimately responsible for undergraduate education. For this reason, the plan relies heavily on standards outlined by faculty locally. In addition, the plan is designed with full awareness that recent developments in the public accountability discussion may push all universities more toward standardized measures of student learning. Coupled with the locally-developed measures are national instruments or nationally developed standards such as those for critical thinking, information literacy, or the responsible conduct of research.

Given that the operating principles guiding the *Discovery-Based Learning Initiative* are improvement of the undergraduate educational experience at UH and reinforcement of the link between academic skills and the skills needed for success in today's world, the assessment plan is linked to the University's general education assessment plan. For some outcomes, the Discovery-Based Learning and core competency measures are shared; for others, the Discovery-Based Learning outcome has a unique measure but is also tied to a more general measure in the general education assessment plan. The alignment of QEP and core competency measures will provide more robust information for both, and will facilitate examination of the *Discovery-Based Learning Initiative* as a tool for strengthening undergraduate education as a whole.

Embedded Assessment in Research-Intensive Courses

The student learning outcome measures associated with the *Discovery-Based Learning Initiative* are shown in Table 18. As elaborated in Section 3.4, the cornerstone of our QEP is the development of a research-supportive curriculum through enhancement or creation of new research-based courses at three levels: core, intermediate, and advanced. The advanced level research-intensive courses provide students with the opportunity to further develop and apply their research-related skills in project-based or capstone experiences. Accordingly, assessment of student learning outcomes is located primarily within research-intensive courses.

The funding criteria for development of new research-intensive courses and the criteria for designating existing courses as research-intensive will stipulate faculty engagement in Discovery-Based Learning outcomes assessment activity. Depending on the level of the course or the stage of program implementation, funding criteria may include participation in rubric development or inclusion of assessment instruments in course requirements. Since student learning outcomes assessment is tied to the funding of research-intensive courses, implementation is ensured.

QEP Curriculum Map

Table 17

QEP Student Learning Outcomes	Research/Educational Experiences									
	Primary			Supporting						
	Core	Intermediate	Advanced	Mentored Research Programs ^a	Work-Study Research Internship Program	Workshops and Tutorials	Graduate Student Near-Peer Mentors	Awareness Opportunities ^b	Dissemination Opportunities ^c	
Students will be able to formulate a research question or problem.	I	R	E	E	I	I, R	R	I, R		
Students will be able to identify basic principles and knowledge related to their research question or problem.	I	R, E	E	E	I	I, R	R	I, R		
Students will be able to develop a research plan to address or resolve a specific question or problem.	I	R, E	E	E	I	I, R	R	I, R		
Students will be able to collect and interpret data and information in an attempt to resolve the question or problem.	I	I, R	E	E	I	I, R	R	I, R		
Student will demonstrate awareness of the responsible conduct of research.	I	R	R	R	I	I, R	R	I		
Students will be able to articulate their research findings through written, performance and/or oral presentations.	I	I	E	E	I	I, R	R		E	

I = Introduced R = Reinforced E = Emphasized

^a Mentored Research = SURF, PURS, AGEF, HLSAMP, faculty grant-funded Research Assistant positions, credit-bearing thesis/independent study research course
^b Awareness = Attendance at Reality Chats, College/Dept. Undergraduate Research Showcase, Undergraduate Research Summit, and reviewing of Undergraduate Research Journal and Online Portal
^c Dissemination = Presentation at College/Dept. Undergraduate Research Showcase, Undergraduate Research Summit, and publication in Undergraduate Research Journal, presentation at regional or national venue facilitated by Student Travel Fellowships for Undergraduate Research

Table 18 Student Learning Outcomes Assessment Plan

QEP Student Learning Outcome	Related General Education Outcome	Assessment Methods	Implementation
<p>Students will be able to formulate a research question or problem.</p> <hr/> <p>Students will be able to identify basic principles and knowledge related to their research question or problem.</p> <hr/> <p>Students will be able to develop a research plan to address or resolve a specific question or problem.</p> <hr/> <p>Students will be able to collect and interpret data and information in an attempt to resolve the question or problem.</p>		<p>Course embedded assessment against a simple rubric.</p>	<p>Funding criteria for research-intensive courses will require research-related skills instruction and assessment to be included in the course.</p> <p>Assessment staff will work with faculty and Office of Undergraduate Discovery Programs to establish criteria and will provide faculty with resources for developing simple course-embedded assessment of the outcomes.</p> <p>Assessment instruments may be placed in WebCT so that courses using WebCT may include QEP assessments easily. Courses not using the WebCT platform will be able to direct students to WebCT for the sole purpose of QEP assessment. Instructional Technology staff to assist with QEP assessments in WebCT.</p>
	Critical Thinking	<p>Locally-developed rubric for cross-sectional assessment.</p> <p>National Instrument for longitudinal or cross-sectional implementation.</p>	<p>Rubric developed by UH faculty assessing critical thinking as a core competency across disciplines. Student work to be sampled from embedded assignments and stored on shared server or e-portfolio system. Subsequent implementation will assess students at beginning and end of undergraduate career. Data collection, analysis, and reporting to be conducted by assessment and Writing Center staff.</p> <p>National instrument for assessing critical thinking will be chosen by UH faculty as part of QEP and general education assessment, and participation in the Voluntary System of Accountability. Implementation and reporting to be coordinated by assessment staff.</p>
	Critical Thinking (Quantitative Reasoning)	<p>Locally-developed standards applied to data embedded in core mathematics courses.</p>	<p>Student work including objective and free response questions embedded in core mathematics courses scored against locally developed quantitative reasoning rubric. Questions to be embedded by mathematics instructors; results to be analyzed and reported by assessment staff.</p>
	Information Literacy	<p>Assessment of modified ACRL Standards.</p>	<p>The Association of College and Research Libraries provides Information Literacy Competency Standards for higher education. A faculty committee will be formed to select and modify the five ACRL standards and associated outcomes to effectively articulate the expected outcomes for UH students. Assessment staff will develop measures for the stated outcomes.</p>
<p>Student will demonstrate awareness of the responsible conduct of research.</p>		<p>Problem-based questions embedded in research-intensive courses.</p>	<p>Using federal guidelines for the responsible conduct of research in multiple disciplines, a faculty committee will articulate a multidisciplinary code of conduct appropriate for undergraduate researchers at UH. Assessment staff will develop questions to assess awareness which faculty will embed in research-intensive courses. Results will be analyzed and reported by assessment staff.</p>
<p>Students will be able to articulate their research findings through written, performance, and/or oral presentations.</p>	Communication (Writing)	<p>Scoring of student writing products against locally-developed assessment rubric.</p>	<p>Using 2006 results of undergraduate writing assessment as a baseline, student writing will be sampled and analyzed against the existing writing rubric on a biennial basis by assessment and Writing Center staff.</p> <p>Each discipline will establish and communicate to faculty and students expectations for research writing in that discipline. Assessment staff and Office of Undergraduate Discovery Programs will facilitate assessment of upper level research writing products against discipline-specific rubrics.</p>
	Communication (Speaking)	<p>Locally-developed rubric utilized at selected QEP-related performance opportunities.</p>	<p>Assessment standards for presentations to be developed by faculty and communicated to students participating in any QEP-related presentation opportunity. Presenters will be scored by 2-3 faculty or industry experts in attendance and provided feedback. Office of Undergraduate Discovery Programs will coordinate scoring. Results will be analyzed and reported by assessment staff.</p>

Performance Criteria	Schedule
<p>Students who have taken research-intensive courses will be able to formulate a research question or problem with adequate or advanced proficiency by AY 2010-2011.</p> <p>The proportion of students reaching advanced proficiency will increase every year.</p>	<p>Funding criteria for research-intensive courses to be completed summer 2008.</p>
<p>Students who have taken research-intensive courses will be able to identify basic principles and knowledge related to their research question with adequate or advanced proficiency by AY 2010-2011.</p> <p>The proportion of students reaching advanced proficiency will increase every year.</p>	<p>First proposals funded Fall 2008.</p> <p>Courses supported by funding scheduled beginning Fall 2009, with additional courses implemented every semester.</p>
<p>Students who have taken research-intensive courses will be able to develop a research plan with adequate or advanced proficiency by AY 2011-2012.</p>	<p>Assessment staff to work with faculty before and during first semester of course to establish assessment instrument.</p>
<p>70% of students who have taken research-intensive courses will be able to collect and interpret data with adequate or expert proficiency by AY 2011-2012.</p>	
<p>Upper-division students will show evidence of advanced critical thinking skills compared to lower division students.</p> <p>Upper division students with greater levels of engagement in research opportunities will show greater critical thinking skills when compared to upper division students with minimal engagement in research opportunities.</p> <p>Performance criteria for national test to be set by UH faculty in alignment with decision for longitudinal or cross-sectional assessment.</p>	<p>Pilot assessment completed March 2008. Refinement of rubric and subsequent assessment to be conducted and reported biennially by May 31.</p> <p>Selection by faculty of national instrument to be completed by July 31, 2008. First implementation to take place AY 2008-09.</p>
<p>Students will demonstrate competency on all quantitative reasoning outcomes by Spring 2009.</p> <p>Students will demonstrate improved quantitative reasoning skills each year.</p>	<p>Pilot assessment to be completed March 2008. Baseline data to be collected and analyzed Fall 2008 or earlier. Subsequent analyses to be conducted annually and reported biennially.</p>
<p>All students will demonstrate minimum competency.</p>	<p>Outcomes identified by December 31, 2008. Assessment methods identified by April 30, 2009. Initial assessment to begin AY 2009-2010.</p>
<p>All students in research-intensive courses will demonstrate awareness of responsible conduct of research.</p>	<p>Questions to be embedded in all research-intensive courses beginning Fall 2009.</p>
<p>Students will demonstrate improved writing skills in comparison to prior years.</p> <p>Students at the same level who have enrolled in more research-related courses will demonstrate stronger writing skills than students who have enrolled in fewer research-related courses.</p> <p>Upper level research writing products will meet minimum criteria established by discipline.</p>	<p>Disciplines will publish standards for quality research writing in the discipline by Spring 2009.</p> <p>Undergraduate student writing will be analyzed and results reported once each academic year.</p> <p>Upper level research writing products will be analyzed against discipline-specific rubrics annually, beginning AY 2009-10.</p>
<p>Students will demonstrate improved speaking skills each year.</p>	<p>Assessment standards to be developed Fall 2008 and implemented each spring semester, beginning 2009. Reports will be completed annually by June 30.</p>

Assessment of Critical Thinking

Many of the skills needed for research – formulating questions, identifying relevant principles, collecting and interpreting data – call on the family of critical thinking skills we uphold as a core competency. The University of Houston has launched its own critical thinking assessment initiative, and will soon begin participation in a national test of critical thinking. We expect the two means of assessment to provide rich and actionable information on students' core skills. Furthermore, the quantitative reasoning measure associated with critical thinking will aid interpretation of evidence regarding students' ability to collect and interpret data in quantitative disciplines.

Assessment of Information Literacy

Similarly, the information literacy assessment will shed light on the ability of students to identify principles and knowledge related to their research question. The Association of College and Research Libraries (2007) has developed five information literacy competency standards, which have been operationalized into 22 performance indicators and 87 outcomes. Some of the standards overlap in significant ways with our *Discovery-Based Learning Initiative* outcomes as well as our core competencies. For example, the fifth standard, addressing economic, legal and social issues surrounding the use of information, contains a performance indicator discussing responsible acknowledgement of information sources. For Discovery-Based Learning assessment, this standard would fall under the outcome regarding the responsible conduct of research. In response to these overlaps, our process will begin with a faculty committee examining the ACRL information literacy standards to identify the outcomes that should be assessed at UH, given what is already being assessed elsewhere on campus and given the University's established general education competencies.

Assessment of Responsible Conduct of Research

The responsible conduct of research outcome is defined by awareness rather than measurable skill, because undergraduate students will rarely be conducting research in a way that leaves them alone in these decisions. Moreover, the manifestation of ethical issues may vary among disciplines. As with information literacy, a faculty committee will be charged to examine federally defined standards such as those found in the Office of Research Integrity's *Introduction to the Responsible Conduct of Research* and *On Being a Scientist: Responsible Conduct in Research*, a document produced from a project approved by the Governing Board of the National Research Council. Using these federally defined standards as references, the UH faculty committee will identify the domains of emphasis for undergraduates engaging in research. Based on the outcomes selected, assessment staff will develop appropriate measures to be included in research-intensive courses.

Assessment of Communication Skills

Finally, the outcome addressing research dissemination has strong ties to assessment of core skills. Assessment of oral presentations will be accomplished with standards set by our faculty and implemented by faculty and industry experts at on-campus assessment forums and research-intensive courses. Our well-established Writing in the Disciplines (WID) program provides a strong foundation for writing assessment and for developing rubrics and standards targeting research writing in specific disciplines - an approach which will be readily adapted for Discovery-Based Learning writing assessment.

5.2 Program Goals Evaluation

While the core component of the *Discovery-Based Learning Initiative* assessment plan is measuring student learning outcomes, our plan also benchmarks program goals. As shown in Table 19, program goals are evaluated primarily with counts and participation rates to provide information about program progress and whether the program is resulting in student participation at the levels expected. In addition, there is one qualitative measure assessing students' understanding of the importance of research to society. The focus groups in which this understanding will be assessed will also be used for gathering ad hoc information about the *Initiative* and its impact.

The primary role of the program goals evaluation is to keep implementation on track, and to further illuminate information gleaned from student learning outcomes assessment. In many cases the participation targets are progressive to account for the cumulative effects of phased implementation and associated momentum. Targets reflect what we hope to achieve; actual participation rates achieved over time will, when compared to our initial targets, provide formative feedback that will guide our annual review of budget allocation, staff allocation, and successful sources of Discovery-Based Learning for students. Programs with lower than expected participation rates may be narrowed in scope or eliminated so that resources can be redirected toward successful programs.

With both program goals evaluation and student learning outcomes assessment, the reporting intervals are typically yearly. This formative reporting will be reviewed by administrators and others who may not be engaged in the day-to-day operation of *Discovery-Based Learning Initiative* activities. The feedback will be used to shape the Office of Undergraduate Discovery Programs' priorities and activities for the subsequent year. After three years, a summative report will provide information on the progress of the *Discovery-Based Learning Initiative* for a wider audience. The QEP Impact Report will be submitted to SACS at the end of five years.



Table 19 Program Goals Evaluation

Goal	Assessment Methods	Implementation
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.	Application and enrollment counts of new students annually. Admission qualification profiles of applicants and new enrollees annually.	Office of Institutional Research and Institutional Effectiveness will extract, analyze, and report from admissions database.
Undergraduate students at UH will participate in some level of research activity by the time they receive their bachelor's degrees.	Annual proportion of graduates who have participated. Number of seniors who have enrolled in a research-intensive course.	Office of Undergraduate Discovery Programs will maintain database of participating students. Office of Institutional Research will provide data on graduates. Office of Undergraduate Discovery Programs will analyze and report.
By the time they graduate, UH students will have a fundamental understanding of research and its importance to society.	Focus groups with seniors who have applied for graduation.	Focus groups will be conducted and analyzed by Office of Undergraduate Discovery Programs.
The number of students participating in a research-related group project will grow.	Annual count of unique students participating in group project.	Office of Undergraduate Discovery Programs will distribute definition of group work that qualifies and will collect lists of participating students from supervising faculty.
A growing proportion of undergraduate research opportunities will be interdisciplinary in nature.	Annual count of interdisciplinary research opportunities	Office of Undergraduate Discovery Programs will inventory all research opportunities and document presence and level of interdisciplinary nature.
The number of students participating in research experiences who are selected for presentation will grow.	Count of students presenting results at local, regional, and national venues.	Office of Undergraduate Discovery Programs to track submissions to the Undergraduate Research Journal, the on-line portal, and the Undergraduate Research Summit, and funded travel fellowships. The Office will also track the undergraduate student publication in peer-reviewed journals, trade journals, and national/regional conferences.
Undergraduate student retention will improve.	Retention rate of students engaging in mentored research experiences. Retention rate of first-time in college students. Retention rate of transfer students.	Office of Undergraduate Discovery Programs to track students who participate in mentored research experiences. Retention data to be provided by Office of Institutional Research and Institutional Effectiveness.
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.	Percentage of first-time in college students who have graduated from UH within 6 years. Percentage of transfer students who came in with 60 or more transfer hours and graduated within four years.	Graduation data to be provided by Office of Institutional Research and Institutional Effectiveness.
External funding for undergraduate research will grow.	Count of number of funding proposals submitted. Count of number of proposals funded.	Office of Undergraduate Discovery Programs will track proposals submitted and funded.

Performance Criteria	Schedule
<p>There will be significant gain in the number of first-time in college applicants representing the top 20% of their high school class and in the proportion of top 20% applicants who choose to enroll.</p> <p>There will be significant gain in the average transfer GPA of transfer applicants, and an increase in the number of transfer students who enroll.</p>	<p>Data to be analyzed and report released by May 31 of each year.</p>
<p>2009-10: 15% of graduates participated 2010-11: 40% of graduates participated 2011-12: 60% of graduates participated 2012-13: 75% of graduates participated</p> <p>Number of seniors who have enrolled in a research-intensive course will increase every year.</p>	<p>Graduation data to be analyzed and report produced by December 31 of each year.</p>
<p>Qualitative analysis will indicate gains each year in depth of understanding of research and its importance to society.</p>	<p>Focus groups to take place during fall semester each year, with report produced by January 31.</p>
<p>2009-10: 300 participants 2010-11: 600 participants 2011-12: 1000 participants 2012-13: 1500 participants</p> <p>Proportion of research opportunities that are interdisciplinary will exceed 35% by AY 2010-11.</p>	<p>Group work definition to be distributed by October 1, 2008. Lists to be collected each semester thereafter.</p> <p>To be reported annually by May 31.</p>
<p>The number of students participating in research experiences who are selected for presentation will grow significantly every year.</p>	<p>To be reported annually by August 31.</p>
<p>FTIC and transfer retention rate will be higher for students who participate in mentored research compared to those who do not.</p> <p>2009-10: FTIC retention to year 2 = 78%; all other years show increase 2010-11: FTIC retention to year 2 = 79%; all other years show increase 2011-12: FTIC retention to year 2 = 80%; all other years show increase 2012-13: FTIC retention to year 2 = 81%; all other years show increase</p> <p>2009-10: transfer retention to year 2 = 70% 2010-11: transfer retention to year 2 = 71% 2011-12: transfer retention to year 2 = 72% 2012-13: transfer retention to year 2 = 73%</p>	<p>To be calculated annually during Fall semester and reported by December 31.</p>
<p>FTIC and transfer graduation rate will be higher for students who participate in mentored research compared to those who do not.</p> <p>2009-10: FTIC graduation = 43%; transfer graduation = 65% 2010-11: FTIC graduation = 44%; transfer graduation = 66% 2011-12: FTIC graduation = 45%; transfer graduation = 67% 2012-13: FTIC graduation = 46%; transfer graduation = 68%</p>	<p>To be calculated annually during Fall semester and reported by December 31.</p>
<p>Beginning in 2010-2011, two proposals submitted per year, at least one for federal funding.</p> <p>Two proposals funded by AY 2012-13, at least one from a federal agency.</p>	<p>To be reported annually by August 31.</p>

References

Criteria for accreditation (1998). Decatur: Commission on Colleges of the Southern Association of Colleges and Schools. 56.

Developing & sustaining a research-supportive curriculum: A compendium of successful practices (2007). Washington, D.C.: Council on Undergraduate Research.
Greater expectations: A new vision for learning as a nation goes to college. (2002). Washington, D.C.: Association of American Colleges and Universities.

Hathaway, R.S., Nagda, B.A., & Gregerman, S.R. (2002). The relationship of undergraduate research participation to graduate and professional education pursuit: An empirical study. *Journal of College Student Development*, 43, 614-631.

Information literacy competency standards for higher education. (2007). Retrieved November 15, 2007, from the Association of College and Research Libraries website: <http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.cfm>

Integrating research and education: Diversity through engagement in research. (1996). Retrieved January, 6, 2008, from the University of Michigan's Undergraduate Research website: <http://www.undergraduate.research.umich.edu/raireapp.html>

Joint statement of principles in support of undergraduate research, scholarship, and creative activities. (2005). Council on Undergraduate Research. <http://www.cur.org/summitposition.html>

Reinventing undergraduate education: A blueprint for America's research universities. (1998). The Boyer Commission on Educating Undergraduates in the Research University.

Reinventing undergraduate education: Three years after the Boyer report. (2001). The Boyer Commission on Educating Undergraduates in the Research University.

Reinvigorating the undergraduate experience: Successful models supported by NSF's AIRE/RAIRE program. (2004). Washington, D.C: Council on Undergraduate Research.

Rimer, S. (2003, September 3). A campus fad that's being copied: Internet plagiarism seems on the rise. *New York Times*.

Scriven, M., & Paul, R. (n.d.). *Defining critical thinking.* Retrieved December 1, 2008, from the Critical Thinking Community website: http://www.criticalthinking.org/aboutCT/define_critical_thinking.cfm

Simmonds, P. (2003, June). Plagiarism and cyber-plagiarism: A guide to selected resources on the Web. *College and Research Libraries News*, 64(6).

The economic impact of higher education on Houston: A case study of the University of Houston System. (2006). Institute for Regional Forecasting. <http://www.advancement.uh.edu/impact/download/PDF/EconomicImpactStudy.pdf>

University of Houston Persistence Study. (2005). University of Houston Office of Institutional Research.

<http://www.uh.edu/ir/fileadmin/reports/special/PersistenceDescriptivesReport.pdf>

University of Houston Undergraduate Writing Assessment. (2006). University of Houston Office of Institutional Research.

<http://www.uh.edu/writecen/Resources/UndergraduateWritingAssessmentSpr06.pdf>

Writing: A ticket to work...or a ticket out. A survey of business leaders (2004). A Report of the National Commission on Writing for America's Families, Schools, and Colleges. College Entrance Examination Board.

http://www.writingcommission.org/prod_downloads/writingcom/writing-ticket-to-work.pdf

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UH Community Involvement

Appendix A

Committee Memberships

QEP Topic Selection Committee

College/Unit	Member	Position
College of Business	Frank Kelley	Director of Undergraduate Programs
College of Education	Jacqueline Hawkins	Associate Professor, Associate Dean of Institutional Effectiveness and Outreach
College of Engineering	Stuart Long	Professor of Electrical Engineering, Associate Dean, Engineering and Honors College
College of Liberal Arts and Social Sciences	Sarah Fishman	Professor of History, Associate Dean
College of Liberal Arts and Social Sciences	Dudley Reynolds	Associate Professor of English
College of Natural Sciences and Mathematics	Simon Bott	Associate Professor of Chemistry, Director of Undergraduate Affairs
College of Natural Sciences and Mathematics	Larry Williams	Instructional Associate Professor of Biology, Immediate Past Chair of Undergraduate Council
College of Pharmacy	Julie Szilagyi	Associate Professor of Pharmacy, Director of Assessment
College of Technology	Enrique Barbieri	Professor and Chair, Department of Engineering Technology
Honors College	Ted Estess	Dean, Honors College
Faculty Senate	Steven Craig	Past President, Professor of Economics
Staff Council	Charles Henry	Immediate Past President, Staff Council
Student Government Association	Francisco Zelaya	Immediate Past President, Student Government Association
Committee Chair	Elaine Charlson	Exec. Associate Vice President, Academic & Faculty Affairs
Ex Officio Members	Jerry Strickland Edward Hugetz Brian McKinney Agnes DeFranco Chris Stanich Libby Barlow	Assistant VC, Liaison and Dir, SACS Reaffirmation of Accreditation Associate VC/VP, Planning/University Outreach Assistant VC/VP, Academic Program Management Assistant VP, Undergraduate Studies Executive Director, Plan/Spc Asst, Government Relations Executive Director, Academic and Institutional Information

QEP Planning Committee

College/Unit	Member	Position
College of Business	Wynne Chin	Professor of Decision & Information Sciences, President Elect, Faculty Senate
	Elizabeth Anderson Fletcher	Associate Dean, Associate Professor, Bauer College of Business (alternate)
College of Education	Jacqueline Hawkins	Associate Professor of EPSY, Department Chair
College of Engineering/Honors/ Research Council	Stuart Long	Professor of Electrical Engineering, Associate Dean
College of Engineering	Hanadi Rifai	Associate Professor, Environmental Engineering
College of Liberal Arts and Social Sciences/Undergraduate Council	Sarah Fishman	Professor of History, Associate Dean
College of Liberal Arts and Social Sciences	Nestor Rodriguez	Professor of Sociology, Department Chair
College of Natural Sciences and Mathematics	Arnold Eskin	Professor of Biology & Biochemistry
	Jeff Morgan	Professor of Mathematics and Department Chair
	Donna Stokes	Associate Professor of Physics
College of Technology	William Fitzgibbon	Dean of College of Technology, Professor of Mathematics
	Heidar Malki	Associate Dean, Professor, College of Technology (alternate)
Faculty Senate	Joe Kotarba	Professor of Sociology, President, Faculty Senate
	David Mazella	Associate Professor of English, Education Policy & Student Affairs Chair, Faculty Senate
Student Government Association	David Rosen Judah Johns	President, Student Government Association Regent Liaison, Student Government Association (alternate)
Division of Research	Don Birx	Vice President of Research, VC Research and Intellectual Property Management
Administration & Finance	Jim McShan	Associate Vice President for Finance
	Thomas Ehardt	Director, Budget Administration and Analysis (alternate)
Committee Chair	Elaine Charlson	Exec. Associate Vice President, Academic & Faculty Affairs
Ex Officio Members	Jerry Strickland Edward Hugetz Brian McKinney Agnes DeFranco Chris Stanich Libby Barlow Karen Weber Veronique Tran	Assistant VC, Liaison and Dir, SACS Reaffirmation of Accreditation Associate VC/VP, Planning/University Outreach Assistant VC/VP, Academic Program Management Assistant VP, Undergraduate Studies Executive Director, Plan/Spc Asst, Government Relations Executive Director, Academic and Institutional Information Program Manager, Office of Undergraduate Research Director, SACS QEP

QEP Planning Subcommittee Members

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 Heidar Malki, Associate Dean, Professor of Electrical Technology
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 Hanadi Rifai (Chair), Professor of Civil Engineering
 Veronique Tran, Director SACS QEP

#2: Mentored Research

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 Stuart Long, Associate Dean, College of Engineering and the Honors College
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#3: Workshops and Resources for Students and Faculty

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 Irene Ke, Assistant Librarian, Library
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#4: Other Co-Curricular Activities

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#5: Assessment Planning

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Appendix B

QEP Topic Selection Process

In September 2006, Dr. Elaine Charlson, executive associate vice president for academic and faculty affairs, chaired a committee whose charge was to recommend a topic for the University's QEP to the SACS Leadership Team and the University's executive administration. The committee represented a broad cross-section of the campus community, including deans, department chairs, faculty, the Faculty Senate president, college administrators, program directors, a Staff Council representative, the Student Government president, and other university administrators. The committee undertook building consensus for and recommending topics to the SACS Leadership Team that:

- Supported the UH System Strategic Principles;
- Addressed an area of significant, demonstrable need related to student learning at UH;
- Was measurable in terms of student learning outcomes;
- Represented a course of action that was achievable within the resources of the University;
- Had the support of key constituency groups (faculty, students, staff); and
- Was selected after broad institutional participation.

The committee developed a list of topics through discussions with colleges, the Faculty Senate, other academic committees, and student groups. Overall, the University community responded enthusiastically to the request for ideas and participation, and major campus groups devoted a significant amount of time to determining a topic. The Faculty Senate's annual fall retreat was organized around a discussion of the QEP topic, as was the deans' retreat in January. QEP topic selection was also discussed at meetings of the Councils of Chairs and Associate Deans.

Using the SACS guidelines as a framework, the QEP Topic Selection Committee reviewed the list of potential topics and explored their feasibility and applicability. The Committee identified three topics with the potential to meet the QEP criteria for UH: ***undergraduate research, mentoring, and writing in the disciplines***. Concept papers were developed for each of the three topics and presented to the University community for comment. Faculty, staff, and students were given access to an online survey through which they could review the concept papers and submit feedback. Three hundred sixty-nine responses were submitted. In addition, Committee members were charged with presenting and discussing the three proposals with governance bodies on campus, including the Faculty Senate, the Undergraduate Council, the Research Council, and the Graduate and Professional Studies Council, the Dean's Council, the Council of Chairs, the Student Government Association, and the University's colleges and departments.

Based on the feedback from the broad University community, the Committee recommended that the University pursue ***undergraduate research*** as its QEP topic, and that mentoring and writing in the disciplines be addressed within the context of undergraduate research. In January 2007, the university's SACS Leadership Team accepted the Committee's recommendation and began the development, implementation, and assessment of the QEP.

Appendix C

QEP Planning Process

In June 2007, Provost Donald J. Foss appointed a diverse group to the QEP Undergraduate Research Planning Committee. Members included deans and associate deans, department chairs, the Faculty Senate president, the Student Government president, faculty, program directors, and other University administrators. The committee was chaired by Dr. Elaine Charlson and charged with developing a QEP focused on undergraduate research that incorporated elements of writing and mentoring. Several subcommittees were formed to advance the process.

An initial subcommittee proposed an approach to the plan. Recognizing that UH students are part of an increasingly tech-savvy, media-fluent generation, the subcommittee quickly realized that the QEP should appeal to students' real world interests in order to attract students to the University, retain them, and engage them in a culture of research. The subcommittee also realized the need to draw upon the extensive learning and technological resources at UH to attract the interest of students unfamiliar with the diligent process of high-level research. Considering the pragmatic outlook of UH students, the subcommittee recommended a plan that would emphasize how research-related skills training and an undergraduate research experience provide our students a competitive edge in today's job market. The QEP's valuable and useful focus would be a central component of UH's marketing strategy in order to attract and retain motivated and qualified students.

A second subcommittee recommended a definition of research that would encompass the diversity of scholarly endeavors at UH (Section 2.4). The subcommittee also developed preliminary goals and measurable student learning outcomes (Section 2.5). One of the distinguishing features of outstanding universities is the high priority given to integrating meaningful research in their curriculums. Upon entering college, many students are unlikely to possess the requisite skills and knowledge to actively participate in research projects of any kind. Therefore, the subcommittee recommended a QEP that will include providing students with research-related skills training at all levels. Elements indispensable for life-long learning: substantive inquiry, critical thinking, information literacy, teamwork, and communication, would be the pedagogical foundation for the QEP.

A third subcommittee reviewed the framework of the QEP and recommended strategies to ensure that transfer students and distance education students will benefit from the enhancement programs. The subcommittee recommended that resources be made available online so that students can readily access them remotely. Transfer students who complete their Core Curriculum elsewhere should have access to online tutorials and open workshops that provide research-related skills training. Tutorial modules could also be incorporated into WebCT course sites. Efforts should be made to integrate research-based pedagogy in major and upper level courses in which transfer students and distance education students are most likely to enroll.

Finally, four content-specific subcommittees reviewed best practices and data from various constituents to recommend central programs and services and new grant programs. Their work will be further elaborated below.

Gathering Ideas from the UH Community

The QEP Planning Committee included a broad cross-section of the University community in developing the plan. During the data gathering phase, numerous constituencies were called upon to share their ideas on how to integrate research into the undergraduate experience.

Involvement of Faculty and Staff in the Colleges

In order to affect student learning across a broad population of students, the QEP Planning Committee solicited preliminary plans for activities at four levels: core, intermediate, advanced, and co-curricular. This multi-tiered approach was used to accommodate students, including transfer students, at different levels of interest in and aptitude for research. Thus, the colleges were invited to submit ideas and preliminary plans for activities in these categories:

- **Core** - Basic research activities would be incorporated into courses in the Core curriculum, providing students with a fundamental understanding of and appreciation for the research process and promote research awareness.
- **Intermediate** - Mid level courses in a student's major incorporating assignments that reinforce research-related skills such as research assignments resulting in the submission of a research paper or delivery of an oral presentation.
- **Advanced** - Upper level courses including faculty-mentored research projects, team projects, capstone courses, senior honors theses, etc.
- **Co-curricular** - Initiatives that complement curriculum-based training and may include programs such as research days, speaker series, seminars and internships that would enhance student interest in and appreciation for research and scholarship.

Colleges were asked to review their existing research-related activities and develop preliminary plans to integrate research into their programs. To solicit preliminary plans, some colleges distributed the guidelines directly to all faculty members in their colleges, while others employed a more formal process to collect ideas. Many of the colleges, including Business, Technology, Natural Science & Mathematics, Engineering, Education, Hotel & Restaurant Management, and the Honors College, held planning meetings which included groups of interested faculty, administrators, and staff. The College of Liberal Arts and Social Sciences (CLASS) hosted three forums for faculty and staff to share their existing undergraduate research activities and brainstorm new ways to integrate research into the undergraduate experience. A CLASS QEP blog was developed for faculty and staff to share ideas and best practices (<http://classqep.wordpress.com/>).

Over 145 preliminary plans were submitted from the colleges. In addition to these planning efforts, meetings and brainstorming sessions were hosted for staff of the Libraries, Writing and Communication Skills Center, and Educational Technology & University Outreach, resulting in a compilation of resources and services that will facilitate implementation of the QEP.

Involvement of Students

Student forums were hosted with the assistance of associate deans in each of the colleges. The forums were advertised broadly through student listservs and flyers, and were moderated by Dr. Veronique Tran, director, SACS QEP. Sixteen forums were conducted across campus with at least one forum hosted in each of the undergraduate degree granting colleges. Three of the forums were conducted in junior and senior-level courses by invitation of the course instructor. At each forum, students brainstormed ideas in these general categories:

- how to incorporate active learning into courses
- resources needed for effective research
- events/programs to excite students about research
- ways to expose freshmen/sophomores to research

Feedback and ideas contributed by the students were shared with college administrators and the QEP Planning Committee.

The student newspaper, *The Daily Cougar*, covered the forum held for the School of Theatre & Dance students. The paper further encouraged students to submit ideas via online survey (<http://media.www.thedailycougar.com/media/storage/paper1206/news/2007/10/31/News/Student.Forum.To.Enhance.Programs-3068362.shtml>).

Involvement of the Broader Campus Community

The broader campus community was invited to submit ideas via an announcement, "Call for Ideas: Integration of Research into the Undergraduate Experience," sent to faculty, staff, and student listservs by Dr. Elaine Charlson. The announcement was linked to an online survey. An article in the faculty and staff newspaper, *UH Today News*, also outlined the QEP Planning process and encouraged submission of ideas via the online survey (http://www.uh.edu/uhtoday/2007/09sept/091307qep_sacs.html).

Members of the University QEP Committee presented information to groups on campus and encouraged their members to submit ideas online. These included the Faculty Senate Executive Committee, Staff Council Executive Committee, the Student Government Association, the vice president for student affairs and his executive staff, the dean of graduate & professional studies, the vice president for research, the Deans' Council, the Council of Chairs, and the Undergraduate Council.

Subcommittee Review of Ideas

Four subcommittees were formed to review sorted data from the QEP preliminary plans, student forums, online survey, and best practices.

- #1: Course-Based Research
- #2: Mentored Research
- #3: Resources and Workshops for Students and Faculty
- #4: Other Co-curricular Activities

Each subcommittee reviewed the data relevant to its category to develop guidelines for new grant programs or centrally administered programs. These guidelines and recommendations were shared and discussed among QEP Planning Committee members to determine the elements of the University's QEP as described in Section 3.

University Community Review and Support of the QEP

A draft of the QEP was posted online from December 20, 2007 to January 18, 2008 for public comment by faculty, staff, students, and alumni.

The QEP was also presented to the University's leadership, including the president and the Board of Regents.

In March 2008, the campus community will learn about the components of the *Discovery-Based Learning Initiative* through the commencement of a broad awareness campaign that includes news articles, electronic announcements, online posting of the QEP report, and other activities.

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