Chapter 9
Assessing Information Technology: Changing the Conceptual Framework
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Higher education is encountering unprecedented pressure for accountability from both internal and external constituencies. Frank Rhodes, former president of Cornell University, states: “Accountability . . . is the newest buzzword for all institutions. It is an important—indeed, a vital—obligation, but it means very different things to different people” (2001, p. 242). These constituencies include trustees, the faculty, the administration, the students, prospective student families, and alumni, each of whom wants something quite different from the institution. The causes are myriad, but internally there are especially strong pressures for the leaders of information technology (IT) units to explain and justify the costs and benefits of the expenses associated with their areas.

This attention to IT is attributable, in part, to the fact that IT is a growing, relatively new, and rather substantial portion of an institution’s budget. While this book, quite appropriately, deals with information resources (IR) in the broadest sense, this chapter focuses on IT assessment and the challenges associated with this facet alone, because the nature of assessment in libraries, media services, and other dimensions of IR is too varied and broad to be adequately addressed in the limited space available. This chapter reviews past and current means of assessing IT on campus, discusses the limitations associated with these, and suggests directions to meet the
needs of campus leaders in addressing the demands of accountability in a more encompassing and holistic manner.

The chapter concludes with the recommendation that institutional leaders embrace a new conceptual framework to assess the next steps required to sustain progress toward articulated goals. Called **transformative assessment**, such a framework integrates IT within the institutional strategic plan and aligns planning and assessment at all levels with a focus on outcomes.

**Shortcomings of Current Models**

Historically, three distinct methods have been used in evaluating and assessing IT: satisfaction surveys, various input measures, and self-assessment. Each method has some serious shortcomings, and although they may be useful in specific contexts, they fail to provide the holistic approach to assessment and accountability that is being called for on campuses today.

**Satisfaction Surveys**

Perhaps the oldest method of assessment is having the IT environment evaluated by the users on a campus through satisfaction surveys. This process has a history that dates back to the mainframe era of campus computing and the desire of IT officers to understand the extent to which the users of their services were being supported. This has been, and should continue to be, a vital part of an overall assessment strategy on campuses, but it has some inherent weaknesses. First, satisfaction data need to be understood in context, because during the past two decades, the user population of campus IT resources has changed from a relatively small, fairly homogeneous, and sophisticated group of users to virtually every faculty member, staff member, and student.

Because IT is still viewed by some within the academic community as causing undesirable change, measures of satisfaction with technology-related services could, in fact, be reporting levels of dis-
satisfaction with long-held assumptions being challenged. It is also highly unlikely that any campus IT organization can really satisfy all constituencies. The campus IT organization is all too often driven by the loudest and most vitriolic voices on campus, not necessarily the most important or rational ones. IT units are seldom given guidance (not to mention protected or defended) by the administration, because most campuses have an ethos and expectation that all needs should and must be met.

Satisfaction may make life easier for everyone in an emotional sense, but it is not necessarily an indicator of the strategic importance of the role IT plays in accomplishing an institution’s core mission. IT investment in infrastructure and services is not and should not be a function of popularity. Satisfaction surveys can be useful in allowing internal success (as perceived by users) to be evaluated (as perceived by users), and this can be very important, but such instruments do not assess the strategic importance or value of an investment. IT is an institutional issue. Setting and managing campus expectations with regard to IT is perhaps the greatest challenge facing higher education leaders. Efforts of the chief information officer (CIO) to do so are often looked on as self-serving and bring into question her or his role and credibility. Thus, it is essential that other senior officers, and especially the president, become involved in clarifying the role of technology in terms of the institutional mission. This cannot be relegated to the CIO alone, because the institutional imprimatur can be granted only by the CEO and other academic leaders.

Input Measures
Like most of the rest of higher education, IT has a history of employing various input measures as indicators of quality, with the implicit assumption that more is better. In other dimensions of the higher education enterprise, the lower the teaching load of faculty, the smaller the student-faculty ratios, the more titles held in the library, and the more students rejected in the campus admission
process, the better the institution. With IT, it was such measures as percentage of the education and general (E&G) budget and the breadth, depth, power, and diversity of hardware and software at an institution that served as benchmarks and indicators of quality. All of these are measures of input, with the potentially fallacious assumption that more input (and, implicitly, greater expense) yielded a better product. These measures did not provide indicators of output and were certainly not indicators of efficiency, but more likely were the opposite of that.

For years, the gold standard for IT was captured in the longitudinal survey work conducted at the University of Texas at Austin by Warlick (various dates). These data provided important comparisons among campuses and often served as an effective means to justify investing more heavily in campus IT infrastructure. Percentage of E&G devoted to IT was one of the measures reported in Warlick’s survey. This value usually ran between 3 and 5 percent of the core academic budget, and it was seen to rise substantially with the advent of campus networks, microcomputers, and the expansion of IT to all disciplines in the academy. This ratio has now become obsolete because of the declining emphasis on fund accounting as a means of presenting campus budgets. With the technology becoming more fully integrated into the overall fabric of the institution, it is also increasingly difficult to isolate expenditures that are solely for IT (although Smallen and Leach, 2002, have conducted some very useful studies of IT expenditures among predominantly smaller colleges; see www.costsproject.org).

Warlick’s research and other similar surveys, such as the CAUSE Institutional Database (ID) survey, conducted annually from 1970 through 1996, and the Campus Computing Survey (Green, 2001) provided much valuable comparative data. Indeed, the new EDUCAUSE Core Data Service launched in the winter of 2002–2003 (see www.educause.edu/coredata) is an attempt to provide leadership with needed understanding of IT functions, organization configurations, sources of IT revenue, and expenditures, practices,
and technologies. However, none of these efforts is, or was intended to be, an assessment tool. These measurements of IT investments were often an institutional version of keeping up with the Joneses, driven by the highly competitive marketplace of higher education. Competition for students, various ranking surveys in popular magazines, and research support comparisons, for example, often motivated others within the college or university, besides the CIO, to turn to these surveys.

Although such efforts may have leveraged additional funds (appropriately or not), they do not include measures that offer insight into how technology is enabling new and better research, whether or how technology is enhancing teaching and learning, or whether administrative functions are easier for students to access or less expensive to operate. The problem is that in order to effectively measure the success or value of an IT investment, we must come to grips with evaluating these functional outcomes of the college or university. However, we have thus far successfully avoided grappling with these difficult challenges of assessing learning outcomes, administrative efficiency, effectiveness, and so on. Without working in tandem with others on campus to identify and evaluate these outcomes and then to understand and describe the enabling role of IT in facilitating these accomplishments (or the failure thereof), we will never be able to assess the return on IT investment reasonably and meaningfully.

**Self-Assessment**

Until recently, the closest that higher education has ever come to any form of assessment that attempts to look at the impact of these investments and the associated outcomes has come under the rubric of self-assessment. In the mid-1990s, CAUSE, Educom, and the Association of Research Libraries collaborated to publish a set of self-assessment guidelines to assist campuses in asking the important, albeit difficult, questions about the impact of IT on campus (HEIRAlliance, 1995). Although some of the questions implicitly
approached the subject of outcomes and the role of IT in achieving those outcomes, most of the questions asked about the adequacy of hardware and software availability, governance structures, training opportunities, and so on.

A major shortcoming of the guidelines was that virtually no one in a leadership position on higher education campuses at the time was sufficiently knowledgeable about IT to judge what was adequate for a given campus. These guidelines, however, were very important in providing any kind of standardized and structured means of assessing what IT resources were available and how well they were supported on campuses. Not only did many campuses embrace this set of guidelines, they were incorporated and adapted into the criteria of a number of the regional accreditation agencies, thus playing a very real role in institutional assessment at that time, and in some cases until the present.

**IT Assessment in Industry and Higher Education**

The history of IT investment in the commercial world is longer than that in the academic world; hence, IT has a more defined set of goals, articulated strategies, and a historic means of measurement in the commercial area. When IT investments are proposed, in industry—and increasingly in higher education—the questions that are asked by senior management have to do with issues such as these: What will be the return on investment? What value will accrue as a function of this investment? Can a cost-benefit ratio on this investment be projected or determined? These financial measures are challenging in the corporate setting and virtually impossible to deal with in the academic setting, because it approaches academic heresy to suggest that higher education is a business or to use the nomenclature associated with a business model. However, as trustees, legislators, and others with responsibility for higher education push for accountability, it will be in the language of business
that they will expect responses, unless we have the rubrics at hand to redirect inquiry to more appropriate measures.

Business measures fill a void. Imposition of the quantitative measures of business to determine the outcomes of investments in technology is simply a reflection of the failure of higher education leadership to assume appropriate responsibility for its role in decisions regarding overall institutional assessment. This denial of responsibility is deeply embedded and penetrates broadly throughout academia. Even midlevel administrators, who are closer to the day-to-day decisions regarding the role of technology in their units, tend to deflect assessment of functionality of technology-enabled processes to the CIO.

Yet responsibility for matching the enabling power of the technology to administrative processes and to assessing its fit with institutional custom legitimately belongs with the functional area head. Ideally, such implementations and assessment efforts would be conducted in cooperation with the CIO, but the point here is that ultimately, this responsibility lies with the functional unit head. Higher education needs to craft better arguments and collect data in a manner that can preserve the integrity of higher education and still be responsive and accountable. To attain these goals, it is imperative that other members of senior management be involved and take responsibility for their own IT environments, in conjunction with the CIO.

Assessing Outcomes of Applications Versus Infrastructure

When campuses decide that certain technology investments are necessary to remain competitive in a market (even though the costs associated with these decisions are anything but insignificant and are recurring because of the need for ongoing upgrade and replacement), then these investments should be assessed not as a function
of their direct savings, but on their ability to allow other institutional goals to be attained. This is the kind of discussion that increasingly should be held at the time such investments are considered, not after the fact in the face of budget increases for IT that are greater than those of other units on the campus.

One of the most useful conclusions that has been generated from the industrial and commercial world is that a fundamental difference exists between how assessment of IT applications and IT infrastructure should be approached. The Gartner Group suggests that in the area of applications, the criteria for investment should focus directly on outcomes, such as return on investment (ROI) and cost savings, with the value of the IT investment measured directly against the outcomes affected in that application (Harris, Grey, and Rozwell, 2001). In higher education, this would manifest itself in such areas as a new admission system, with the measurement being in terms of number of new applicants, increased yield, or a change in trend lines associated with such output measures.

These outcomes would need to have some dollar value assigned to them to get a true ROI measurement, but with a specific application, such measurement is possible. Similarly, in the implementation of a new development system, better tracking, higher alumni giving rates, and other measures could be translated into direct ROI measures (Knox, 2002). All of these “savings,” however, require a plan to capture the necessary data to document and substantiate these findings—something that all too often is missing from a campus implementation plan for an IT application.

The use of such financial outcome measures may be possible with applications but becomes nearly impossible with infrastructure investments. Infrastructure, such as the campus backbone, the level and speed of connectivity of the network, or even public access clusters, creates a campus environment in which it is difficult, if not impossible, to directly identify any kind of definitive ROI or cost-
benefit ratio, and the same is true in industry. According to Knox (2002, p. 6), “Unlike IT applications, which are typically linked to a specific business goal, the value of infrastructure is realized over a long period of time through the support of multiple business goals, many of which may not be known at the time of initial infrastructure development. The value of infrastructure is realized through the applications and initiatives it is used to support. Infrastructure in isolation is valueless, just as the foundation of a house provides no value unless, or until, a house sits on top of it.”

This approach to infrastructure requires that all divisions and functional areas see the advantage and the need to invest in infrastructure, so that they can achieve their own subunit goals. However, the ability to see this greater good and to make tough decisions that result in a higher “taxation rate” for these services is difficult, especially in times of limited resources and a difficult economy. IT organizations have tended to perpetuate this situation by crafting infrastructure procurement rationales in terms of inputs, that is, power, capacity, speed, and so on.

The University of California System serves as an example of a higher education institution that is beginning to understand the important distinction of looking at IT as a critical investment to achieve other goals, and not as a cost center. The underlying assumptions associated with the new business architecture efforts being undertaken in the University of California System, as they lay out a plan for how they will do business in the future, clearly identify technology as an enabling function, not an end in and of itself (New Business Architecture Planning Group, 2001).

The Gartner Group has recently proposed a useful approach that looks at the value of investment (VOI), a broader and more inclusive concept than just a financial ROI metric. This concept of VOI emerged as a function of the “knowledge economy”; it focuses on leveraging intangible assets and reflects the multiple dimensions of benefits accrued instead of limiting assessment solely
to ROI considerations (Harris, Grey, and Rozwell, 2001). This concept is not only more inclusive, it is also more acceptable and compatible with the academic culture, whereas, as previously noted, ROI is certainly not politically correct. The Gartner Group’s research suggests that the value of an investment is accomplished through initiatives that increase organizational competencies; enable collaboration among people, systems, and enterprises; implement new leadership methods and capabilities; multiply the impact of networks, whether social (people) or technical (applications or other system connections); and formalize knowledge management and the management of intellectual assets. Learning outcomes assessment is also on the rise. Given the growing significance of the enabling role of technology in teaching, leaders need to pay attention to this dimension of the assessment of the value of investment in technology.

These are all critical outcomes in any organization and are especially important to higher education. They suggest that “over time, this value is increasingly the source of competitiveness, including increased value of brand, new and deeper core competencies, innovation, knowledge creation, increased depth and range of talent, and improved strength and diversity of human and technology networks. Although enterprises intuitively recognize the value in these initiatives, most lack a formal process for assessing expected value and managing the initiative to achieve it” (Harris, Grey, and Rozwell, 2001, p. 5). This is the challenge that higher education faces as we begin to deliberate how outcomes are to be defined and measured within the academy.

In their strategic plans, higher education institutions generally articulate a vision describing the outcomes of their efforts. Assessing the value of investment is a tactical method of focusing on desired outcomes that will lead to the fulfillment of that vision. Transformative assessment is a higher-level strategy for keeping the disparate internal objectives on the trajectory toward that institutional vision.
Transformative Assessment

The term *transformative assessment* is used to describe assessment that is directly linked to the goals of the institution and occurs when the institution’s academic and administrative leaderships are genuinely committed to transformative change. The institution is ready to move from asking, “Did we do what we said we would do?” to asking, “What has to happen to move to the next stage?”

According to the READY tool developed by EDUCAUSE, “Transformative assessment occurs when a number of studies at different levels align with each other, and with the process of planning and implementation, so that over time they all help guide and accelerate the desired improvements.” Instead of saying, “We have installed Internet2-level networking infrastructure,” we need to be able to say, for example, “The installation of Internet2-level networking infrastructure has enabled 225 faculty in the following disciplines . . . to adapt the pedagogy in their courses in the following ways . . . to engage their students in solving complex, new problems in higher level courses.” This type of assessment moves beyond simplistic measures—for example, benchmarks of an institution’s installed base of technology—to a far more complex and sophisticated assessment of multidimensional progress toward desired goals. The purpose of assessment shifts from what is to the determination of what ought to be. This approach links the planning and assessment processes much more closely. The process involves the identification of a set of desired institutional outcomes together with their manifestation at multiple levels throughout the institution, and the establishment at the outset of the assessment activities that will gauge progress toward their attainment while at the same time surfacing new goals to be pursued along the road to transformation.

Higher education institutions are just beginning to understand the importance of integrating a broad institutional assessment framework, which must include a technological assessment component, within their strategic plans. With the acknowledgment that
IT infrastructure is no longer solely an IT issue, members of the institution's leadership cadre assume mutual responsibility for getting their homework done. For any significant IT investment to be made, senior IT and institutional management must validate that decision; top management must assess, agree, and decree that the investment is worthwhile to the institution. Moreover, they must agree, at the outset, on how the value of the investment in infrastructure will be measured.

The right questions become evident once leadership recognizes its collective responsibility to assess both the existence of appropriate technology and the appropriate use of that technology. Assessment must occur within a collaboratively developed framework, designed to answer questions about the value added by the institution's investment in technology at the time the investment is being planned.

Transformative assessment is a collaborative activity because it must measure change in multiple dimensions and modes. Its collaborative nature is among its greatest challenges. Reaching agreement regarding motivation for change, indicators of goal attainment, target conditions, and value-added outcomes requires deep discussion, often at an unprecedented level of intensity and revelation.

The University of Missouri, for example, uses the Balanced Scorecard approach to address the multiple dimensions of assessment and to measure performance and progress against its strategic plan (see www.system.missouri.edu/urel/SP2001.html). Other universities, such as the California State University at Monterey Bay (csumb.edu/academic/ulr) and Brigham Young (www.byu.edu/academy), have made a significant commitment to student or learning outcomes assessment. The University of Maryland is identifying a set of outcome measures for each of the goals set forth in its strategic plan, and IT staff members are collaborating with those responsible for assessment in other functional areas to coordinate and integrate their efforts (www.oit.umd.edu/ITforUM/2001/Spring/plan).
It is especially difficult to command the required sustained engagement of faculty in any such transformative assessment program. Confronted with this reality, administrators and faculty tend to revert to the superficiality that allows them to retreat to traditional political and intellectual relationships with which everyone is familiar and comfortable.

An example that runs counter to this assertion is the Student Learning Objectives (SLO) project at the University of Washington (see depts.washington.edu/grading/slo/SLO-Home.htm). According to Friedman (2003), associate provost for academic planning, SLO is an effort "to identify learning objectives for its undergraduate learning experiences across the entire University" and to align and integrate those objectives at the program level. Faculty members are identifying student learning objective metrics at the course level, and the university is using e-portfolios to enable students to identify their own learning objectives. Friedman goes on to say that "educational transformation has been inhibited by the suite of metrics available to keep track of student progress. Credits have served as the critical measure of progress; requirements about how many of which kind serve as the rules. The SLO initiative offers an additional set of metrics, one which is designed to enable, rather than restrict, the transformation agenda."

Acknowledging the political and cultural realities of assessment in higher education, Dziuban and Moskal (2002) emphasize that assessment must be both quantitative and qualitative, and it must serve to further both knowledge about learning outcomes, for example, and overall institutional goals (for example, whether there was a positive impact on the institution, as well as on the student). Their admonition demonstrates a practical awareness of the politics of assessment, which is a significant factor in higher education.

Realistically, assessment in higher education must take into account academic culture, campus politics, and, increasingly, expectations about outcomes by multiple constituencies. Dziuban and Moskal play an important role in the assessment efforts used by the
University of Central Florida (UCF) to monitor and inform its transformation process. UCF president John Hitt states that goals must be simple enough to be remembered and measured (Hitt and Hartman, 2002). This is especially important in attaining and sustaining alignment among the many directional thrusts of a complex university.

Similarly, Graves argues that higher education needs to measure and communicate its value to multiple external constituencies. Much as we would like to believe that “one size fits all” and that one set of values and customs should prevail, “higher education leaders . . . need to help their internal constituencies understand the difference between education as a societal good and education as a private good, the forces that are bringing that distinction to the fore, and the need to pursue strategies that depend on the nature of the goals that the strategies are intended to achieve” (Graves, 2002, p. 42).

Assessment in higher education needs to move rapidly from being overly simplistic, business oriented, and quantitative to becoming exceedingly complex to take into consideration the unique aspects of the institution and the expectations of that institution’s many constituencies, for example, students, faculty, parents, alumni, boards, politicians, and funding agencies to name a few. The enabling role that IT plays in meeting their varied expectations makes IT assessment particularly sensitive, important, and challenging.

**Conclusion**

Each of the three methodologies discussed in the first section of this chapter has its place within the IT assessment framework on college and university campuses, but such assessment needs more than just input measures, satisfaction surveys, and self-assessment. We need to look at input measures and satisfaction as part of a broader, multidimensional approach, and we need to focus on real institutional outcomes.
Higher education has yet to step up to the challenge of measuring the outcomes of its teaching, learning, and research. Researchers can measure the movement of subatomic particles and the radiation and other effects of nebulae that have never been seen. However, when it comes to measuring and assessing the impact and effectiveness of teaching, learning, and research on our own campuses, we all too often hear that such an effort is too difficult. Whether because we have not yet learned how to do this effectively or have merely avoided it is irrelevant. Society is becoming increasingly intolerant of such responses.

For assessment to be valid and for it to communicate accurately and effectively to multiple constituencies, it must be multidimensional and collaborative; it must be supported by a cadre of research professionals who conduct their work with a savvy blend of methodological expertise and practical sensitivity to the cultural and political realities of higher education; and it must engage and earn the commitment of the highest levels of the institution’s academic and administrative leadership.

Transformative assessment seems the most promising path to achieve this more encompassing approach that is so desperately needed. Without such efforts, evaluating IT in isolation is likely to result in futile and frustrating results that will impede the kinds of change that higher education must effect in the information age.

Notes

1. The READY Tool (www.educause.edu/ready) is a sophisticated assessment and decision tool for engaging leadership in the dialogue regarding distributed learning and for assessing an institution of higher education’s stage of readiness for distributed learning, as well as a means of ensuring that decision makers ask, and answer, the right questions, and participate collectively and appropriately in such decisions.

2. Chuck Dziuban and Patsy Moskal’s Transformative Assessment Project (TAP) Online Workshop, held April 22, 2002, was a
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joint project of the National Learning Infrastructure Initiative, the Coalition for Networked Information, and the Flashlight Project. The objective of TAP is to identify the significant measures of progress and the rubrics of a framework for transformative assessment. The results will be published separately.

References


