Institutional Content Management

Yea, from the table of my memory I’ll wipe away all trivial fond records.
—William Shakespeare

Key Findings

- The most common environment respondents reported for enterprise management of digital content was a mix of best-of-breed enterprise and local/departmental solutions (35.9% of institutions). Four in 10 institutions reported only local or ad hoc solutions (that is, no enterprise solutions at all), whereas slightly more than 1 in 10 said they have an integrated enterprise content management solution. Institutions generally anticipated having more enterprise-oriented content management environments three years in the future.
- Institutions with more enterprise-oriented content management environments tended to report greater agreement that they could effectively manage all the varieties of data and digital content that their institutions need.
- Public relations and marketing organizations were responsible for the look and feel of the institutional website at about two-thirds of institutions.
- Video streaming/download and content formatted for handheld devices were the top web environment enhancements institutions selected as most important to meeting constituent expectations in the next three years.
- Agreement that the institutional web environment routinely exceeds user expectations was higher among institutions that reported more extensive use of such best practices as a database-driven web environment, website owner ability to perform routine maintenance without IT intervention, consistent web page look and feel, and granular control over user access to website content.
- About half of institutions overall had some kind of entity responsible for electronic records management.
- Seven in 10 institutions reported having documented electronic records retention schedules for financial, student, and/or HR records; about half have such schedules for faculty and/or staff e-mail.
- Respondents gave lackluster ratings to their institutions’ ability to comply with records retention and disposition requirements throughout the institution, averaging 2.5 (between fair and good) on a 5-point scale. Average ratings were higher where institutions reported more documented electronic records retention schedules, where enterprise data quality scores were higher, and where an enterprise records management solution had been implemented.
Information technology units once dealt almost exclusively with structured data that flowed inside structured processes. Designing an information system meant mapping the way data elements changed as they entered processes and were transformed by them. Every data element had a discrete type, length, and name. As some of the findings of preceding chapters make clear, managing that kind of data has its challenges, but it also works according to some fairly clear and powerful rules.

Structure, however, no longer governs the world of data. All kinds of things have become data by the simple fact of being captured or expressed using a digital tool. Not just the budget and enrollment figures of the English department, but its announcements and course descriptions, photographs of its faculty members, social interactions between students, even texts taught, lectures delivered, and discussions led are all now potential elements of the institutional data universe. Much of this data is entirely unstructured except at the most basic formatting level, and some of it can be considered semistructured in the sense that it is meant to be inserted into structured templates or tagged according to some schema.

Making this huge and complex emerging digital content environment usable and manageable is one of the great challenges of modern IT administration. In this chapter, we examine a few facets of institutional content management, focusing on those aspects where we believed we would find the most pressing institutional challenges and the most mature (if emergent) practices. Beginning with an investigation of the extent to which institutions are taking an enterprise approach to content management, we turn next to practices and future plans for the institutional web environment, and then to management of electronic records.

Institutional Content Management: An Overview

Institutions have a profound interest in the many varieties of digital content they generate. The institutional website is the world’s window on the institution and provides many critical constituent services. Important information is locked up in e-mails, spreadsheets, and documents, some of which may meet legal or archival criteria that make them official records. At some level, the institution needs a way to discover, organize, and manage important digital assets and to realize the efficiencies that come with standardizing on common tools.

On the other hand, digital content presents classic enterprise dilemmas. Not everything needs to be (or can be) managed centrally, nor do different types of content necessarily lend themselves to a single management platform. Integrated enterprise-grade solutions may be functionally inferior to separate best-of-breed products that address specific content types. Users with special requirements will demand special tools to meet them, and local units have the budgets and (sometimes) the expertise to go their own way. Considering the slow and uneven progress institutions have made toward achieving enterprise control over even the most heavily structured administrative data, the challenges of managing the Wild West of digital content stand out in high relief. A group of IT administrators who implemented a content management system for learning content at Athabasca University sum up the potential, and the challenges, from a higher education perspective: "A content management system can and should manage the institution's full gamut of formalized content...[but] until processes and applications mature further, full implementation of a CMS within an institution will be constrained, largely due to the difficulty of creating simplified algorithms to describe and deal with dissimilar content sets."
Nevertheless, the concept of enterprise content management (ECM)—that is, integrated systems and processes for dealing with a wide variety of digital content relevant to business operations—has been promoted for a decade or more, and Gartner Inc. forecasts that the integrated ECM suites that embody the concept are within a few years of reaching maturity (or, in the company’s language, the “plateau of productivity”). We wanted to know if institutions are embracing this concept, a more modest or partial enterprise-oriented approach, or some version of distributed or ad hoc approaches. We also looked in more detail at specific kinds of ECM solutions and at the way institutions are approaching the management of learning content.

**Content Management Environment**

For a big-picture look at institutional content management environments, we asked respondents to choose which of five different environments best characterized their institution. The options, shown in Table 6-1 (along with short descriptors we’ll use to refer to them), ranged from integrated enterprise-level solutions, through mixed enterprise and local, to purely local or ad hoc environments. We also looked in more detail at specific kinds of ECM solutions and at the way institutions are approaching the management of learning content.

As Figure 6-1 shows, we found a wide distribution of current environments emphasizing content-specific tools, and not much adoption of integrated ECM solutions. The most common environment (35.9% of institutions) was a mix of best-of-breed enterprise and local or departmental solutions varying by content type. Four in 10 institutions reported only local or ad hoc solutions—that is, no enterprise solutions at all. Only 11.5% said they have an integrated ECM solution.

Three years out, however, things look quite different. Although about a third of institutions still anticipated a mixed enterprise/local best-of-breed environment—slightly fewer than now—the percentage of those expecting to have an integrated ECM environment was almost triple the current number. Correspondingly, the percentage of those anticipating an environment of local solutions by content type or an ad hoc environment dropped dramatically from the current levels.

In short, institutions seem to anticipate moving “up” the enterprise content management ladder at least to some degree. Table 6-2 shows how respondents expect current environments to change in three years. (Note that we combined the local solutions by content type and ad hoc categories into a single category to simplify this table.) Among respondents who currently report

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**Table 6-1. Institutional Content Management Environment Descriptions and Short Names**

<table>
<thead>
<tr>
<th>Short Description</th>
<th>Environment Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated enterprise content management (ECM)</td>
<td>An integrated enterprise content management solution that manages the widest possible range of content</td>
</tr>
<tr>
<td>Enterprise best-of-breed predominant</td>
<td>Best-of-breed enterprise solutions for most or all major content types</td>
</tr>
<tr>
<td>Mixed enterprise/local best-of-breed</td>
<td>A mix of best-of-breed enterprise and local/departmental solutions varying by content type</td>
</tr>
<tr>
<td>Local solutions by content type</td>
<td>No enterprise solutions, only local/departmental solutions for particular content types</td>
</tr>
<tr>
<td>Ad hoc</td>
<td>Digital content management is generally ad hoc</td>
</tr>
</tbody>
</table>
In an integrated ECM environment, only 6.1% expected changing to a different environment. By contrast, 80.4% of those in local/ad hoc environments expected to be in a different, more enterprise-oriented category. The largest group of these respondents (42.0%) expected to move to a mixed enterprise/local best-of-breed environment, but almost a quarter (23.2%) anticipated having an integrated ECM solution. Those respondents who currently have a mixed enterprise/local best-of-breed environment also often seem to aspire to something more centralized; 61.0% of them anticipated moving to either integrated ECM or an enterprise best-of-breed–predominant environment.

Assessing the likelihood of these plans being realized is difficult, though as we have noted elsewhere in this study, planned enhancements don’t always materialize. These
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figures do, however, seem to be a vote of confidence in the value of more enterprise-oriented content management and (to a lesser degree) in the near-term maturity of integrated ECM solutions. At the University of North Texas, Maurice Leatherbury, acting vice president for information technology and CIO, is looking forward to the planned implementation of an ECM system. “Right now, we only have loosely enforced policies about who can manage and edit content,” Leatherbury said. “The ECM implementation will provide better templating, rollback, better look-and-feel control and change control, and it will simplify the editing process and make it easier to maintain web pages.”

Do content management environments vary significantly by institution type? Interestingly, we found that they did for current environments but not for those three years out. As Figure 6-2 shows, among the major Carnegie classes, baccalaureate institutions were the most likely to report integrated ECM solutions. This suggests that the best fit for current ECM products is with smaller, organizationally flatter institutions, though baccalaureates were actually slightly more likely to report mixed enterprise and local best-of-breed solutions. Doctoral institutions had the highest rate of mixed enterprise and local best-of-breed solutions, which probably reflects both the characteristically distributed nature of research institutions and a wider range of content management needs. Perhaps the main impression these results leave, however, is variety: Every one of the environment types was reported by at least some institutions of every Carnegie class.

Effective Management of Varieties of Data and Digital Content

One of the key promises of ECM is that it brings coherence and manageability to...
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content creation and distribution, allowing the institution to manage content consistently across different content types. But do institutions pursuing enterprise approaches to content management actually do better at achieving this goal?

Judging by one rough measure, we found at least some indication that they do (see Table 6-3). Asked to express their agreement with the statement that their institutions effectively manage all the varieties of data and digital content that the institutions need, respondents on average weren’t inclined to agree: Their mean response was 2.81, short of even a neutral (3) response. But those reporting local or ad hoc solutions only were even more critical, averaging a 2.56 response. By contrast, those with enterprise best-of-breed—predominant or mixed enterprise/local environments averaged close to a neutral answer, and those reporting integrated ECM had a slightly higher than neutral response. It gives a sense of the magnitude of the difference to note that among the local/ad hoc group, only 12.4% agreed or strongly agreed with the statement, whereas among the integrated ECM group, 45.7% did. The uninspiring overall response to this statement strongly suggests that institutions are struggling to manage all the varieties of data and digital content they need. It’s hard to say that even those with integrated ECM systems are achieving the goal of effective management when their average answer barely tips past neutral—and this group represents fewer than one in eight of our survey respondents.

Some limits to these results should be kept in mind. Since our statement referred to all varieties of data and digital content, it didn’t consider whether the benefits of managing particular types especially well might be more important to some institutions than managing the whole range effectively. Likewise, it may be that institutions willingly maximize other factors, such as local autonomy or preserving freedom to innovate, at some cost in effective management of the whole spectrum of content.

Still, combined with the patterns we found in anticipated shifts from local to enterprise environments over the next three years, and in the context of an explosion of new data and content types, these assessments about effectively managing variety seem to suggest that an enterprise orientation helps with this challenging task.

**ECM Components**

In addition to the overall institutional content management environment, we wanted to know about the status of key major components of environments that contain enterprise solutions. Respondents

<table>
<thead>
<tr>
<th>Current Environment</th>
<th>We effectively manage all the varieties of data and digital content that the institution needs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean*</td>
</tr>
<tr>
<td>Integrated enterprise content management</td>
<td>3.17</td>
</tr>
<tr>
<td>Enterprise best-of-breed predominant</td>
<td>2.95</td>
</tr>
<tr>
<td>Mixed enterprise/local best-of-breed</td>
<td>2.93</td>
</tr>
<tr>
<td>Local/ad hoc</td>
<td>2.56</td>
</tr>
<tr>
<td>Total</td>
<td>2.81</td>
</tr>
</tbody>
</table>

*Scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
who reported an environment containing at least some enterprise aspects (that is, those reporting integrated ECM, enterprise best-of-breed–predominant, or mixed enterprise and local best-of-breed environments; see Figure 6-1) were asked a follow-up question about the status of each of three major ECM solutions:

- web content management (solutions permitting enterprise management of web content creation and publishing),
- records management (solutions managing/archiving official records for regulatory, financial, or historical needs), and
- document management (solutions for imaging, search, and other document-related functions focused on operational needs).

Respondents were asked to say whether each solution was implemented, being implemented, planned but not started, or not planned. Note that our question asked only about enterprise solutions of these types, whether best-of-breed or part of an integrated suite. Purely local solutions for these purposes did not fall within the scope of the question.

As Figure 6-3 shows, only web content management solutions were implemented at as many as half of institutions with enterprise-oriented content management environments. Records management solutions were implemented at 37.6% and document management solutions at 31.8% of the institutions with enterprise-oriented environments. But existing implementations don’t tell the whole story. When institutions currently implementing and planning to implement these solutions are included, our respondents seem overwhelmingly to feel that each of these items belongs in its enterprise IT environment. In each case, fewer than 1 in 10 reported not planning the solution.

Our qualitative interviewees gave us some insights into both the dynamics currently restraining content management approaches and those that might stimulate interest in them. For Linda Deneen, director of Information Technology Systems and Services (ITSS) at the University of Minnesota Duluth, web content management solutions don’t make the cost-benefit cut. “We investigated them,” she said, “but they seemed much too complex for our level of use, as well as too expensive.” UMD’s ITSS unit delivers Dreamweaver templates for use within the
institutional web environment, “and that guides users to a common look and feel, depending on how they’re used.”

At Bates College, by contrast, Gene Wiemers, vice president for Information and Library Services, describes the rationale that led Bates toward a “very tightly managed” approach to web content management. “We recognized early that the web is an official publication of the college,” he said. “We felt that if the faculty member wants to be creative with his or her course description, the way to do it is through an official approval process.” So Bates employs a content management system combined with an official approval protocol and the ability to draw some content, such as course descriptions, directly from enterprise administrative systems. Wiemers noted, however, that the institution’s web content management system needs much more flexibility, especially the ability to incorporate internally and externally hosted resources within the same framework. “That will enhance our ability to use tools like Flickr and YouTube within our institutional look and feel,” Wiemers said, “something we can’t even dream of now.”

Our interviewees tended to see web content as the area with the most mature content management tools, and a number of them particularly wished to see better tools to address pressing issues with document management. Terri-Lynn Thayer, assistant vice president and deputy CIO for Computing and Information Services at Brown University, said that “document management systems have to support the various document flow processes, and I don’t think the technology is there yet.” At the same time, Thayer added, business units must change business processes to facilitate, and exploit the advantages of, enterprise document management. “We’d love to find a common infrastructure that can be leveraged across units,” she noted. At the University of St. Thomas, Samuel Levy, vice president for Information Resources and Technologies and CIO, identified the central problem as making the information in documents discoverable and usable by applications. “Key information is in e-mails and their attachments,” Levy said. “What’s the taxonomy for that? You have these various repositories sitting in various databases and you need to find some way to abstract from the application to the repository in a way that’s meaningful to the organization. That’s the biggest single challenge.”

Since only respondents reporting some sort of enterprise-oriented content management environment were asked about the solutions listed in Figure 6-3, the incidence of each in the overall respondent population may be considerably smaller than shown there. On the other hand, the great majority of those institutions reporting a purely local or ad hoc content management environment today expect to move to an enterprise orientation within three years. If they realize those expectations and are as inclined to adopt ECM solutions as those who already have enterprise-oriented environments, the demand for these solutions could be even larger than implied in Figure 6-3.

Management of Learning Content

In Chapter 3, we reported that respondents on average assessed learning management system (LMS) data and content as one of the fastest-growing categories of data we asked about (see Table 3-1). Thanks to the richness of learning content and its increasing interactivity and presence within Web 2.0–influenced contexts, it is also one of the most varied and complex forms of institutional content. Efforts to make learning content more discoverable, reusable, standardized, and pedagogically targeted add still further elements to the mix, as do intellectual property considerations and institutional workflows. As a result, LMSs that once stored content in fairly simple application databases have developed more sophisticated data management schemes and are also often
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Our survey asked respondents about their institutions’ use of three different kinds of content stores used to deliver digital learning content via institutional LMSs:

- LMS database(s),
- dedicated learning content management systems (LCMSs), and
- other content management systems.

As Figure 6-4 shows, LMS databases were the most frequently reported content store, but dedicated LCMSs were surprisingly common as well. While 8 in 10 respondents reported using the LMS database, about 7 in 10 reported a dedicated LCMS. Though it seems clear that some institutions are using the LCMS in lieu of the LMS database, for the most part the dedicated LCMS is a supplement rather than an alternative. Of 200 institutions that reported using a dedicated LCMS, 163 (81.5%) also reported using an LMS database.

Evaluating the use of other kinds of content management systems definitively is more difficult, since this item attracted a large 14.0% “don’t know” response. It appears, however, that these content management systems are mainly supplemental to dedicated LCMSs. Of the 89 institutions reporting use of other content management systems, 68 (76.4%) also reported using a dedicated LCMS. Other content management systems were more commonly reported at doctoral institutions and at larger institutions, especially those with FTE enrollments of more than 15,000. Overall, it looks like these systems tend to be used in complex environments where there might be a wide variety of content types, LMSs, or both.

Among three kinds of content stores asked about, the largest proportion of respondents reported having two (44.6%), and a substantial additional group reported three (19.9%) (see Figure 6-5). Overall, only slightly more than a third of institutions used just one of the content stores we asked about. Most of these used the LMS database.

The Institutional Website

It’s hard to believe that colleges and universities somehow functioned without websites until about 15 years ago. Today, an institution without a website is as unthinkable as an institution without a campus—more unthinkable, in fact, in part because websites have made it so much easier to create an institution without a physical campus. Websites present the institution to the external world and facilitate a huge amount of internal communication;

![Figure 6-4: Content Stores Used to Manage Digital Learning Content Delivered via Institutional Learning Management Systems]
they are a sort of campus-branded universal platform.

And that’s what makes them so hard to manage. Probably no other technology has taught so many hard lessons about content management over the last decade or so. The web in its early years was a poorly understood yet immensely attractive environment that promiscuously mixed technically and creatively inclined users; everybody was an amateur. Campus web environments were a collage of inconsistently formatted, eccentrically edited, technically quirky sites, loosely overseen by nervous central IT units that lacked clear guidelines regarding authority or best practice. Although publication workflows that had some relevance to the problem were well known for years before the web was invented, they were largely found in special professional environments far from the IT culture, and it took a while to cross the barrier.

Since then, institutions have benefitted enormously from progress in the technical, policy, and procedural aspects of website management. At the same time, the web environment has become ever more complex—absorbing more types of content, interconnecting with more underlying systems, and facilitating more social practices. Thanks to a looming mobility revolution, the one semi-stable aspect of traditional web management—the PC as delivery platform—is fracturing, and the cloud computing paradigm is effacing the distinction between local applications and the web.

Given these challenges, we wanted to know where institutions situate responsibility for website design issues, to what extent they provide content management capabilities, what plans they have to enhance or add to their web environments, and whether they think they are exceeding the expectations of key website constituents.

**Responsibility for Website Look and Feel**

Assignment of responsibility tells us something about whether a technically enabled process is seen as a business or a technical matter. One of the pleasant surprises of this
study has been discovering that a reasonable division of responsibilities governs many data-management-related concerns. In Chapter 5, for example, we reported that key business-related issues such as data accuracy and regulatory compliance were most often the primary responsibility of business and academic units rather than central IT (see Figures 5-1 and 5-2).

When we asked a similar question regarding primary responsibility for determining the look and feel of the institution’s primary website (i.e., domain.edu homepage and subordinate pages), we found an even more pronounced assumption of business unit responsibility (see Figure 6-6). At about two-thirds of respondent institutions, this responsibility fell primarily to the public relations or marketing office, strongly suggesting that at this level the main website is conceived of primarily in terms of its business function of representing the institution. Central IT had the primary responsibility at only 5.6% of institutions.

This connection to the public relations or marketing function may actually be stronger than even these figures indicate, yet at the same time central IT’s role may not be quite as marginal as its infrequent assumption of primary responsibility suggests. At 23.4% of institutions, primary responsibility fell to a web policy/planning committee, and we asked these respondents which entities (from a list of 11 possibilities) were represented on the committee (see Figure 6-7). Out of 70 institutions replying to this question, 67 (95.7%) said that central IT was represented, and public relations (91.4%) and marketing (87.1%) rounded out the top of the list. They seem to have plenty of company as well: The median number of represented entities was seven, and 22.1% of institutions reported nine or more.

Thus, at the great majority of respondent institutions, public relations and marketing—campus offices typically charged with outreach, brand management, and publishing responsibilities—either have direct primary responsibility for website look and feel or are represented on the committee that has it. We speculate as well that even where some entity other than a policy/planning committee has primary responsibility, mechanisms exist to involve central IT and get input from a variety of campus organizations, whether through committees that are subordinate to the department in charge or through informal or ad hoc processes.

Certainly our qualitative interviewees described an active central IT role in web policy, planning, and administration, as well as confirming our survey results emphasizing public relations and marketing units as the entities with primary responsibility for overall look and feel. At Georgia State University,
for example, J. L. Albert, associate provost and CIO, explained that University Relations approves website templates, but IT programs the templates on the basis of frameworks in the university’s content management system; in doing so, Albert noted, “IT is controlling the ergonomics of navigation.” Steve Gallagher, CIO at the University of San Francisco, described an environment in which IT is both technical enabler and enterprise coordinator. “Academic enrollment and services manages content in admissions-related areas, and the advancement area, which includes public affairs and communications, handles other institutional content,” Gallagher said. Schools and departments must also keep their own content up to date, whereas “IT’s role is to provide the infrastructure and the information channeling capability.” The planned implementation of a new content management system, however, is leading USF to rethink its basically federal structure and consider greater central oversight. “The challenge,” Gallagher noted, “is the natural tension between providing a central framework that will ensure consistency while empowering the local levels.”

The predominance of outward-facing departments in determining website look and feel is no doubt partly explained by their professional competencies. But it also has something to say about the strategic nature of the website. Because it’s a virtual embodiment of the institution, it must convey a positive and consistent image; because it communicates so much information, it must be suited to frequent and diverse updates, and speak with authority. These requirements in turn imply the need for a web environment with robust content management characteristics.

**Web Environment Characteristics**

Like previous IT realms, web management has been forced by its own success to develop the markers of mature information practice: separating data and logic components that were once intertwined,
leveraging technologies that take routine work out of the hands of programmers and put it into the functional staff hands where it belongs, and formalizing access rules and workflows even as participation in the technology broadens.

To learn more about how widespread practices like this are, we presented respondents with five statements relating to web content management and asked them the extent to which each characterized their institution, using a scale from 1 (in no cases) to 5 (in all cases). The statements and mean responses appear in Table 6-4.

Most of the characteristics we asked about were fairly prevalent. Consistent look and feel, ability of website owners to perform routine maintenance without IT intervention, and granular control over user access to website content all had mean responses above the midway point between “in some cases” and “in most cases,” and for each item, more than 60% of respondents said the characteristic applied in most or all cases. At the bottom of the list was one of the more advanced aspects of web content management, having adequate workflows in place for the editing and approval of website content. Even here, however, 41.4% said that such workflows were in place in most or all cases.

Broadly speaking, then, our respondents painted a relatively positive picture of the extent of these good (if basic) web content management practices. In addition, we found a strong positive association between having an enterprise web content management solution and higher mean results for all of the web environment characteristics we asked about. As Table 6-5 shows, institutions that reported an implemented enterprise web content management system reported on average a considerably higher prevalence of each web characteristic than those that did not plan, or had not started, such an implementation. Those in the process of implementing were in between. (Only institutions with an enterprise-oriented environment for digital content management—one of the three left-most categories shown in Figure 6-1—were included in this analysis.)

Although we can’t prove a causal link, and other factors surely are involved, it seems reasonable to interpret this relationship as evidence that enterprise web content management solutions do help achieve the ends they’re designed for. As Wayne Powel and Chris Gill of Gonzaga University argue in a 2003 article in the EDUCAUSE Quarterly, “Web content management systems present the best of both worlds: They give the people who know the

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**Table 6-4. Web Environment Characteristics**

<table>
<thead>
<tr>
<th>At my institution...</th>
<th>Mean*</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web pages have a consistent look and feel.</td>
<td>3.80</td>
<td>309</td>
<td>0.816</td>
</tr>
<tr>
<td>Website owners can perform routine site maintenance without IT intervention.</td>
<td>3.73</td>
<td>308</td>
<td>0.976</td>
</tr>
<tr>
<td>We have granular control over user access to website content (e.g., create, edit, publish, read access).</td>
<td>3.66</td>
<td>305</td>
<td>1.185</td>
</tr>
<tr>
<td>The web environment is database-driven (i.e., content is stored separately from templates).</td>
<td>3.33</td>
<td>300</td>
<td>1.094</td>
</tr>
<tr>
<td>Adequate workflows are in place for the editing and approval of website content.</td>
<td>3.15</td>
<td>299</td>
<td>1.146</td>
</tr>
</tbody>
</table>

*Scale: 1 = in no cases, 2 = in a few cases, 3 = in some cases, 4 = in most cases, 5 = in all cases
content control over it, but retain the university’s ability to define a look and feel consistent throughout all or parts of an entire site.\textsuperscript{4}

Future Enhancements to Institutional Web Environment

Websites evolved rapidly from the simple display of static information to more dynamic responses to user inputs, integration with back-office systems, incorporation of personalizable portals, and the addition of Web 2.0 tools. Recently, institutional websites have also come up against new competition, including extensible, platform-based social networking sites like Facebook that users can orient their online lives around and cloud-based office applications and collaboration tools users can access directly without the mediation of an institutional bureaucracy.

To keep up, institutional websites have to evolve constantly, incorporating new kinds of data and content that add their weight to an already overburdened institutional data management scene. We were interested to know how respondents expected demands on the institutional website to change in the near future, so we asked them to identify the three additions or enhancements to their institutional web environment (from a list of 10 items) they thought would be most important to meeting constituent expectations in the next three years (see Figure 6-8).

### Table 6-5. Web Environment Characteristics, by Enterprise Web Content Management Solution Status*

<table>
<thead>
<tr>
<th>At my institution...</th>
<th>Enterprise Web Content Management Solution Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Planning/Planned, Not Started</td>
</tr>
<tr>
<td>The web environment is database-driven (i.e., content is stored separately from templates).</td>
<td>Mean**</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Website owners can perform routine site maintenance without IT intervention.</td>
<td>Mean**</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Adequate workflows are in place for the editing and approval of website content.</td>
<td>Mean**</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Web pages have a consistent look and feel.</td>
<td>Mean**</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>We have granular control over user access to website content (e.g., create, edit, publish, read access).</td>
<td>Mean**</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Std. Deviation</td>
</tr>
</tbody>
</table>

*Data excludes institutions reporting only local/departmental or ad hoc solutions for enterprise management of digital content.

**Scale: 1 = in no cases, 2 = in a few cases, 3 = in some cases, 4 = in most cases, 5 = in all cases
Two items stood out from the rest: video streaming and download, named among their top three by 69.9% of respondents, and web content formatted for handheld devices, selected by 55.3%. The video streaming result echoed a theme that has appeared several times in this study: the challenge of meeting growing demand for video resources. In Chapter 3, we noted that online video and audio content was the data type that institutions least agreed they had the infrastructure to manage (see Figure 3-1). At the same time, respondents were relatively positive about their ability to manage this kind of data in three years, and our results regarding enhancements to the web environment are consistent with those expectations.

One probable stimulus of online video demand is lecture capture systems, which permit institutions to create a library of streamable course lectures; likewise, media, arts, and education programs all increasingly involve video content creation. Institutions may also be responding to the growing prevalence of video in web content, stimulated by the popularity of YouTube, “vlogs” (video blogs), and the increasing amount of digitally delivered video entertainment. ECAR’s 2009 study of students and IT found that 84% of undergraduate respondents download music or video and 45% contribute content to video websites.

Handheld devices may be on the cusp of an even bigger transformation of the web. The success of Apple’s iPhone redefined the smartphone as an applications-consuming information appliance with a “real” browser. A new generation of competing devices is now following Apple’s lead. Though device and data plan costs remain high, they are likely to drop, and even at their current levels they have already permitted the lively growth of mobile computing at some campuses. Stanford University, MIT, and the University of California at San Diego have been conspicuous among institutions developing campus mobile computing strategies, and Blackboard’s 2009 acquisition of Terriblyclever Design, an iPhone
applications start-up founded by Stanford students, signals the incorporation of mobility into mainstream enterprise environments. ECAR’s 2009 student study found a large, though diverse, student user base for Internet-enabled handheld devices: Half of students said they owned such a device, and though a substantial 35% of these never accessed the Internet from them, 29% did so daily and another 21% did so weekly or several times per week. These figures suggest that institutions are wise to put web content formatting for handheld devices on their near-term web development agendas.

Qualitative interviews made it clear that many IT administrators are keenly following these developments. “We plan to aggressively push out new mobile services, to students in particular,” said USF’s Gallagher. “The overarching goal is to create more touch points to the institution.” At the University of Tennessee at Chattanooga, Clinton Smullen, director of Academic and Research Computing Services, reported that, besides improved content management, the most important enhancement the university will add to its web environment is support for mobile devices. “Blackboard has developed an iPhone app to connect to the course management system, and we think that’s a good thing to support,” said Smullen. “We’re also looking at ways to reformat our ERP content appropriately when the system detects a mobile browser.”

Though Web 2.0 capabilities weren’t especially conspicuous in our survey results regarding future web plans, interviewees often mentioned plans related to social networking and interactivity. Neil McElroy, dean of Libraries and Information Technology Services at Lafayette College, summed up the college’s plans this way: “We want to see the website ingest content from the community, not just from the central communications office. That’s the essential characteristic of Web 2.0.” But, McElroy adds in a comment echoed by many of our interviewees as they discussed their website plans, “You can’t do that without a good content management system.”

The Institutional Website and Constituent Expectations

Given this picture of what institutions think they need to do to meet constituent expectations, it’s only natural to wonder how well they think they’re meeting those expectations now. In our survey, we set a high bar of performance, asking respondents their level of agreement that the primary institutional website at their institutions routinely exceeds the expectations of each of four constituent groups: faculty, staff, students, and public users.

The results were a little ambiguous but leaned against the interpretation that institutions think they routinely exceed expectations. As Figure 6-9 shows, “neutral” was by far the most common response for each constituent group, and for all groups except public users, more respondents disagreed than agreed. Notwithstanding this slightly stronger agreement overall that public user expectations are routinely exceeded, the most striking thing about the responses was their similarity. The mean responses for all groups were close to an average neutral response. Among the on-campus constituent groups, means hovered slightly below or around an average neutral response for staff (2.99), faculty (2.80), and students (2.89), whereas mean agreement about exceeding public users’ expectations was 3.23.8

If these top-level results feel a bit blase and homogeneous, though, we found more differentiation when we compared mean agreement about exceeding expectations with the extent to which the web environment characteristics we discussed above (Table 6-4) prevailed at the institution. As Table 6-6 shows,9 mean agreement about exceeding expectations rose for every constituent group where the extent of each of four web environment characteristics was greater:
Table 6-6. Primary Institutional Website Routinely Exceeds Expectations of Constituents, by Web Environment Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Faculty</th>
<th>Staff</th>
<th>Students</th>
<th>Public Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>The web environment is database-driven (i.e., content is stored separately from templates).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In no or few cases (N = 65)</td>
<td>2.49</td>
<td>0.859</td>
<td>2.67</td>
<td>0.894</td>
</tr>
<tr>
<td>In some cases (N = 77)</td>
<td>2.82</td>
<td>0.914</td>
<td>2.95</td>
<td>0.986</td>
</tr>
<tr>
<td>In most or all cases (N = 139)</td>
<td>2.94</td>
<td>0.841</td>
<td>3.16</td>
<td>0.850</td>
</tr>
<tr>
<td>Adequate workflows are in place for editing/approval of website content.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In no or few cases (N = 79)</td>
<td>2.37</td>
<td>0.894</td>
<td>2.56</td>
<td>0.953</td>
</tr>
<tr>
<td>In some cases (N = 88)</td>
<td>2.86</td>
<td>0.847</td>
<td>3.00</td>
<td>0.892</td>
</tr>
<tr>
<td>In most or all cases (N = 116)</td>
<td>3.07</td>
<td>0.789</td>
<td>3.28</td>
<td>0.799</td>
</tr>
<tr>
<td>Web pages have a consistent look and feel.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In no or few cases (N = 23)</td>
<td>2.13</td>
<td>0.920</td>
<td>2.29</td>
<td>1.160</td>
</tr>
<tr>
<td>In some cases (N = 56)</td>
<td>2.61</td>
<td>0.779</td>
<td>2.76</td>
<td>0.844</td>
</tr>
<tr>
<td>In most or all cases (N = 211)</td>
<td>2.92</td>
<td>0.860</td>
<td>3.13</td>
<td>0.855</td>
</tr>
<tr>
<td>We have granular control over user access to website content (e.g., create, edit, publish, read access).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In no or few cases (N = 54)</td>
<td>2.44</td>
<td>0.883</td>
<td>2.53</td>
<td>0.920</td>
</tr>
<tr>
<td>In some cases (N = 52)</td>
<td>2.69</td>
<td>0.843</td>
<td>2.89</td>
<td>0.904</td>
</tr>
<tr>
<td>In most or all cases (N = 180)</td>
<td>2.95</td>
<td>0.861</td>
<td>3.15</td>
<td>0.876</td>
</tr>
</tbody>
</table>

*Scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
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Table 6-7. Primary Institutional Website Routinely Exceeds Expectations of Constituents, by Enterprise Data Quality Score

<table>
<thead>
<tr>
<th>Enterprise Data Quality Score</th>
<th>Faculty Mean*</th>
<th>Faculty Std. Deviation</th>
<th>Staff Mean*</th>
<th>Staff Std. Deviation</th>
<th>Students Mean*</th>
<th>Students Std. Deviation</th>
<th>Public Users Mean*</th>
<th>Public Users Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (less than 2.5), N = 64</td>
<td>2.39</td>
<td>0.920</td>
<td>2.63</td>
<td>0.960</td>
<td>2.40</td>
<td>0.871</td>
<td>2.83</td>
<td>0.985</td>
</tr>
<tr>
<td>Medium (2.5–3.5), N = 144</td>
<td>2.83</td>
<td>0.817</td>
<td>2.99</td>
<td>0.868</td>
<td>2.99</td>
<td>0.901</td>
<td>3.24</td>
<td>0.819</td>
</tr>
<tr>
<td>High (greater than 3.5), N = 77</td>
<td>3.09</td>
<td>0.835</td>
<td>3.29</td>
<td>0.860</td>
<td>3.14</td>
<td>0.823</td>
<td>3.52</td>
<td>0.821</td>
</tr>
</tbody>
</table>

*Scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree

- the web environment is database-driven,
- adequate workflows are in place for the editing and approval of website content,
- web pages have a consistent look and feel;¹⁰ and
- the institution has granular control over user access to content (e.g., to create, edit, publish).

Interestingly, despite the sometimes dramatic differences between institutions where these characteristics were less extensive and those where they were more extensive, we did not find any significant difference based on the status of enterprise web content management solutions. Neither did we find significant differences related to demographic factors such as Carnegie class, FTE enrollment size, or public/private control.

However, one other factor was strongly associated with higher agreement about exceeding constituent expectations about the institutional website: data quality. In Chapter 4, we introduced an enterprise data quality score based on the average response to eight different data-quality-related survey items (see Table 4-2 and related text). As Table 6-7 shows, for all constituent groups, mean agreement about exceeding expectations was roughly 0.7 higher (on a scale of 1 to 5) among institutions with high enterprise data quality scores than among those with low scores.¹¹

Taken together, these findings suggest that investments in web content management best practices and in data quality overall do have an impact on how the institution’s web environment is perceived. The web environment characteristics reported here are intended to make websites easier to navigate and maintain, to keep up to date, and to manage for appropriate access, and it’s not hard to see how these characteristics might directly affect user experience. The connection with enterprise data quality is less obvious, especially since our data quality questions referred to administrative systems rather than to the web environment. But the institutional website is often fueled by underlying enterprise data, particularly through enterprise portals and self-service sites, and sound data may make those services not only more trustworthy but also easier to implement in the first place. Likewise, as we reported in Chapter 4, better data quality is associated with the granularity of user data access authorization, perhaps by making identity information more robust, and this may help make websites more powerful or convenient. Finally, given the frequency with which a data quality connection has arisen in
In this study, it may be that good enterprise data quality is a marker for a general atmosphere of good data management, with pervasive effects that improve user satisfaction.

**Electronic Records Management**

Within the large and expanding universe of information used by an organization, some elements have qualities that give them special status as records. Exactly what constitutes a record is a matter of some debate, but ISO standard 15489:2001, which addresses the practice of records management, defines records as “information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business.” These attributes are fairly elastic, especially if, as is often the case, records are understood to have historical as well as legal and business importance. But this definition does make it clear that records stand out as particularly significant documents requiring special treatment in the context of complex regulatory and business needs. For these reasons, we dedicated a portion of our survey to find out more about how institutions manage records, especially those that exist in electronic form.

**Electronic Records Management in the Organization**

Records management professionals can contribute a range of skills that complement those of IT professionals. Although IT staff have a professional familiarity with data management grounded in the disciplines of computer science and the management of information systems, records professionals know the regulatory environment that applies to the whole spectrum of records, both paper and electronic, and draw on expertise from archival and library science. As law fitfully catches up with developments in IT and as the technology itself provides better ways to get value from data, professional practices in both areas have had to evolve. The goal of this convergence of skills is to better manage the fuzzy zone between data design and operational use on the one hand and regulatory compliance and full life-cycle information management on the other. As one author puts it, records managers and IT administrators “must educate each other and their organizations on the technology and the policies to ensure that their organization makes efficient, effective use of its information in a compliant environment.”

We were therefore interested to know to what extent institutions have designated archivists or records officers and have assigned them responsibility for electronic records. As Figure 6-10 shows, the two aspects of our inquiry divide neatly in halves: 50.5% of institutions reported having a designated archivist or records officer, and those institutions in turn were almost equally divided between those where the archivist/officer is or is not responsible for electronic records. Altogether, about a quarter of respondents (25.9%) reported an archivist/officer with electronic records responsibility. (The overall percentage for archivists/officers may be slightly low due to a relatively large 8.4% who didn’t know whether their institution had a designated archivist or records officer.)

Though we found institutions with designated archivists or records officers across all Carnegie classes and institution size ranges, the incidence of such officers and the likelihood that they had responsibility for electronic records increased with FTE enrollment size (see Figure 6-11; these percentages exclude respondents who answered “don’t know”). Research-oriented institutions were considerably more likely to report having an archivist or records officer (72.3%) than were teaching-oriented institutions (48.0%). Our figure for research-oriented institutions was a little
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ECAR Research Study 8, 2009

Figure 6-10. Institution Has Archivist or Records Officer, and Archivist/Officer Responsibility for Electronic Records (N = 309)

- No archivist/officer: 41.1%
- Archivist/officer has designated archivist/officer: 50.9%
- Archivist/officer not responsible for electronic records: 25.9%
- Archivist/officer responsible for electronic records: 74.1%
- Don’t know: 8.4%
- Not responsible for electronic records: 24.6%

Figure 6-11. Institution Has Designated Archivist/Records Officer, by FTE Enrollment and Responsibility for Electronic Records

- 1–4,000 (N = 133)
  - No archivist/officer: 30.1%
  - Archivist/officer not responsible for electronic records: 28.9%
  - Archivist/officer responsible for electronic records: 45.4%
  - Don’t know: 17.3%
- 4,001–15,000 (N = 97)
  - No archivist/officer: 25.8%
  - Archivist/officer not responsible for electronic records: 21.3%
  - Archivist/officer responsible for electronic records: 52.6%
  - Don’t know: 17.3%
- More than 15,000 (N = 47)
  - No archivist/officer: 57.4%
  - Archivist/officer not responsible for electronic records: 21.3%
  - Archivist/officer responsible for electronic records: 28.9%
  - Don’t know: 11.6%
higher than the 66% reporting a records management function in a 2008 survey of member institutions of the Association of Research Libraries.  

A designated archivist or records officer isn’t the only path to managing electronic records, so we also asked respondents if they had a group responsible for overseeing electronic records management. Four out of 10 (40.7%) said they did, and although some of these institutions were no doubt referring to their archivist or records officer, 31 institutions that said they had no archivist/officer reported having such a group. Altogether, 65.9% of institutions said they have an archivist/officer, an electronic records management group, or both. When all overlaps and archivist responsibilities are taken into account, 49.1% of institutions officially assigned responsibility for electronic records to either an archivist/officer or to an electronic records management group.  

There are probably other ways to skin the electronic records cat than by having a designated archivist records officer or an electronic records group with responsibility for them. Still, the fact that barely half of respondent institutions reported one or both of these organizational entities for managing the exploding and increasingly regulated realm of electronic records suggests that this aspect of records management has fallen through organizational cracks at many institutions.

**Electronic Records Retention Schedules**

One of the central concepts of records management is the information life cycle, and a key aspect of that life cycle is deciding whether, and in what way, records should be retained beyond the period of their operational use. Many requirements, both external (such as regulations and legal liability) and internal (such as preserving information with business or historical value), affect institutional records retention needs, and formal documentation of records retention schedules is a commonly noted best practice in records management. Electronic records (or e-records) present particular challenges, since they are extremely abundant, their physical preservation and readability depend on specific technologies and systems, and full-spectrum understanding of their nature may require expertise rarely found in a single individual or department.

Retention schedules for electronic records were quite common among our respondent institutions, at least for core areas of administration (see Figure 6-12). About three-quarters or more of institutions said that they have documented e-records retention schedules for financial (81.8%), student (78.4%), and human resource (73.3%) records. Outside these domains with long traditions of administrative practice and regulatory oversight, retention schedules were less common, though by no means rare. Schedules for course-related and LMS e-records, research grant e-records, and faculty and staff e-mail were in each case reported by roughly half of institutions. Somewhat complicating the interpretation of these figures were unusually high “don’t know” response rates, particularly in relation to HR, course/LMS, and research grant e-records.

These retention schedule rates hold up well in comparison with the results of a 2007 survey of records management professionals conducted by two industry groups (ARMA International and AIIM International) and by Cohasset Associates, a records management consulting firm. In that survey, 46% of organizations said they had electronic records retention schedules for data objects such as application data—well below the rates we found for financial, student, and HR data—and 45% said they had schedules for communications including e-mail; these were about the same as the rates we found for staff and faculty e-mail.
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Overall, among our respondents the median number of documented e-records retention schedules reported was five (of seven asked about), and the average number of schedules tended to rise with FTE enrollment size—that is, bigger institutions tended to report more.\textsuperscript{18} Schedules also tended to be more numerous where institutions had implemented an enterprise records management system, perhaps because such systems provide a framework for creating and maintaining schedules. However, we did not find any difference between institutions on the basis of having or not having an archivist/records manager or a group responsible for overseeing e-records management.

**Records Retention Compliance**

Documenting records management policies is one thing; following them is another. Like a lot of institutional processes, records management can be difficult to carry out at the institution-wide level because of the distributed nature of records and the competing demands of higher-priority (or at least higher-urgency) operational tasks. Nor are these difficulties limited to higher education. In the 2007 ARMA/AIIM/Cohasset survey mentioned above, 45\% of organizations answered with one of the two lowest-compliance categories—“not regularly” and “when time permits”—when asked whether they followed their records retention schedules. The study authors suggest that noncompliance is often the result of a lack of senior-level commitment to the schedules and the failure of records managers to take a strong role asserting consistent schedules throughout their organizations.\textsuperscript{19}

Such factors may help explain why, when we asked our respondents to rate their institution’s ability to comply with records retention...
and disposition requirements throughout the institution, most answered at the low end of our rating scale of 1 (poor) to 5 (excellent). As Figure 6-13 shows, 53.0% rated their institution as either poor or fair, and only 13.4% said it was either very good or excellent. The mean answer overall was 2.5, halfway between fair and good.\(^{20}\)

The records management challenges implied by these results seem to be widespread. The response pattern didn’t vary significantly by Carnegie class, institutional FTE enrollment, or research/teaching orientation. Neither did we find that having a designated archives or records officer made a difference.

We did, however, find some other indications that good data management practices travel alongside better perceived ability to comply with records retention and disposition requirements throughout the institution (see Table 6-8). Mean perceived compliance tended to rise with the number of electronic records retention schedules the institution reported; among those with no schedules or only one, it averaged fair, whereas among those reporting six or seven, it averaged just slightly under good. As with a number of other important outcomes measures, we also found that institutions with higher enterprise data quality scores tended to report higher records retention and disposition compliance. Finally, respondents whose institutions had implemented an enterprise records management solution rated compliance substantially higher than did those that did not plan, or had not started, such a solution. (Only those institutions that told us they had an enterprise-oriented environment for digital content management—one of the three leftmost categories shown in Figure 6-1—were included in the enterprise records management solution result).\(^{21}\)

**Facing the Content Challenge**

Taken together, three measures reported in this chapter suggest a sense of unease among our respondents about meeting the challenges of the modern content
In the institutional environment. Asked about their institutions’ ability to effectively manage all the varieties of content their institutions need, to routinely exceed the expectations of major on-campus constituents regarding the institutional website, and to comply with records retention and disposition requirements, in each case respondents answered, on average, below or at the middle value of the response scales. Granted, one of these measures (exceeding expectations) set a high bar of performance. But then again, the institutional website is such a vital and heavily used resource that a high standard of satisfaction is worth pursuing.

We also found a rough outline of institutional response to the content challenge. Current content management environments tend to be distributed, and indeed for 4 out of 10 institutions they are entirely local or ad hoc; but looking to the near future, institutions seem to express the ambition for a more enterprise-oriented approach. That has some potential to help, considering that we found that institutions with more enterprise-oriented environments reported higher agreement about effectively managing content variety, and they were more likely to report web content management best practices that, in turn, we found positively associated with higher agreement about exceeding constituent expectations for the website.

Although institutions aren’t on the whole very optimistic about complying with records retention needs, those that have documented more e-records retention schedules give themselves higher compliance ratings, as do those that have implemented enterprise

<table>
<thead>
<tr>
<th>Rate your institution’s ability to comply with records retention and disposition requirements throughout the institution.</th>
<th>Mean*</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of E-Records Retention Schedules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–1</td>
<td>2.00</td>
<td>48</td>
<td>0.744</td>
</tr>
<tr>
<td>2–3</td>
<td>2.14</td>
<td>43</td>
<td>0.915</td>
</tr>
<tr>
<td>4–5</td>
<td>2.45</td>
<td>110</td>
<td>0.863</td>
</tr>
<tr>
<td>6–7</td>
<td>2.93</td>
<td>105</td>
<td>0.824</td>
</tr>
<tr>
<td>Enterprise Data Quality Score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (less than 2.5)</td>
<td>2.22</td>
<td>69</td>
<td>0.937</td>
</tr>
<tr>
<td>Medium (2.5–3.5)</td>
<td>2.49</td>
<td>152</td>
<td>0.876</td>
</tr>
<tr>
<td>High (greater than 3.5)</td>
<td>2.79</td>
<td>84</td>
<td>0.851</td>
</tr>
<tr>
<td>Enterprise Records Management Solution Status**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not planning/planned, not started</td>
<td>2.42</td>
<td>62</td>
<td>0.950</td>
</tr>
<tr>
<td>Implementation in progress</td>
<td>2.55</td>
<td>42</td>
<td>0.739</td>
</tr>
<tr>
<td>Implemented</td>
<td>3.03</td>
<td>64</td>
<td>0.816</td>
</tr>
</tbody>
</table>

*Scale: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

**Data excludes institutions reporting only local/departmental or ad hoc solutions for enterprise management of digital content.
records management solutions. And, finally, in a recurring theme in this study, better data quality keeps company with higher agreement about both exceeding website constituent expectations and better compliance with records retention requirements.

Our outline suggests, then, that institutions can take some practical steps toward taming the content beast: approaching content from an enterprise view, being diligent about indentifying and documenting the subset of content and data that needs special treatment as records, and in general maintaining a high-quality data environment. Yet we can’t help but speculate that even institutions attempting to make these improvements at the margins will struggle to keep up with increasing content scope and complexity in the absence of some new, radically more potent paradigm for managing content according to its value and use, rather than its type and point of origin. Speaking of the difficulties of managing the modern data environment, Renee Drabier of the University of North Texas Health Science Center confessed, “I feel a little shortsighted about what we might be using in 10 years. So far it’s just been bigger, faster, more reliable. But I feel there has to be a sea change coming. It’s hard to prepare for the unknown. You just have to make the best possible decisions now and deal with what comes as best you can.”

Endnotes
3. The results in Table 6-5 apply only to the 180 respondents who reported an enterprise-oriented environment for digital content management, because only those respondents were asked about the status of an enterprise web content management solution (see Figure 6-3 and related discussion). On the hypothesis that most or all of those respondents who had non-enterprise-oriented environments could be assumed not to have enterprise web content management solutions, we tested this relationship for the whole population of 309 institutions. It was also statistically significant, though the association was not as strong.
6. For an analysis of MIT’s approach to mobility, see Bob Albrecht and Judith A. Pirani, “Massachusetts Institute of Technology: Transforming the Campus Experience with the MIT Mobile Web” (Case Study 3) (Boulder, CO: EDUCAUSE Center for Applied Research, 2009), available from http://www.educause.edu/ecar.
8. Ns/standard deviations were 292/0.878 (faculty), 296/0.913 (staff), 292/0.911 (students), and 287/0.889 (public users).
9. Ns shown on detail lines in Table 6-6 represent the smallest N of the separate means reported on each line; the actual Ns vary slightly.
10. A small number of “in few or no cases” responses to the consistent look-and-feel item make the means for this response slightly less reliable than the other means reported in this table.
11. Ns shown on detail lines in Table 6-7 represent the smallest N of the separate means reported on each line; the actual Ns vary slightly.
15. These figures exclude those who answered “don’t know” to the question about having a designated archivist or records officer.

18. Analysis of median and mean numbers of documented retention schedules excluded “don’t know” responses.

19. Williams and Ashley, *Call for Collaboration*, 22–23. The other two answer categories were “generally” (50%) and “always” (14%).

20. N = 306, SD = 0.906.

21. We only included the 180 respondents who reported an enterprise-oriented environment for digital content management because only these respondents were asked about the status of an enterprise records management solution (see Figure 6-3 and related discussion). Some respondents answered “don’t know” to the records management solution question or skipped it, and these are not included in the Ns in Table 6-8. On the hypothesis that most or all of those respondents who had non-enterprise-oriented environments could be assumed not to have enterprise records management solutions, we tested this relationship for the whole population of 309 institutions, and it was also statistically significant.