TAKING RESPONSIBILITY
for the Quality of the Baccalaureate Degree

A Report from the Greater Expectations Project on Accreditation and Assessment

Association of American Colleges and Universities
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Participants in the Project on Accreditation and Assessment

**Regional Accreditors**
Stephanie Bangert, associate director, Accrediting Commission for Senior Colleges and Universities, Western Association of Schools and Colleges
John O. Dwyer, associate executive director, Commission on Colleges, Southern Association of Colleges and Schools
Sandra Elman, executive director, Northwest Commission on Colleges and Universities
John H. Erickson, deputy executive director, Commission on Higher Education, Middle States Association of Colleges and Schools
Robert C. Froh, associate director for assessment, Commission on Institutions of Higher Education, New England Association of Schools and Colleges
Cecilia L. López, associate director, The Higher Learning Commission, North Central Association of Colleges and Schools (now vice president of academic affairs, Harold Washington College)

**Specialized Accreditors**
Kathryn Aberle, associate executive director, Accreditation Board for Engineering and Technology, Inc.
Milton R. Blood, managing director, accreditation services, The Association to Advance Collegiate Schools of Business
Margaret Jackman, associate director, Commission on Collegiate Nursing Education
Antoinette Mitchell, associate vice president for accreditation, National Council for Accreditation of Teacher Education

**National Accrreditors**
George Lucas, executive director, American Academy for Liberal Education; professor of philosophy and associate chair, Department of Leadership, Ethics & Law, United States Naval Academy

**Higher Education Associations**
Barbara Cambridge, vice president of fields of inquiry and action, American Association for Higher Education
William Craft, representative, American Conference of Academic Deans; vice president for academic affairs and dean of the College, Luther College
Judith Eaton, president, Council for Higher Education Accreditation
Joan Fiscella, past president, Association for Integrative Studies; associate professor and bibliographer for professional studies, University of Illinois at Chicago Library
Fred Janzow, executive director, Council for Administration of General and Liberal Studies; dean, School of University Studies, Southeast Missouri State University
B. Thomas Lowe, executive director, Association for General and Liberal Studies; associate provost and dean of University College, professor of natural resources and environmental management, Ball State University
Mary Beth Nowinski, technical assistance coordinator, American Association of Colleges for Teacher Education
Joan Stanley, director of education policy, American Association of Colleges of Nursing

**Association of American Colleges and Universities**
Jerry G. Gaff, senior scholar
John P. Nichols (Chair), senior fellow; NEH distinguished teaching professor, St. Joseph’s College
Carol Geary Schneider, president
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DEAR COLLEAGUE:

I recommend this project report, *Taking Responsibility for the Quality of the Baccalaureate Degree*, for three reasons:

- It reaffirms the commitment of regional and specialized accreditation to assuring quality in liberal education.
- It explains the important connection between liberal education and the value of the degree.
- It urges further attention to student achievement in liberal education on the part of faculty, academic administrators, and accreditors.

While commitment to liberal education has long been an important aspect of the work of accreditation, the Project on Accreditation and Assessment (PAA) provided an opportunity for additional reflection on and reaffirmation of this key area. The result is a clear message of commitment from the regional and specialized accreditors involved that, indeed, their expectations about the quality of liberal education should and do influence the ongoing work of institutions and programs.

The work that included the Association of American Colleges and Universities and the accreditors of degree-granting higher education institutions and programs is in many ways an affirmation of the college degree’s value and its centrality in our vision of an educated student. Indeed, the project complements the Council for Higher Education Accreditation (CHEA) statement, adopted in May 2001, on the value of the degree. In this statement, CHEA indicates that the degree is important because it assures that students

- develop and deepen the capacity to think;
- obtain knowledge on which preparation for the future depends;
- acquire a fuller understanding of cultures;
- strengthen the foundation for informed citizenship, participation in community life, and public leadership;
- sustain vocational and career goals.

Evidence of student achievement as a key consideration in assuring quality is a subject of major importance to higher education institutions and to the accrediting community. There have been many initiatives underway for a number of years. The PAA adds its important support and assistance to those engaged in obtaining such evidence with a particular emphasis on liberal learning.

Judith S. Eaton

President, Council for Higher Education Accreditation
This monograph is a report of the Project on Accreditation and Assessment (PAA), created by the Association of American Colleges and Universities (AAC&U) in 2000. PAA assembled a group of professionals from accreditation agencies, leaders from an array of educational associations, and faculty members and academic administrators from colleges and universities for the purpose of distilling principles of educational excellence. These principles are a basis both for assessing baccalaureate degree learning and for accrediting institutions and programs.

The Project on Accreditation and Assessment was one arm of AAC&U’s Greater Expectations initiative, a family of projects that articulate and promote a powerful, contemporary vision for collegiate education in an era when the great majority of high school graduates continue their studies in postsecondary education. PAA participants were asked to advise the initiative’s national panel as it formulated its report, Greater Expectations: A New Vision for Learning as a Nation Goes to College (AAC&U 2002).

While the Greater Expectations report focuses largely on the aims of college study, this report from PAA highlights two aspects of higher education accountability: (1) effectively assessing student achievement of those important college aims and (2) accrediting institutions and professional programs.

The two pillars of the accountability function of higher education, assessment and accreditation, are often viewed as peripheral by academics, especially faculty members. Both are seen largely as administrative rather than academic functions and as something done to the faculty rather than by the faculty. They take time and threaten the loss of autonomy.

However, as the PAA conversations deepened, it became apparent that assessment and accreditation, like college professors themselves, are focusing with new intensity on student learning. Assessment experts and accrediting bodies are taking steps to assist faculty members in their efforts to educate their students well. Recent developments in both assessment and accreditation are designed to support faculty as they struggle to educate an increasingly diverse student body.

The regional (institutional) accrediting agencies used to have a set of standards that were thought to be indicative of quality, and visiting teams sought information about
compliance with these standards. The size of the library, the qualifications of the faculty, and the resources of the institution, for example, while important, are now regarded as secondary to actual evidence of student learning. The pervasive trend is for regional accreditors to require that institutions clearly state their goals for student learning, provide educational programs that intentionally cultivate those desired qualities, and document student learning. The focus has shifted from inputs or resources to outcomes, and new procedures allow great latitude in the evidence that academics must provide.

Specialized accreditors of professional programs also emphasize student learning goals and their assessment. But more significantly, they are developing a new vision to overcome one of the oldest and most prevalent fissures in the academy, namely the tension between liberal and professional education. In this project, leaders from the agencies accrediting professional programs were unanimous in declaring that a liberal education is not impractical or an unnecessary luxury; rather, it is essential to professional success in their fields, whether business, education, engineering, or nursing. Further, each of the agencies has clear and high standards for liberal education as well as for the professional part of their programs. In contrast to the usual practice of allowing the arts and sciences faculty to be responsible for the liberal education and the faculty of the professional schools to be responsible for the specialized programs—two largely independent bodies with little common planning—the PAA group concluded that a high quality program should integrate liberal and professional education. If implemented, this recommendation could lay the foundation for more collaboration among faculty members in the liberal arts and sciences and the professions and for innovations for mutual benefit, especially for the benefit of students.

Assessment, too, is becoming more supportive of the interests of faculty members. When the “assessment movement” was getting started in the 1980s, it was fixated on a few easily measured foundational outcomes, such as quantitative reasoning and writing. Too often, it has been stuck there. Faculty typically were committed to cultivating higher-level learning among their students, such as critical and creative thinking and problem solving, but these complex qualities seemed not to be captured by the available tests. Further, assessment seemed to require additional time and extra measures, not the in-class steps professors already were using. It followed a paradigm of experimental social science that did not enjoy a widespread following and seemed to be the responsibility of a new group of expert assessors. This report, in contrast, presents examples of assessment of higher-level abilities, approaches that differ from experimental social science, and practices that embed assessment in classroom activities.

These ideas are not just idle thoughts. Many accrediting agencies made changes in their standards and procedures during the time PAA was convened, and even before. PAA
provided an opportunity for new ideas about accreditation to percolate among accreditation leaders and assisted them in revising their standards and procedures to more effectively support student learning.

The significance of the collective PAA work on assessment and accreditation at the college level results from the unusual mix of organizations represented in the project:

- Six major regional (institutional) accrediting agencies
- Four specialized (professional program) accreditors in business, engineering, nursing, and teaching
- A national accrediting agency for liberal education
- A number of educational associations involved in liberal learning, the undergraduate curriculum, and policy
- Faculty members and academic administrators at a variety of colleges and universities

Despite their similar interests, these diverse groups have seldom joined together to address educational goals, curriculum, teaching, learning, and assessment; their assembly through PAA can be considered a significant milestone. The group readily found substantial common ground on what constitutes quality in undergraduate education and on how quality can be cultivated and assessed.

PAA's work has no official standing in accreditation processes, which would require formal endorsement by each agency's membership. Nonetheless, the participation of senior members of the agencies' staffs, the prestige of the organizations involved, the high degree of agreement reached to improve assessment and accreditation, and the revision of practices in the accreditation of institutions and professional programs assure that this work will have enduring impact. In the most general terms, the impact will be on emphasizing student learning and insisting on evidence of achievement in the process of accrediting institutions and programs. In this regard, PAA's work reinforces the fundamental recommendation of the Greater Expectations initiative and furthers the national effort to change the prevailing paradigm from teaching to learning. Recent changes in accreditation are designed to support campus innovations such as more engaging and coherent general education programs, learning communities, and active, experiential, and technology-enhanced approaches to teaching and learning, all of which have been shown by research to be more effective than traditional practices.

John Nichols, AAC&U senior fellow and NEH distinguished teaching professor at St. Joseph's College (IN), conceived of PAA, recruited participants, provided valuable leadership throughout its two years of work, and wrote the original draft of this report. AAC&U gratefully acknowledges his contributions and appreciates his leadership of
the project. AAC&U also gratefully acknowledges generous support for Greater Expectations, including PAA, from The Pew Charitable Trusts, Carnegie Corporation of New York, and Fund for the Improvement of Postsecondary Education of the U.S. Department of Education.

Writing this report, like PAA itself, was a genuinely collaborative activity. During its several meetings, the group focused on different aspects of a five-point model: understanding institutional or program mission; establishing desired student learning outcomes; designing curricular practices to intentionally foster those outcomes; using curricular, teaching, and learning approaches to achieve the outcomes; and assessing students to provide evidence of learning. Background materials relevant to each topic, often from the organizations involved, were assembled, and members of the group led discussions designed to elicit broad areas of agreement. The conversations became progressive and cumulative.

Various individuals drafted portions of the text and suggested examples of effective assessment practice. Nichols prepared a first draft of the document, which was then distributed to others for critique and revised. The advanced draft then was edited by Nancy O’Neill, program associate in AAC&U’s Office of Education and Quality Initiatives. This interim report was posted on the AAC&U Web site.

This published report, *Taking Responsibility for the Quality of the Baccalaureate Degree*, was prepared by Andrea Leskes, Robert Shoenberg, Jerry Gaff, and David Tritelli as well as John Nichols.

This final publication is a better document than could have been produced by any single person. It represents more insight and wisdom than the sum of its parts. The PAA participants hope it will provide guidance to academics about how assessment and accreditation can contribute to a high-quality education for students.
Everyone agrees that students should be provided with a high-quality education. The consensus often founders, however, on the precise definition of quality. Until recently, within the accreditation community, quality has been defined with reference to talented students, well-prepared faculty, strong finances to support salaries for the faculty and staff, the size of the library holdings, efficient operations, or the presence of sophisticated technology. Each of these factors—and others—can certainly affect the quality of the education students receive.

But, increasingly, the higher education community as a whole is coming to view the achievement by students of desirable learning outcomes as the key indicator of quality. Evidence of this shift can be seen in scholarly publications about the “learning institution” (Senge 1990) and a change in the predominant paradigm “from teaching to learning” (Barr and Tagg 1995). Evidence also can be found in the hundreds of institutions now seeking to become “learning centered.” And it is also found in accrediting bodies—both regional, which accredit whole institutions, and specialized, which accredit specific programs—that now require collective agreement about the aims of education, the incorporation of demonstrated good practice in curriculum and instruction, and assessment of student learning. Though accreditors have by no means abandoned older measures of fitness, they have steadily increased the pressure on institutions and programs to develop credible strategies for demonstrating the quality of the learning their students master. Their new emphasis requires colleges, universities, and departments to become more focused on effective student learning.

Of course, to say simply that colleges and universities should focus on learning invites more questions—and more controversy. For example, when a student tells someone s/he is going to college, one of the first questions s/he is likely to get is, what will be your major? It is as if learning about a subject in depth is the only important element in a college education, even though for most students the major constitutes fewer than half of the courses taken for the degree. Faculty, too, tend to hold their own disciplines as more important than others and often view themselves primarily as economists, physicists, and historians, for example, rather than as “college professors” or as “members of the faculty at X university.”
Judith Eaton (2000), president of the Council for Higher Education Accreditation, the accreditation coordinating body, articulates a contrasting view. She cites several core academic values, the most relevant of which here is the distinction between a credential and a baccalaureate degree. While a credential provides evidence of a specialized education that may lead directly to a job, a degree offers evidence of much more. Unlike a credential, a degree indicates that specialized or professional study has been supplemented and enhanced by a liberal education. It indicates an emphasis on broader knowledge, more sophisticated intellectual skills, and the capacity for lifelong learning. A baccalaureate degree represents both a broad liberal education and specialized learning; both are essential for a high-quality education.

In order to develop principles of good practice for the design of curricula, for the use of effective approaches to teaching and learning, and for the assessment of learning, PAA had to posit a set of desirable learning outcomes. As other groups already were focusing on the aims of baccalaureate education, it was not necessary for PAA to decide on the best or most complete list. But it did need to identify a reasonably clear set of goals in order to develop principles to cultivate and assess them. Thus, PAA developed a process for reaching agreement that essentially models the way institutions and programs also can forge agreement about important learning outcomes. That is, PAA collected information from diverse sources; read, discussed, and devised a provisional list of outcomes; critiqued its own work; and persisted in this iterative process until general agreement was reached.

Indeed, the group discovered that widespread agreement about the desired outcomes of a college education already exists. Strikingly similar views of desirable student learning outcomes emerge from the standards developed by specialized accreditors in business, engineering, and nursing as well as by regional accreditors in the western and middle states; from various scholarly analyses; and from the expectations of corporations that hire college graduates (see chart on p.20–21). Given the extensive overlap among such diverse groups, it was relatively easy for the PAA group to agree on some valuable outcomes. (The PAA list is included at the bottom of the chart.)

It is noteworthy that representatives from the four specialized accrediting agencies in PAA—business, education, engineering, and nursing—are unanimous in declaring that a strong liberal education is essential to success in each of their professions. Whereas some in the general public may see liberal education as impractical, as an unnecessary luxury, or as unrelated to their intended career, these leaders see it as a central aspect of educational quality in their fields. Further, their agencies have established standards and procedures that place a high priority on liberal education in the accreditation of these specialized programs. Recent changes in accreditation policies and procedures—
Chapter 1: Quality Defined by Student Learning Outcomes

nursing in 1998, engineering in 2000, and business in 2002—have reaffirmed the central role of liberal education in professional preparation. However, this message has been slow in reaching the students and faculty members who persist in prizing specialized over general education.

The Accreditation Board for Engineering and Technology (ABET), for example, has established eleven expected learning outcomes for engineering and technology graduates. Seven of these are not specific to engineering or technology:

- The ability to communicate effectively
- The ability to design and conduct scientific experiments and to analyze and interpret data
- Knowledge of contemporary issues
- Understanding of professional and ethical responsibility
- The ability to function on multidisciplinary teams
- The broad education necessary to understand the impact of engineering solutions in a global context
- Recognition of the need for, and the ability to engage in, lifelong learning

Further, the PAA group asserted that the professional faculty should take responsibility for the entirety of the baccalaureate education of their students. Too often, the professional faculty simply turn the liberal education portion over to the faculty in the liberal arts and sciences disciplines, who have little understanding or appreciation of the demands on future engineers, for example, and little agreement about specific educational attainments desired. The PAA group called for greater collaboration between faculty members in the arts and sciences and those in professional fields; it called for closer monitoring by the professional faculty to ensure that their students are acquiring the desired liberal education attributes.

Realizing that ABET visiting team members were unaccustomed to these new standards and to accrediting the liberal education portion of engineering and technology programs, ABET provided training to site visit team members as it phased in its new expectations. It also offers continuing technical assistance to campus leaders so they can prepare self-studies that address current standards.

Similar steps have been taken by other specialized accreditors beyond the PAA group. Pharmacists, for example, are increasingly seen as important healthcare providers who help their clients make important health decisions. In this context, students preparing to become pharmacists must learn to think critically, communicate effectively, evaluate ethical issues, develop people skills, and acquire the means for continuous learning—as well as learn specific technical knowledge about chemical compounds and their impact on the human body (Zlatic 2000).
Likewise, regional accreditors now require assessment of desired student outcomes as central to their processes. Even prior to their involvement in PAA, representatives from regional accreditation bodies had been involved in conversations about how to “add value” to institutions through their processes, to make their work more transparent to the public, and to provide more useful information to the institutions and the public. During the time that PAA existed, the world of regional accreditation was in ferment, with some agencies having just changed their procedures (the Western Association) and others completing changes during these conversations (the North Central Association, the Middle States Association, and the Southern Association). Each of these changes specifies a set of learning goals to be assessed as part of the accreditation process.

For example, the Middle States Association of Colleges and Schools adopted new standards that draw from the conversations conducted in PAA and include a number of the important goals of baccalaureate education:

- Oral and written communication
- Critical analysis and reasoning
- Scientific and quantitative reasoning
- Information literacy
- Technological competency
- Commitment to ethical, intellectual, social, and where appropriate, religious values
- Expanded cultural and global awareness and sensitivity
- Pursuit of lifelong learning

Leaders of institutions and programs must understand these fundamental changes in accreditation. They slight the specification and assessment of expected outcomes at their peril.
Establishing Learning Outcomes at Institutions

While common aspirations for college and university students exist, it is important that institutions and programs periodically undergo a process of reviewing their desired learning outcomes, taking ownership of them, and assuring that they guide practice in the curriculum, instruction, and assessment. Of course, the mission, history, and character of an institution may modify the common outcomes or add others. Often a college or university seeks to create a distinctive or signature program, either a general education program that epitomizes some aspect of its values and traditions or a major that is not widely available. For example, some liberal arts colleges adopt a theme for their general education programs, such as the “individual and community” or “the practical value of the liberal arts” and incorporate learning goals and educational practices that specifically address the theme. Similarly, some state universities seek to capitalize on their location in urban areas by expecting their students to engage in community research, problem-based learning, and community service. A Catholic university in the Franciscan tradition emphasizes service learning as a central part of the education it provides. A university in California emphasizes the importance of learning about cultures on the Pacific rim, which have a significant impact on its region. And a Historically Black University offers a two-semester freshman seminar in which the first part focuses on fundamental issues facing all people, such as the meaning of freedom and community, while the second focuses on the African-American experience in America.

There are, of course, variations among institutions: variation in whether or not an institution generates educational aspirations from its mission; in the balance between general and specialized education; and in the exact definition of the desired outcomes, their articulation and, most importantly, how the program’s design helps students reach the outcomes.

The collegial, iterative process of arriving at a list of desired outcomes is an essential step in the operation of undergraduate programs. It involves developing a shared language that speaks to local concerns, clarifying the meaning and implications of the goals, and building ownership of the concepts. Ownership and commitment are the bases for converting the statement of learning outcomes into educational reality. Without ownership and commitment, implementation becomes difficult and haphazard. A purposeful educational program starts at the endpoint, with the desired characteristics of an institution’s graduates, and asks the faculty to reason backwards from outcomes to the implementation of an intentionally designed curriculum to cultivate the desired qualities. In such a purposeful program, faculty members are expected to employ teaching practices that advance the desired learning outcomes; to assess how well the curriculum and instruction succeed; and then to make adjustments for still greater success.
The PAA group adopted this simple process model of expected outcomes, curriculum design, appropriate instructional approaches, and assessment to guide its thinking. The model is used in this report as a way to present PAA’s recommendations. It also can serve as a useful way for a professional school or campus to organize a review or self-study of its own educational programs.
Although establishing student learning goals and assessing their achievement are required for the accreditation of all institutions and programs, wide latitude is given regarding the educational program and the methods of teaching and learning used to reach the goals. But staff members of accrediting bodies are prepared to offer advice to campus leaders about curriculum and instruction. This is the spirit in which the PAA group developed a set of “principles of good practice” in curriculum and instruction. Given the imperative of applying them in particular institutional contexts governed by different missions and somewhat different outcomes, these principles should be considered as guidelines, rather than as directives.

Good Practice in the Curriculum

The principles of good practice in the curriculum developed in this project derive from the best ideas of the past twenty-five years, many of which are expressed in multiple AAC&U publications. They emanate largely from the reflections of practitioners, primarily faculty members and academic administrators from colleges and universities of all types. If the design of the major and general education—the two largest building blocks of the college curriculum—adheres to these principles, campuses will produce purposeful pathways of learning to help students acquire the outcomes set for them.

The Major

Drawing from AAC&U’s work on the major with learned societies and campuses, Carol Schneider (1996; Schneider and Green 1993) identifies five key aspects of a quality curriculum:

1. A set of educational goals that are known to both students and faculty members and that guide the operation of the program. In the 1980s, when AAC&U’s work on the major began, many majors lacked such explicit learning goals—although many more have them today, prompted by specialized accreditors and mandated assessment by regional accreditors and states.
2. An engaging beginning that captures the interest of students and provides insight into the ways scholars in that field think and create knowledge. Too often, the common introductory course provides a survey of most major portions of a discipline, an approach that often fails to excite students intellectually or to illustrate a discipline’s distinctive modes of thought.

3. A middle that is purposeful and leads to cumulative and deeper learning. While some of the more structured disciplines, such as mathematics and the natural sciences, involve sequences, many do not. This is especially the case with the less structured humanities and social sciences. Without a sequence of courses and a progression that builds on prior learning, the middle can consist solely of lower-level courses and produce what Schneider calls a “muddle in the middle.”

4. A culminating experience in which students are expected to integrate their learning and produce a significant piece of intellectual work, such as a research project, a policy paper, an art object, or some similar product that demonstrates their learning. Although many programs now require such a capstone experience, others do not.

5. A major that functions as a “learning community,” an intellectual home for students that gives them support and security as they encounter ideas and perspectives from other disciplines. Many students do not experience a supportive community—whether or not they are studying online or commuting to school.

General Education

As Stephen Jay Gould (1991, 5) notes, “disciplines are exacting. All gain strength, respect, and acceptance by working honorably within their bounds and knowing when transgression upon other realms counts as hubris or folly.” In other words, limits to a field of study or a major are a source of strength. But at the same time, those involved in a major should recognize its “own necessarily partial vision” (AAC&U 1991, 5). Each discipline views human experience from particular perspectives. Therefore, the major alone cannot do the required job of preparing students for high-quality performance in any field of endeavor. The major must be complemented by general education in a robust twenty-first century baccalaureate education.

AAC&U has published many studies that focus on general education and contain principles of good practice (AAC&U 1990, 1994, 2001; Gaff 1999; Schmitz 1992). Drawing from this body of work, PAA distilled the following set of principles.
An effective general education program

- **is purposeful.** It has a clear rationale and explicit educational goals, related to the mission and character of the institution, that are understood and accepted by all constituencies.

- **is coherent.** The various components fit together and mutually reinforce each other rather than producing a fragmented experience for students.

- **is engaging.** Students are invited into an inquiry of subjects that matter to them and stimulate their curiosity to learn and to apply their learning in areas in which they are interested.

- **is rigorous.** Students are challenged and rewarded for learning difficult material and for developing sophisticated skills of analysis, thought, and expression.

- **extends throughout all four years.** If general education is confined to the first two years and consists of disconnected introductions to the disciplines, students will not see the power in general education and they will try simply to get their requirements “out of the way.” Also, they will experience learning at low introductory levels rather than master more advanced content and sophisticated skills.

- **has good leadership from the faculty and administration.** Often this means appointing a coordinator, director, or dean to be responsible for general education, which is typically the largest academic program at an institution. This person, aided by a general education committee and, possibly, by directors of major components such as writing or freshman seminars, can help faculty collaborate to cultivate the learning goals, foster coherence, and assess student achievement.

- **is a corporate responsibility of the faculty.** No matter how general education is defined at an institution, it cannot be accomplished by an individual or even a small group of faculty members. The faculty as a whole must agree on the purpose, structure, and content of general education, aid its implementation, and participate in its assessment.

- **enjoys sufficient resources to achieve its purposes.** The institution supports the faculty in this endeavor by providing sufficient personnel, budget, opportunities for faculty development, and other resources.

These are high standards, and no institution fully realizes them. Nonetheless, these normative statements are valuable because they provide benchmarks that leaders of institutions and programs can use to measure the effectiveness of their programs and to establish higher expectations. Moreover, these standards are beginning to influence the accreditation process. For example, attention is given to the minimum number of credit hours allotted to general education: thirty hours at the Southern Association and the Middle States Association; one-third of the degree at the New England Association; and forty-five hours at the Western Association. More important than the number of hours is the requirement by the Higher Learning Commission of the North Central
Taking Responsibility for the Quality of the Baccalaureate Degree

Association that institutions must document the *centrality* of general education to baccalaureate education. The centrality of general education is to be demonstrated by the inclusion of a substantial general education in all programs, by the assessment of the outcomes of this component, and by the assignment of qualified faculty to teach in general education.

The specialized accreditors make a distinctive contribution to the dialogue about general education by stressing the integration of general and liberal studies in the major. For example, after students are instructed in the basic *core proficiencies* in lower-level courses, it is the departmental faculty’s responsibility to reinforce, apply, and extend the mastery of these proficiencies. Students preparing to be engineers need to continue writing in their engineering projects and discussing how their proposed solutions to technical problems impact political and economic life. Nursing students should continue writing about healthcare situations and deliberating about critical cultural, ethical, and religious issues that arise in their work. It takes an entire collegium to educate an engineer, a nurse, or, indeed, graduates entering any career.

Similarly, *inquiry capacities* need to be developed in the major as well as in the general education program. Through study in depth in the major, a student gains a solid grasp of a discipline and its ways of gathering evidence, testing propositions, and making sense of human experience. Through general education, the same student gains a sufficient grasp of the ways other disciplines work—their kinds of data, evidence, testing of hypotheses and accomplishments—to better deal with the complexities of the twenty-first century.

Professional programs provide students with opportunities to practice applying these proficiencies and capacities. Education majors do student teaching in classrooms under the tutelage of experienced teachers. Business majors solve actual problems or help develop strategic plans for firms. Engineering students conduct simulations and develop plans for specific designs or products. Nursing students work in clinics with real patients as they learn to practice their specialties. Loose distribution models of general education are not the most effective curricular design for enabling this kind of cumulative experience for students.

**Integration of the Major and General Education**

One of the PAA group’s strongest recommendations is that the major and general education should not just coexist; they should be integrated. The pervasive tendency, however, is to separate this content into two strands and to assign primary responsibility for their development to separate curricular domains—responsibility for the major to a department or professional school and for general education to a portion of the faculty
in the liberal arts and sciences. Yet the major and general education must be coordinated in an intentional manner if students are to have a coherent educational experience. The traditional educational division of labor, which pits general education against the major, is not just arbitrary; it contradicts the notion of shared learning outcomes and shared responsibility for meeting them, which is beginning to permeate the standards for professional preparation. It is far more constructive to recognize that both parts of the curriculum are complementary and ought, therefore, to be “owned” by the same faculty members.

This point of view is expressed well by the Middle States Commission on Higher Education in its publication, *Characteristics of Excellence in Higher Education* (2002, 37):

> “General education skills may be taught or developed as part of courses in the major, in separate courses, or through decentralized distribution. However, the skills and knowledge derived from general education and the major should be integrated because general education and study in depth, together, comprise a quality undergraduate education.”

Other accreditation agencies also have begun to acknowledge the importance of integrating general education and the major. The specialized agencies, in particular, are providing leadership for this approach, partly because employers of their graduates are demanding workers who can communicate effectively, understand history and culture as well as science and mathematics, think through and solve unscripted problems, work with diverse people, and make ethical decisions—all staple goals of general education programs. Furthermore, it is impossible for faculty in any discipline to defend the inability of their graduates to perform these tasks. What is needed now is for faculty members in the liberal arts and sciences, who typically teach most general education courses, to learn what is expected of graduates with professional degrees and to work together with their colleagues in professional fields to educate their students.

Although this integrated, holistic approach to the curriculum is influencing accreditation standards and reforming institutional curricula, a balkanized approach to general education still prevails among most faculty members, students, and advisors. It also persists in the general education requirements of many state systems that focus only on the first two years; in “rising junior” testing programs that assume broad learning to have been completed; in general education requirements that have no upper-division component; and in the way numerous institutions present their requirements in catalogs and advising materials. The holistic curricular thinking of the accreditors and visionary academic leaders has yet to permeate the general sensibility of higher education institutions at the faculty and departmental levels; a vision of a self-contained major continues to dominate the undergraduate curriculum.
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<td>Specialized accreditor: Accreditation Board for Engineering &amp; Technology, Inc.</td>
<td>■ ability to communicate effectively</td>
<td>■ ability to design/conduct scientific experiments</td>
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<td>Specialized accreditor: Commission on Collegiate Nursing Education, American Association of Colleges of Nursing</td>
<td>■ communicating effectively in a variety of written and spoken formats</td>
<td>■ thinking critically</td>
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<td>Regional accreditor: Accrediting Commission for Senior Colleges &amp; Universities, Western Association of Schools &amp; Colleges</td>
<td>■ college-level written and oral communication</td>
<td>■ critical analysis and reasoning</td>
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<td>Regional accreditor: Commission on Higher Education, Middle States Association of Colleges and Schools</td>
<td>■ oral and written communication</td>
<td>■ scientific and quantitative reasoning</td>
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<td>Scholarly analysis: Schneider &amp; Shoenberg, Contemporary Understandings</td>
<td>■ writing</td>
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<td>Scholarly analysis: AAC&amp;U, Greater Expectations</td>
<td>■ communicating in diverse settings and groups, using written, oral, and visual means, and in more than one language</td>
<td>■ deriving meaning from experience, as well as gathering information from observation</td>
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<td>Industry: Boeing Corporation</td>
<td>■ good communication skills: written, verbal, graphic, listening</td>
<td>■ ability to think both critically and creatively—independently and cooperatively</td>
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<td>■ speaking/listening</td>
<td>■ qualitative and quantitative reasoning</td>
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<td>Personal development</td>
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<td>group and individual dynamics in organizations</td>
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<td>understanding the impact of engineering solutions in a global and societal context</td>
<td>ability to function on multidisciplinary teams</td>
<td>recognizing the need for, and ability to engage in lifelong learning</td>
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<td>appreciating cultural differences and bridging cultural and linguistic barriers</td>
<td>engaging in effective working relationships</td>
<td>the arts, sciences, and humanities as a forum for the study of values, ethical principles, and the physical world</td>
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<td>appreciating diversity</td>
<td>ability to work with others</td>
<td>cultural and aesthetic breadth</td>
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<td>expanded cultural and global awareness and sensitivity</td>
<td>negotiating difference</td>
<td>knowledge in humanities, arts, sciences and social sciences</td>
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| | intellectual agile
The principles contained in this chapter are similar to the conclusions reached within the Accreditation Board for Engineering and Technology (ABET) during the 1990s. Employers, parents, faculty, and ABET staff were concerned that graduates of the programs were insufficiently equipped to enter their chosen professions. As a result, ABET engaged in a significant reform of the criteria used to evaluate the quality of educational programs in engineering, technology, computing, and applied science. The result was an expectation of an integrated program that went beyond that acquisition of technical knowledge and skills. For ABET, it was clear that we were doing an excellent job of preparing our students to work in the twentieth century, but not in the twenty-first. What distinguishes preparation for the twenty-first century is the ability to make informed decisions in an increasingly complex world. Technological literacy is a crucial element in the achievement of this goal. Technological literacy is not the same as technical competency. Technological literacy is more a capacity to understand the broader technological world in order to make informed decisions as employees, as consumers, and as citizens. For many issues, the technological component cannot be separated from the social, ethical, legal, environmental, and political aspects. A purposeful and thoughtful curriculum that integrates and connects general education and the major can result in graduates who are technologically literate and not just skilled computer users. To foster the development of the “educated person” for the twenty-first century, we must ensure that the curriculum addresses technological literacy for all our students, not just engineering and science majors.

— KATHRYN ABERLE, associate executive director, Accreditation Board for Engineering and Technology, Inc.

In his novel *Howard's End*, E. M. Forster maintains that one should try “to see life steadily and see it whole,” a dictum pertinent to the purposes of baccalaureate education. The major can be thought of as the vehicle through which students learn in a disciplined way to “see life steadily.” A single field of study, with its characteristic modes of investigation and defining epistemology, provides a lens through which one can see the world in fine detail. But while the image is sharp, the view is limited. Disciplines are artificial and necessarily bounded. General education is oriented toward more complete understandings; it develops the intellectual agility to “see life whole,” to understand and work within complex systems and with diverse groups—abilities important for the contemporary world.

A corollary of this recognized mutuality of general education and the major is more careful coordination of the learning activities assigned to each of these curricular elements. Academic departments ought to reflect on how their major requirements reinforce, build on, and take to a higher level the broad intellectual skills introduced in general education. Individual instructors of major courses ought to design their syllabi with knowledge of the intellectual skills being addressed in general education courses and the proficiency level they require. All faculty members ought to assume responsibility for students achieving the desired learning outcomes. If the baccalaureate program is truly to graduate students who demonstrate high-level intellectual and practical capacities, the faculty as a whole must challenge students with progressively more sophisticated tasks. Faculty members cannot teach in isolation; they must work within an integrated, comprehensive framework.

— ROBERT SHOENBERG, senior fellow, AAC&U
**Good Instructional Practice**

The PAA group did not attempt to distill new principles for instructional practice, because the recent literature already contains well-developed principles of good practice. Instead, it decided to appropriate existing knowledge.

Chickering and Gamson (1991, 63) assembled a group of educational researchers for a retreat to identify the most important conclusions about effective teaching and learning that had been generated through empirical research. They distilled from existing research seven principles that frame good practice in undergraduate education.

Effective instruction

- encourages contact between students and faculty;
- develops reciprocity and cooperation among students;
- encourages active learning;
- provides prompt feedback;
- emphasizes time on task;
- communicates high expectations;
- respects diverse talents and ways of learning.

According to a more recent summary of the research literature compiled by Jones and Ewell (1993) and cited by Gaff and Ratcliff (1996), effective instruction

- creates high expectations for student learning;
- provides coherent, progressive learning;
- creates synthesizing experiences;
- integrates education and experience;
- creates active learning experiences;
- requires ongoing practice of skills;
- assesses learning and gives prompt feedback;
- enables collaborative learning experiences;
- provides considerable time-on-task;
- respects diverse talents and ways of knowing;
- increases informal contact with students;
- gives special attention to the early years.

Not surprisingly, the traditional classroom lecture has been found wanting in study after study. While it may successfully transmit factual information, the lecture has been shown to result in a relatively low level of learning. Despite the persistence of the lecture, academics have developed a host of newer active, collaborative, experiential, and technological approaches that embrace the principles of good practice listed above. These include freshmen seminars in which small groups of students read original texts...
on topics of interest to them and discuss their insights; learning communities that connect two or more courses to address a common theme or issue; undergraduate research on serious questions with unknown answers; service learning; community-based learning in which students study real problems in their communities; and the use of technology to study and analyze issues. All of these approaches have the backing of at least a modest amount of empirical research, while some are backed by much positive evaluation.

For the PAA group, one kind of practice is paramount: the integration of intellectual work. If the major and general education are to be truly integrated, it simply will not do for students just to learn facts and theories that are kept in separate compartments corresponding to separate courses. Instead, students will need practice in integrating ideas from disparate areas. They should connect ideas across cultures and disciplines; they should connect ideas from introductory, intermediate, and advanced courses; and they should connect ideas with lived experiences.

If students are to acquire this valuable capacity to integrate, faculty will have to attend to the “iron law” articulated by the University of Chicago’s Jonathan Smith (AAC&U 2003, 17), viz. that “students will neither criticize nor integrate what the faculty will not.” Integrative experiences must be built into the curriculum; the faculty must model the behavior, coach students on how to do it well, and assess for its achievement. This requires faculty to move beyond their familiar and sometimes comfortable role as “experts,” for this task at least, and to become mentors or coaches to guide students in mastering perhaps the most difficult and complex levels of learning.

Thomas Zlatic (2000, 371), who chairs a committee working on the integration of learning within colleges of pharmacy, puts it especially well:

...what does the integration of general and professional ability outcomes mean? It means teaching general and professional abilities in the same courses, in both the pre-professional and professional years, adopting the explicit goal of helping students to improve as problem-solvers, critical thinkers, ethical decision makers, and communicators within the discipline taught in the course. It means moving beyond content (not away from content) toward a student-centered pedagogy that stresses active and lifelong learning.
Assessment to Enhance Learning

In its influential national report *Integrity in the College Curriculum* (1984, 34), AAC&U declared, “the stark truth is that higher education is not yet in possession of generally useful means for the sophisticated assessment of the general worth of programs or of the integrated cumulative intellectual growth and capacities of students.” Today, after nearly two decades of a veritable assessment movement, few institutions have evidence about the integrated cumulative capacities of their students.

Assessment serves three primary purposes. The first and most important purpose is to provide to students prompt and helpful feedback on their performance in courses. This function is especially important to keep in mind, given the present situation in which, according to Doherty, Riordan, and Roth (2002, 4), “ongoing assessment of individual student learning with feedback to help students improve does not seem to be the focus of most institutions.” Teachers need to give feedback to help students focus their learning energies and to show them both what they have mastered and what remains to be learned. Such feedback can fit into daily or weekly classroom work, in connection with assignments and in-class activities. The second purpose of assessment is to assist those faculty members who are responsible for a particular program and for the overall educational experience in taking stock of how well students are learning and in identifying strengths and areas that need improvement. This task should become integral to good campus practice. The third purpose is to make periodic reports to various external stakeholders, such as accreditors or government agencies, by indicating how well students are acquiring the learning outcomes set for them. If, however, the first two purposes of assessment have been fulfilled—and documented—then the information for this third use of assessment can be derived from those findings. An administrator can select the relevant data gathered to improve programs and aggregate them for accountability purposes.

This approach to assessment has several advantages. First, it focuses on the most important question: To what extent are students learning what is expected? It is centered on students and not external bodies. Second, this approach is intrinsic to the teaching-learning relationship rather than externally imposed. Third, because it embeds...
assessment into the teaching-learning process, it need not be additional work for students and faculty members. By placing the emphasis on excellence rather than on accountability, this approach reverses what many academics consider to be the role of assessment.

**Examples of Good Assessment Practice**

The PAA group agreed on several suggestions for implementing this approach and identified examples of good practice that it would like to see become the norm. First, just as the notion of “beginning with the end” is helpful in defining desired student outcomes, so too is a focus on senior-level performance as the primary site of assessment. The culmination of a student’s course of study is the optimum time for students to demonstrate their best work. A project, assignment, or capstone course allows students to demonstrate their cumulative learning, including their ability to draw from both their major and general education.

Of course, faculty members and administrators should be intentional about preparing students for such a demanding capstone experience. If students are not practiced in drawing from their cumulative education or experienced in connecting ideas across courses and disciplines throughout their careers, then it is unlikely that they will be able to display integrative capacities in a one-time project at the end. By “beginning with the end,” faculty can plan how to work with students, from the freshman to the senior year, so they progressively develop the capacities to be assessed. At key points along the way, students can be expected to complete well-designed projects that encompass many of the desired outcomes and to gain feedback on their performance. Formative assessment, shared with students at these points, encourages better learning.

This developmental approach differs from the growing phenomenon of “high stakes testing,” which requires students to demonstrate learning in a manner that may be unrelated to their studies up to that point. That approach has the appearance of objectivity and the value of comparing students across programs and institutions, but it is not sensitive to the particular educational goals established by each campus or to the way students actually use knowledge in “live” contexts. To paraphrase Richard Hersh, senior fellow at the Council for Aid to Education, if the outcome tested is landing a plane safely, pilots should be encouraged to practice extensively beforehand—and preferably not with real planes. Capstone assessments should examine how well students integrate different parts of their learning.
Good assessment practice ought also to include the following elements:

- The use of both formative assessment, for the purpose of giving feedback and making improvement, and summative assessment, for the purpose of identifying levels of attainment
- Multiple methods that include both qualitative and quantitative evidence
- Authentic methods that arise from students’ actual assignments and learning experiences, which might be both curricular and co-curricular
- Assessments that are developmental, so that students and others can observe progress toward valued outcomes, perhaps through the use of portfolios
- A focus on higher, more sophisticated knowledge and capacities rather than on more easily measured basic skills
- Faculty ownership of not just the education but also, because it is inherent to the learning process itself, the assessment of students; whether they teach major or general education courses, faculty need to create, implement, and sustain the program to educate and assess students
- Assessment as continuous, systematic, and multi-dimensional
- An ongoing, systematic process for using assessment results to improve teaching, learning, and the curriculum

The PAA group identified a dozen examples of good practice that embody these principles. Complete descriptions of all twelve are included as an appendix.

The approach advocated by the PAA group is entirely congruent with the direction in which accreditation is headed, and it is fully commensurate with what accreditors are asking for in assessment. For example, the purpose of assessment, according to the Middle States Association, is “continuous improvement.” The Western Association stresses that each accredited institution ought to strive to be an “organization committed to learning and improvement” and to cultivate a “culture of evidence.” PAA embraced this latter concept and extended it even further by calling for a culture of excellence.
Over time, as they have gained more experience with assessment and reflected critically on its important elements, accreditors have produced a number of useful resources for campuses. The Western Association (2002) issued an “Evidence Guide” that communicates clear and useful information about what counts as convincing documentation of student academic achievement. The Middle States Association (n.d.) publication *Student Learning Assessment: Options and Resources* furnishes practical advice on assessment for both the novice and the more experienced professional alike. And the North Central Association, in collaboration with the Assessment Forum of the American Association for Higher Education, has offered workshops for leaders of institutions approaching the time for reaccreditation.

It follows from the premise of formative and developmental assessment that no results are negative. Any result, good or bad, is useful in that it can lead to student and/or program improvement. If faculty and administrators find students inadequately achieving the desired outcomes, they can feed this information back into a process to improve the effectiveness of curricular content or structure or pedagogical methods. Occasionally, the data may trigger a review of the learning outcomes themselves. The PAA model for twenty-first century baccalaureate education reinforces the interrelationships of its components: learning goals, curriculum, instruction, and assessment. Assessment provides evidence concerning all of the other components.

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**COMMENTARY**

In recognition of recent and emerging changes in the healthcare world, the Commission on Collegiate Nursing Education (CCNE), the nationally recognized agency that accredits baccalaureate and master’s degree programs in nursing, is clearly supportive of a solid liberal studies education for graduates from its programs. Today’s professional nurses are involved in caregiving, not only in acute care situations in the hospital, but also in the community and in broader settings where a liberal studies background is as important as professional skill.

As a result of this expansion of care and responsibilities, CCNE has incorporated into its accreditation standards criteria that clearly relate to the integration of liberal studies into the professional core content. Evaluation teams are expected to determine whether or not the nursing program under review is successful in doing so. While examining didactic courses and clinical practica, the team looks at how content is sequenced and how it builds in complexity throughout the program. It looks not only at the nursing component of the program, but at the liberal studies component as well, to see if it is designed to build in depth and complexity as the student moves through the program.

CCNE is most supportive of collaboration between general education faculty and professional faculty in order to achieve the goal of producing graduates capable of meeting the challenges of the twenty-first century. As a nursing dean stated at a recent national meeting, “The baccalaureate in nursing is the liberal arts!”

—MARGARET JACKMAN, associate director, Commission on Collegiate Nursing Education
When designed and conducted well, assessment reveals points at which desired outcomes need to be clarified and refined. It suggests modifications to the curricular content and structure. Assessment also can reveal a need to examine teaching practices. Sometimes introducing new pedagogical methods, even within an unchanged curricular structure, can significantly improve student learning. In addition, assessment methods themselves can be revised as faculty discover how to improve them. Expected outcomes, curriculum, pedagogy, and assessment are interrelated. Accordingly, a change anywhere in that cycle typically eventuates in change elsewhere.

In addition to fine-tuning outcomes, revising the curriculum and instruction, and refining the assessment methods themselves, assessment results serve another crucial purpose: helping an institution enhance, through increased collaboration among faculty members, the integration of general education and the major.

**Benefits of This Approach to Assessment**

When students have clear knowledge of the expected outcomes of their education and receive prompt and ongoing feedback on their progress, they are able to take responsibility for their own learning. Under these conditions, not only do they acquire the capacity for self-assessment, but, as they move toward their senior years, students’ own judgments of their work can be expected to match more closely those of the faculty. As an aspect of critical thinking, accurate self-assessment is crucial to performance in professional fields and essential to lifelong learning.

Assessment itself is likewise an exercise in critical thinking for the faculty and the institution. To build a culture of excellence is an unending project. It entails taking responsibility for meeting the expectations of different stakeholders: the general public, federal and state government officials, leaders of professional and disciplinary associations, sponsors of the institution, faculty members, and especially students. By far the most exigent of all expectations come from the faculty’s own sense of excellence. The whole thrust of the PAA approach to assessment, however, is that it is a collegial endeavor of the faculty, wherein faculty members in a program, and even in a whole institution, challenge and support one another in discharging this responsibility.

Indeed, at the end of the discussion, one sees that the most beneficial results of this approach to assessment are the students’ developed capacity for self-assessment and the faculty’s collegial exercise of self-assessment in the pursuit of a culture of excellence.
There can be only one reason for the existence of formal assessment procedures at a college or university: to enhance student learning and development. Campuses accredited by the Southern Association are asked to “say what they do and do what they say.” Thus “institutional effectiveness” starts with a mission statement, which, at its best, reveals the set of values at the institution’s core. The statement is supported by an appropriate plan for meeting the mission and a continuously functioning planning and assessment process. The next steps apply to all educational programs and support services:

1. Establish a clearly defined purpose appropriate to collegiate education.
2. Formulate goals and objectives consistent with that purpose.
3. Develop and implement assessment procedures to evaluate the extent to which the goals are being achieved in each program and unit.
4. Use the results of assessment to improve programs, services, and operations.

This final and most important step is widely known within the Southern Association as “closing the loop.” It means that the process of assessment has enhanced the quality of the institution.

—JOHN DWYER, associate executive director, Commission on Colleges, Southern Association of Colleges and Schools

Assessing performance or achievement along students’ careers (formative), as well as at the end of their careers (summative), provides faculty with valuable information about which students learn, what they learn, how they learn, and when they learn. Tracking cohorts of students over time helps faculty interpret student performance within the context of the educational experiences that led to that performance—pedagogy, curricular design, opportunities to transfer and apply concepts and principles, and related educational opportunities that faculty believe foster learning. If certain students are unable to demonstrate progress toward desired outcomes, with formative assessment faculty have the opportunity to review pedagogy, course content, course sequencing, and students’ course-taking patterns to understand why these students are less able than others to show progress. Faculty might then explore the following kinds of questions: How have students learned in their previous coursework? Does their history of learning include ample opportunity to practice the kind of learning we value? How do our courses build on each other to contribute to desired learning? What pedagogies contribute to desired learning? Which students benefit from these pedagogies? How well are curricula and pedagogies matched with the outcomes? Do students’ course-taking patterns help or hinder their levels of achievement?

—PEGGY MAKI, senior scholar, Assessing for Learning, American Association for Higher Education
The meaning of quality for a twenty-first century baccalaureate degree has begun to emerge in broad outlines. It includes

- a focus on expected learning outcomes that address intellectual and practical skills as well as conceptual knowledge;
- coherent organization of the educational experience through intentional practice and the integration of student learning in general education and the major;
- the widespread use of powerful, active, and collaborative instructional methods;
- assessment of students’ progress and success in learning.

Accrediting bodies acknowledge this interpretation of quality and, increasingly, they expect institutions to adhere to it. Because they understand that assessment is primarily a means to improve learning, accreditors insist upon the need of every institution to know—rather than simply to believe—its students are learning what it expects them to learn. More important than the need for any specific accountability to a larger public is the need to demonstrate to all stakeholders, primarily the students, that an institution takes its responsibility for student learning seriously; that it holds itself accountable for learning success; and that it gathers information to evaluate its progress. This attitude of self-analysis characterizes a “culture of excellence,” which should distinguish any true learning institution.

This is the approach advocated by leaders of mainstream accrediting agencies. They are requiring colleges and universities and professional programs to adhere to these principles as a condition for receiving their approval. To some academics, this may appear to be an unwelcome imposition by external authorities. But accrediting associations are voluntary groups led by campus leaders; individual institutions and programs belong to them because they value their approval. Accreditation site visiting teams and the commissions that make decisions about accreditation are composed primarily of academics; accreditation is a form of peer review. This new approach is simply a way for academics to hold fellow academics accountable for using the best practices that the
academy has been able to devise. As such, accreditation is not a peripheral external demand for conformity but, rather, a powerful force for supporting faculty members and administrators in improving student learning. Accreditors and campus-based academics are actually strong allies in fostering important learning outcomes and documenting their attainment.
As the case with the entire Greater Expectations initiative, AAC&U’s ultimate hope is that analysis will lead to action. To enable all undergraduate students, regardless of their field of concentration, to achieve the powerful outcomes of liberal learning; to accomplish this in an intentional manner through an integrated curriculum and appropriately chosen teaching methods; and to monitor progress through authentic assessment will require major changes in higher education’s culture and practices. PAA’s work indicates how the efforts to implement these changes must be led by the faculty and accreditors, both separately and collaboratively, and suggests how those efforts might evolve. The changes desired in higher education have implications for both faculty members and accreditors alike.

Implications and Recommendations for Faculty Work

The faculty holds primary responsibility for outcomes, curriculum, pedagogy, and assessment because all these elements comprise teaching and learning. Respectively, they form the end, means, and quality control of baccalaureate education. Traditionally, the curriculum has received the greatest, and often exclusive, attention of faculty members. Yet, as the PAA learning and assessment process model demonstrates, the more neglected areas can no longer remain so. To achieve learning of excellent quality, all elements must be aligned with and supportive of institutional mission.

The consensus forming around the intellectual and practical capacities required of all college graduates—whether completing professional or liberal arts programs—provides the basis for work shared by all faculty members. Drawing both from PAA and the Greater Expectations national panel report, we propose the following steps for campus-based action.

1. Collectively, an institution’s faculty should discuss, agree on, and make transparent the broad outcomes of undergraduate education. In this process, faculty members should look to institutional mission for distinctiveness, to the future for relevance, and to the national consensus forming around the importance of liberal learning for anchorage.
2. The faculty at a college or university should conduct an “audit” to see how well and how intentionally the institution’s curriculum advances the outcomes. Faculty members should consider the curriculum’s coherence, the mutuality of general education and the majors, and the cumulative quality of student learning.

3. Academic departments should conduct a similar audit to examine departmental outcomes and to gauge the coherence of major programs. The degree of resonance between departmental and institutional outcomes, the relationship of the major program to general education, and the success with which departmental faculty members have accepted responsibility for the broad outcomes of liberal learning should be the key issues.

4. Faculty members from across the institution should regularly share with one another their course and program purposes, as well as their classroom practices. Better knowledge of one another’s expectations for student work and assumptions of prior learning will enable all faculty members to see their own contributions in a larger, more integrated context.

5. The faculty should examine its teaching practices, both individually and collectively, to see whether and how well they help students develop the desired intellectual and practical skills. Because faculty members often have not been prepared by their formation to be professional educators with a range of teaching strategies, faculty development programs can play an important role.

6. The faculty, collectively and individually, should learn about, design, and employ assessments that provide direct evidence of cumulative student learning and then use the results to improve teaching and learning. Such assessments should (a) relate closely to student work and thus differ from one discipline to another, (b) be sophisticated enough to evaluate the complex capacities of liberal learning, (c) look at learning across individual courses, and (d) manifest principles of good practice (transparency, multiple methods, longitudinal analysis).

Implications and Recommendations for Accreditation

Accreditation, both regional and specialized, has been moving toward learning-centered institutional practice. With its longstanding emphasis on mission-driven programs and its newer commitment to learning outcomes as a central measure of educational effectiveness, accreditation can serve as an external validation of the parallel trends in campus practice. Its commitment to liberal learning as the basis for appropriate outcomes has placed accreditation at the forefront of the effort to define quality baccalaureate education for the twenty-first century. Most recently, as demonstrated in the PAA conversations, accreditors have recognized the need to use both general education and the majors, including professional programs, in mutually supportive and
intentional ways to achieve complex outcomes. This understanding exists across accreditation agencies and fields.

Accreditors must hold institutions and programs accountable for the implementation of these concepts. As part of accreditation, this accountability might include insistence on a clear statement of outcomes as well as documentation of the process used to define them. More precisely, it might involve requiring that outcomes statements include evidence for the kind of transferable learning that results from liberal education. Accreditors could ask institutions and programs to explain how both the curriculum’s design and teaching practices intentionally support student achievement. They also could look for a comprehensive program of assessment that examines learning beyond the confines of individual courses and feeds results back into a cycle of improvement.

In addition, accreditation could ratchet up accountability by examining not just processes but the aggregation of assessment results to see how well the institution is achieving its own goals. Over a cycle of several self-studies and accreditation visits, the accreditation agency could look for improvement in student learning as a true and direct measure of educational quality. Attention to the results as well as to the process would endow peer accreditation with even more convincing quality control of the degree.

Because both the PAA and Greater Expectations national panel work have direct implications for the accreditation process, we offer the following recommendations:

1. **Standards as well as guidelines for accreditation visits should clearly indicate to campuses the expectations for outcomes, attention to liberal learning, intentional practice, a coherent approach to curricula, and comprehensive assessment.** By stressing their expectations for quality in these terms rather than simply as compliance with basic standards, accreditors would emphasize their interest in the important activity of student learning. They would also encourage faculty members to devote attention to these matters.

2. **Visiting team members should understand and be trained to look for the comprehensive characteristics of excellence both in process and results.** More extensive discussion of and training in the key concepts of clear learning goals, authentic assessment, and intentional practice should form part of orientation workshops.

3. **Accrediting teams should look for evidence that the entire faculty takes responsibility for general education, examines how general education and the major programs strengthen one another, and strives to improve learning.** This corporate responsibility will come from regular communication about expectations for student achievement, about how individual courses contribute to a coherent whole, about the actual results of assessment, and about making responsive changes in curriculum and teaching.
Together, regional and specialized accreditors should encourage colleges and universities eligible for joint institutional/program evaluations to combine them in a single self-study process. The advantages to the institutions themselves reach far beyond a simplification of work. Collaborative reviews would debunk the bipolar myth that undergraduate professional programs are either independent of or irrelevant to liberal education. Put positively, they would reinforce the centrality of liberal learning to professional education and the importance of a fully-fledged program of outcomes assessment. The Middle States Commission on Higher Education (2002b) has produced a handbook for collaborative reviews that serves as an excellent model.

Implementation of the above recommendations will move the higher education community and its quality control system of peer accreditation closer to direct assessment of student learning. With learning outcomes at the center of institutional effectiveness, and intentional practice the means to quality college education for all, colleges and universities will be in a position to demonstrate their accountability not only to the most important clientele group—the students—but to external stakeholders and policymakers as well.
Appendix

Models of Good Practice in Assessment

Though all five facets of the PAA process model are equally important, assessment plays the role of an “acid test” in accreditation circles. This appendix provides examples of campus assessments that enable (1) general education outcomes and major outcomes to be assessed together, and (2) general education and major outcomes to be assessed at the highest levels of undergraduate education—largely in the senior year.

Using the contacts of regional and specialized accreditors, a total of thirty-four programs were reviewed for inclusion in this appendix. To make them as comparable as possible, each institution or program was asked to respond to the same five points:

- Give a brief description of the senior assessment.
- What are the general education outcomes and field-specific outcomes that are required to be integrated by the student in performing this assessment activity?
- How are students, in explicit and cumulative ways, prepared for this senior assessment in prior semesters?
- How is this senior assessment a learning experience for students?
- What is the breadth of faculty collaboration in the assessment activity?

The PAA group selected twelve programs that exemplify the criteria of good practice covered in Chapter 3. The first seven occur in specialized professional programs, the next three illustrate general education or all-college capstones that include the major, and the final two represent culminating experiences in certain majors that include institutional general education outcomes.

The examples are drawn from a mix of small, medium, and large institutions. Each model write-up includes a description of the (mostly) senior assessment experience, information on how major and general education outcomes are integrated into that experience, and information as to how students are prepared earlier in their college years for the experience.
**PORTFOLIO ASSESSMENT**

*Teacher Education at Alverno College*

Candidates for student teaching at Alverno College engage in a portfolio assessment experience the semester before they complete their student teaching. This is a culminating experience, one toward which they have been working since the beginning of the program. The purposes of the portfolio assessment are to give candidates an opportunity to demonstrate their readiness for student teaching by showing how they plan, teach, assess, and give feedback—and how they assess their own teaching. Both Alverno faculty and an educator from the P-12 sector give feedback on the portfolio. There are eight general areas of ability that the Alverno faculty identified as essential attributes to be attained by every student who graduates from the institution. For education majors, these eight attributes are clustered and aligned with the five abilities required of professional teachers.

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<tr>
<th>Education “Abilities”</th>
<th>College’s “Attributes”</th>
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<td>Diagnosis</td>
<td>Analysis</td>
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<td></td>
<td>Problem Solving</td>
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<tr>
<td>Coordination</td>
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<td></td>
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<td>Effective Citizenship</td>
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<td>Developing a Global Perspective</td>
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<td>Integrative Interaction</td>
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<td>Aesthetic Responsiveness</td>
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Students regularly work on lesson plan development and self-assessment according to the frameworks used in the portfolios, so that they prepare for the portfolio assessment in every class they take. New learning also occurs in doing the portfolio in two ways. First, students write reflections on what each lesson shows about them as developing teachers. They also write a detailed analysis of a videotaped lesson in terms of the double list of abilities above. Second, a professional in their field publicly critiques the portfolio. In these ways, students advance from just reflecting on their own performance to a deeper understanding of effective teaching.

Portfolio assessment involves all members of the education department, members of the departments that prepare secondary teachers, and professionals from local P-12 systems.

**SENIOR ASSIGNMENT IN BUSINESS**

*Southern Illinois University Edwardsville (SIUE)*

The core of SIUE’s assessment program rests with the Senior Assignment (SRA). The SRA is defined as a scholarly engagement between student and professor that results in a product. Because the product is visible, it, and the curriculum that produced it, can be assessed. Students are observed while doing the SRA and examined on or asked to defend the product. The SRA is a culminating experience that provides a concrete experience of integration for students and an authentic indication of student learning to the faculty.

The SIUE School of Business identified four sets of attributes that their graduates should possess, with each set containing five further specifications of the general attribute. Each of the graduating seniors should

- demonstrate skills acquisition;
- demonstrate liberal knowledge;
- possess business goals;
- possess business skills.

Elsewhere, the second outcome might be considered to be outside of business—an outcome for which general education faculty “out there” are responsible. At SIUE, in contrast, Business School professors are responsible for all of the outcomes listed above and are involved in teaching formal general education classes.

Two kinds of student activities occur in the Business SRAs. The first is an assignment to write a memorandum to a department manager in a simulated corporation. The student must review all aspects of a complex business case—markets (domestic and international), legal aspects (court decisions, tax law), accounting and financial contexts, technology, labor relations, and so forth—a genuinely cross-functional analysis. The memorandum is expected to make recommendations in the area of the student’s specialization, after demonstrating a grasp of the total situation. Students then give an oral presentation and defense of the memorandum, and several faculty raters judge the student’s mastery of oral and written communication, application of appropriate knowledge, analytical and critical reasoning, and persuasiveness or effectiveness.

The second is participation in an annual International Business Policy Competition that calls for multidisciplinary student teams to develop an analysis and a set of recommendations in response to simulated quarterly reports. As in the previous case, this simulation asks students to undertake roles and duties similar to what they will encounter after graduation. SIUE faculty use the results of each set of SRAs to improve its quality in ensuing years. For example, recent assessments have led to a plan to include a more explicit ethical dimension to the memorandum exercise.
**INTERACTIVE QUALIFYING PROJECT**

**Worcester Polytechnic Institute (WPI)**

WPI takes very seriously its responsibility to prepare its graduates to be problem solvers in an interdisciplinary and international context. In 1970, the institution adopted a project-based structure for its undergraduate programs, which consist mainly of engineering, science, and management areas. The first project, called the Sufficiency, is an independent study in some area of arts and humanities that rounds out and integrates the liberal arts dimension of the degree. The second, called the Major Qualifying Project, constitutes a senior capstone experience in the student’s major.

The third, called the Interactive Qualifying Project, is a model of good practice in integrating general education and the major. A team of students completes this project, and it focuses on a complex technological problem as well as on the human and social context in which the problem and any potential solution exist. Students usually do this project, which is worth three courses, in the junior year. Its aim is to develop in students the ability to frame, study, and solve problems in ways that are technologically sound but also appropriate to the human, social, economic, and environmental context. Teamwork, communication skills, and integrative thinking figure significantly in these endeavors.

In addition to these project requirements, there is a strong international dimension to the degree. WPI has fourteen Project Centers in places such as London, Venice, Bangkok, Zimbabwe, and Australia. Students who do their Interactive Qualifying Project overseas must also add intercultural sensitivity to the list of competencies to be demonstrated.

WPI also recently established the Worcester Community Project Center to bring students living on campus the experience of an off-campus learning environment. Within their project parameters, student teams work with community groups to gain experience in how local governments operate, and the sponsoring agencies receive a useful product from the team’s analysis of the agency’s issue.

There is a well-organized process for evaluating student performance in the Interactive Qualifying Project. Teams of faculty are recruited in the summer for paid positions where they read the reports from the student teams and rate them on a Likert scale for each of the ABET criteria (a mixture of engineering and liberal arts outcomes). The ratings on the eleven ABET criteria and narrative evaluations of the reports are then entered into a database that faculty can consult in order to improve the quality of any further projects they sponsor. Administrators use the database to design faculty development workshops related to these projects.

**SENIOR INTEGRATED DESIGN PROJECT**

**College of Engineering, University of Hartford**

The College of Engineering at the University of Hartford has been engaged in deliberate efforts to integrate humanities, sciences, and social sciences into the engineering curriculum. The new senior capstone is the fifth in a series of “Integrated Learning Blocks” that begin in the freshman year. This capstone gives students the opportunity to show that they have mastered the process of solving engineering problems, while at the same time taking into account the larger human, social, political, economic, and environmental contexts.

The capstone focus is an engineering problem that is studied by a team of seniors under the direction of Hartford faculty and one or more industry partners. The final product could be a new product or process or a new experiment or methodology that would be implemented in industry. The results are shown in the form of a written report that summarizes the student team’s analysis of the problem and the design solution that it proposes. The team makes an oral presentation of its report to an audience of student peers, university faculty, and representatives from business and industry. The oral and written reports must contain sections that address the social, political, economic, and cultural dimensions of the problem and its proposed solution.

Students are prepared for this senior project by Integrative Learning Blocks in the previous three years of the engineering curriculum. The Freshman Block calls for collaboration between engineering and humanities faculty on the development of skills in communication, research, data evaluation, and problem analysis in small groups. In the sophomore year, the focus is on problem-solving skills and discussion of ethical issues and their social context between engineering and non-engineering students. Junior year engineering courses are linked to Western Heritage courses in the all-university curriculum. Collaborative learning and team-building experiences are key parts of these preparatory learning blocks.

Faculty assessment of the senior capstones is done on the basis of work carried out to satisfy the objectives and goals. The presentation part is focused on the written report and its oral presentation, as well as on observation of the process used by the student team to produce the report. Students have had feedback from faculty in previous years on the development of skills needed to succeed in the capstone. The assessment of the team’s work by business and industry clients raises the level of seriousness of this capstone project in students’ minds. Engineering faculty put the results of the capstone assessments to good use in revising the structure and the teaching of the earlier Integrated Learning Blocks.
**SYNTHESIS FOR PROFESSIONAL NURSING PRACTICE**

**DePaul University**

At DePaul University all students are required to complete a capstone course to fulfill a liberal studies general education requirement. The capstone course is designed to integrate humanities and science perspectives within the major discipline. For nursing students this course is “Synthesis for Professional Nursing Practice,” a liberal studies course taught by nursing faculty. Although the main assignment in this course deals with a nursing topic, student performance is assessed in relationship to the ten University Learning Goals for graduates: mastery of content, communication, independence and cooperation in professional practice, multicultural perspectives, religious and ethical foundations, critical and creative thinking, multiple literacies, arts and literature aesthetic, self-reflection and lifelong learning, and historical consciousness. In that way, this seminar course serves as a culmination of the student’s prior courses and includes further development in the professionalization process.

One-half of the grade in the synthesis course derives from the written and oral presentations of a student’s handling of a controversial issue in professional nursing practice. In keeping with the breadth of the ten learning goals, there are clear and explicit expectations that the student presentations will include an historical perspective, an aesthetic dimension, and spiritual or cultural influences. Discussion of topics related to evidence-based practice, health policy development, ethical decision making, use of technology, and cost containment practices in managed care are some of the specific ways that university goals in the humanities and social sciences show up in these projects. Communication skills and critical thinking skills are assessed whether students are presenting or in the audience.

As was stated in a recent syllabus for this synthesis course, “after participating in this course the student will be able to synthesize information on a specific controversial topic, including a historical perspective, ethical and legal issues, aesthetic and spiritual perspectives.”

The nursing department developed specific assessment criteria for each of the ten learning goals, as a student of nursing would be expected to exhibit them. Assessment rubrics for these criteria are used to assess performance formally at entry into the program and at graduation, as well as throughout student coursework to give criterion-referenced feedback. The assessment process includes student self-assessment prior to faculty assessment using the same rubrics. The synthesis project thus serves both as the formal graduation assessment used to measure capstone student performance, including integration of nursing outcomes with university general education outcomes, and as the primary source of data for program evaluation.

**NURSING PORTFOLIO**

**Madonna University**

Student nurses at Madonna University develop and maintain an educational portfolio during the four semesters of nursing courses. In the Senior Seminar in the final semester, they compose a prologue to the portfolio. In this prologue, the student makes explicit connections between the goals of general education at Madonna and the Department of Nursing program outcomes.

The student also includes in the prologue a summary of the areas of most significant growth throughout his or her whole baccalaureate experience.

Completion of the fourth term marks the final assessment of the student’s progress toward achieving general education goals and nursing program outcomes. The final state of the portfolio is highly organized. Students write individual essays that explicitly address the integration of relevant University general educational goals with the nursing program outcomes. Thus, nursing program outcomes, general education outcomes, and personal goals are woven together in the student’s final semester—but as a reflection on what has happened all through the previous semesters. The integration of the undergraduate experience begins when the student begins to put together the portfolio.

For example, communication is one of the nursing program outcomes. The student begins with general education courses in English composition to improve the ability to write effectively. Later, a course in “foreign” culture enlightens students on ways of thinking and practicing in other cultures and facilitates the development of cultural sensitivity in communication. In the nursing program, there are courses that address therapeutic communication and communication in family and community situations that provide insights into verbal and non-verbal forms of communication. Therefore, specific communication abilities required for nursing professionals are developed by expanding and further reinforcing the communication skills that were begun in general education courses. To help the student make the link between program outcomes and general education goals, the Senior Seminar syllabus links each program outcome with the appropriate general education goal, the seminar course outcomes, and the course outcome indicators.
**SENIOR ASSESSMENT**

**Alverno College Division of Nursing**

As a general principle, all assessments of outcomes at Alverno deal with both disciplinary knowledge (the major), as well as the eight abilities to be acquired by all graduates from the College (general education). These eight abilities are: communication, analysis, problem solving, valuing, social interaction, developing a global perspective, effective citizenship, and aesthetic responsiveness. The advanced outcomes for student nurses at Alverno incorporate the preceding eight abilities. The student nurse

- uses the nursing process within an analytic framework in meeting health needs of individuals, families, and groups;
- formulates value judgments reflecting a respect for the dignity and individuality of every person;
- interacts in an effective goal-directed manner;
- collaborates as a member of the health team to facilitate the adaptive process;
- uses adaptation theory in analyzing environmental influences;
- accepts a commitment to fulfill the responsibilities of a professional practitioner in contemporary society.

Typical of the kind of performance assessments embedded throughout the years of study are two senior-level assessments created by the Nursing Division that require integration of these outcomes in a manner especially appropriate to a nursing graduate. The first is an “In Basket” simulation, in which a senior nursing student takes on the role of a public health nurse preparing to go on vacation, who then gets a call dealing with possible child abuse. The student must immediately generate questions to ask during the site visit and possible interventions to be ready to implement. In addition to that call, s/he must prioritize and develop care plans for a caseload of families and assign the right personnel to manage the caseload while s/he is on vacation. The student nurse’s performance is judged by faculty, by professionals from the community, and by the student him/herself (according to previously published criteria).

The second assessment assigns the task of designing a campus health fair (to be actually conducted on campus) to a group of student nurses. One of the important parts of the design is the development of the criteria that the students will use to judge the degree of success of the health fair. As above, many people provide feedback to students on their performance and, more importantly, on their self-assessments.

These particular assessments are also learning experiences for students, because they simulate real professional situations and demand “on-your-feet” synthesis of abilities and knowledge.

**SENIOR SEMINAR**

**Saint Joseph’s College**

Saint Joseph’s College has had an interdisciplinary core curriculum since 1969; all students take the same ten team-taught general education courses (a total of 45 semester hours) throughout an eight-semester period. The final core segment in the second semester of the senior year is a three-credit seminar that engages students, individually or in small groups, in confronting some serious contemporary issue that forces them to integrate what they have learned through their majors with what they have learned in the general education core.

There are four primary points on which student work is assessed. Students must: (1) study a seminar topic from at least two disciplinary perspectives; (2) include the ethical dimension of the topic in their work; (3) demonstrate the ability to do the kind of research appropriate to their topic; and (4) present the results in oral and written forms representative of senior-level work.

Since these senior seminar presentations constitute both a bridge between general education and the major and also a performance that recapitulates a student’s entire undergraduate experience, a great deal of attention is focused here in the institution’s assessment plan. This is where the college judges its “product.” The seminar professor makes the grading and assessment judgment for each of his or her students and also coaches students in making detailed self-assessments of their work. But at least half of the seminar presentations are also judged by a team of four or five “outside” raters: retired professors, administrative staff, and professionals from the local community. (There are rubrics created by the core faculty to help coordinate the outside ratings with the faculty ratings.) The core curriculum committee analyzes the results of each year’s assessments of the senior seminar to determine if and where changes need to be made in the freshman, sophomore, and junior years.

Although the senior seminar requires more thorough research and a more professional presentation than any previous work in the core, there is ample opportunity for students to learn and to rehearse these skills at the lower levels. In the six-credit segment of the core that students take each semester, they constantly see faculty modeling interdisciplinary ways of studying topics and attending to the value dimensions of issues. In core discussion groups, students then are required to talk and write about the texts and issues in an integrative manner. Since Saint Joseph’s is a small institution, the faculty for the core are the same faculty who teach in the majors, so the common core and the majors tend to become synchronized very quickly.
**SENIOR CAPSTONE**

*Portland State University*

The general education program that Portland State adopted in 1994 requires every student to complete a six-credit senior capstone. This capstone has four main objectives:

- to provide an opportunity for students to apply the expertise learned in the major to real community issues
- to give students experience working in a team context necessitating collaboration with persons from different fields of specialization
- to encourage students to become actively engaged in addressing community issues
- to empower students to create summation products that represent their learning and meet the needs of community partners

The specific expertise from the major will obviously vary from student to student. All students, however, are expected to exhibit competence in four key areas: communication, appreciation of diversity, critical thinking, and appreciation of social responsibility. Earlier components of the general education program are designed to prepare students to perform as desired in the capstones. The freshman year focuses on inquiry skills in various disciplines; communication, both individual and in groups, is stressed in the second year; and then upper-level cluster courses enable students to apply inquiry and communication skills in a more sustained manner to a theme of their own choosing. Finally, students are provided with orientation and training materials within the capstone itself.

Each capstone engages a multidisciplinary team of students, under the supervision of a faculty member and a community partner, in developing solutions to real community issues. Students have to work collaboratively with one another and with people from the community. Some 140 of these capstones are offered each year—thirty-five in each of the four quarters—so students have real possibilities of finding a topic that fits both their interests and their academic background.

Through observations by faculty and community leaders, study of reflective journals by the students, and open-ended surveys and interviews, assessment results show that students claim and demonstrate the ability to apply inquiry and communication skills in a more sustained manner to a theme of their own choosing. Finally, students are provided with orientation and training materials within the capstone itself.

**HONORS CAPSTONE**

*Hampton University*

The Honors Capstone at Hampton University is designed to provide an opportunity for students to synthesize their undergraduate experience. In the Capstone Seminar, students discuss research methodology while doing an in-depth study of some topic of interest. Two products are required—a report on the results of the study and an Honors Portfolio.

For the independent study, the student must select a topic that is not directly related to his or her major. Because this work will be done independently, each student prepares a work schedule and sets the time for presentation, subject to the professor’s approval. The student is required to make an oral presentation of the project using appropriate technology to enhance the presentation.

The Honors Portfolio consists of a minimum of three and a maximum of six pieces of work that span the student’s period of study at Hampton. Among these must be at least one piece of writing that involves research. The work in the portfolio need not be all written work. It may include video or audiotapes, art works, computer programs, or any other work that the student can successfully relate to course objectives. There must be a written prologue to the portfolio that explains why each piece is included.

In order to graduate with Honors College endorsement, a student must demonstrate the following:

- the ability to present ideas and communicate effectively in writing
- the ability to speak effectively
- the ability to analyze and synthesize a broad range of material
- the ability to apply research methods to a chosen topic
- the ability to reflect on experiences

The capstone research project and the Honors Portfolio are evaluated with these five criteria in mind. Each student chooses a committee of three people, two members of the faculty and one peer, to evaluate both the independent study product and the Honors Portfolio. This committee reviews and critiques these products and also the public oral presentation and defense of them.

The Capstone Seminar is designed as a community of learners that discusses, makes suggestions, provides feedback, and supports its members so there is a fruitful combination of individual and group dimensions to the work of the class. On the one hand, students have to take responsibility for individual research but, on the other hand, they do so with the support of a community. Furthermore, since the topic for the project is outside the student’s academic major, each student selects a mentor who has expertise in the field of that topic and receives guidance from that mentor, thus widening the range of faculty contributions to the Honors Capstone.
COMPREHENSIVE MATHEMATICS PROJECT

Saint Mary’s College
Assessment for seniors in mathematics at Saint Mary’s is done primarily through the Senior Comprehensive Project. Each student undertakes a semester-long independent study project under the direction of a faculty advisor. Two hour-long preliminary reports are given to the entire seminar group of seniors (seven or eight) doing this project, and everyone in attendance completes a comment form after the talk. The instructor reviews these forms and returns them to the student with additional comments. The student writes a final paper (usually 25-30 pages) that is read by three faculty members and makes a public oral presentation with questioning by a faculty panel. Students are expected to be able to answer questions about any mathematics they have studied that is relevant to the topic of their independent study. In this way, the mathematics faculty emphasizes synthesis and independent learning in the senior year.

In addition to knowledge and abilities in the area of mathematics, the general education outcomes most directly involved in this senior project are those dealing with oral and written communication, clear thinking about complex problems, and the ability to learn independently. Lower-level mathematics courses reinforce the development of these abilities by including writing assignments in every course, and by giving feedback on students on the precision and style of their writing. Oral presentations are also included. Upper-level mathematics courses require the foundations developed in the first two years. Synthesis of the material—connecting the pieces presented in class and recognizing the big picture, including relationships to other parts of the undergraduate experience—is accomplished by individuals and also by the group. As students write papers dealing with a sequence of technical issues, they are expected to provide connections between ideas. And as students progress through the major, they are expected to work more and more independently.

The entire mathematics department is involved in these projects. Every student has an advisor, and a team of three faculty members reads the final paper and then asks questions during the oral presentation. The instructor for the senior seminar group sits on each review panel, and every faculty member in the department serves on at least two of these panels each year. At the end of the presentation, the seminar instructor conveys to the student via letter the judgment of his or her performance. When all the projects for a particular year have been concluded, the department faculty meet as a whole to assess the experience and propose any needed changes.

INDEPENDENT RESEARCH IN BIOLOGY

King’s College
The Senior Integrated Assessment in Biological Research at King’s College differs from a typical laboratory course in that there is no designated topic or laboratory project. Students must decide on an appropriate topic based on their previous learning. There is likewise no pre-designed protocol for carrying out the project, so students must design their own. Of perhaps greatest significance in this approach is that students must, therefore, continuously resolve problems in the course of doing the project.

An appropriate topic is one for which testable hypotheses can be generated. With guidance from a faculty member, the student then devises and conducts original and independent research that may provide results relevant to these hypotheses. These results are communicated in both written and oral form, with the expectation that these communications conform to the conventions of invited presentations at major conferences in the field of biology.

The general education program at King’s College aims to develop seven skills in each student, skills that are conceived as transferable to any major field: critical thinking and problem solving, effective writing, technology competency, effective oral communication, quantitative reasoning, library and information literacy, and moral reasoning. As students progress from semester to semester through their undergraduate experience, these skills are reinforced and developed in both general education and major courses. Thus, the student who begins the culminating research project in biology has been rehearsing the skills required to complete it successfully all through his or her course of studies.

Two other assessment exercises help prepare students for the challenges of the independent research project. Biology majors maintain a portfolio of their work in the major, and they are given frequent feedback on the contents of their portfolios by faculty advisors. There is also a sophomore- or junior-level “Diagnostic Project” that requires an oral and written report on a smaller scale than that of the senior independent research, but emphasizes the same transferable skills.

In the particular case of the senior research project in biology, students are provided with a detailed list of the criteria by which their work will be judged. This list covers the oral report, the written report, critical thinking, use of the library and information technology, and the various components of quality research in the field of biology.
Works Cited


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