

## FACTORS AFFECTING THE ADOPTION OF OPEN SOURCE CONTENT MANAGEMENT SYSTEMS IN JAPANESE UNIVERSITIES

JONATHAN LEWIS

### I. *Introduction*

This article proposes key factors in the adoption of open source content management systems (CMSs) in Japanese national universities. Using the framework proposed by Rogers (2003) to explain differences in the rate of diffusion of innovations, the article focuses on key features of the social system of web publishing in Japanese universities and on attributes of open source CMSs. It argues first that the publishing process is highly decentralized, i.e. most online information is produced not at the university level but by functionally autonomous faculties, libraries and other sub-organizations. This argument is supported by an analysis of the visual design of a random sample of national and private university websites. This decentralization, it is argued, will tend to slow down adoption of CMSs in Japanese universities. Second, it argues that open source CMSs have a number of attributes that will also tend to slow down their adoption by Japanese universities. Finally, it points to the academic CMS “enthusiast” as playing an important but potentially unreliable role as opinion leader in a university’s decision to adopt a CMS.

The arguments are based on interviews carried out with site administrators at four Japanese universities and the staff of four companies providing open source CMS solutions to Japanese universities in February and March 2008.<sup>1</sup> The author’s fifteen years of experience in web publishing at three Japanese universities, two national and one private, and his four years of participation in the Japanese and international user and developer communities of the Plone open source CMS<sup>2</sup> also inform the arguments.

The article is organized as follows. The first section describes the institutional context of web publishing by Japanese universities, noting the various pressures to increase the volume of information published and the continuing decentralized character of online publishing. These contentions are supported by a visual analysis of a random sample of national and private universities. The second section then analyzes the diffusion of open source CMSs in Rogers’ framework, pointing out a number of attributes and other factors that will tend to slow down the rate of adoption. Finally, some conclusions point out inefficiencies of the present system and discuss possible remedies.

---

<sup>1</sup> Many thanks to the following informants: Manabu Terada (<http://www.cmscom.jp/>); Michiharu Sakurai (<http://www.breakbeans.com/>); Jack Kato (<http://synergies.jp/>); Takashi Nagai; Retsu Yamamoto; the staff of Keio University Library; anonymous informants at two major national universities; and members of the Plone Kenkyukai (<http://plone.jp>). An earlier version of this paper was given at Plone Symposium East, Penn State University, in March 2008; I am grateful for all the feedback received.

<sup>2</sup> See <http://plone.org>. For an academic treatment see Aspeli (2004).

## II. *Web Publishing by Japanese Universities*

Japanese universities, like their counterparts in other countries, have in recent years put great efforts into providing more information online regarding their teaching, research and other activities. The motivations for this are various. First, potential students are much more likely to look for information about universities online than in print media such as brochures or posters.<sup>3</sup> Second, university administrations are able to increase the efficiency of their operations, such as providing syllabus information to students, by deploying web-based intranets; once the infrastructure and knowledge of online data provision is in place, it makes sense to expand its use to include functions such as faculty research databases. Third, faculty members find it a cheap and convenient way to disseminate information to students, colleagues and others, and the feedback they receive encourages them to publish more. Fourth, both national and private universities have become keener to raise money from former students and corporations, and an attractive online presence may be a way of reaching potential donors. Fifth, Japanese universities have become increasingly concerned about their positions in international rankings of universities. While the most widely quoted rankings such as the The Times Higher Education -QS World University Rankings and Shanghai Jiao Tong University's Academic Ranking of World Universities focus mostly on the quantity and quality of academic publications and universities' reputations among academics and employers, at least two rankings, Webometrics and G-Factor, assess universities' online presence. Amidst the general concern about international rankings, Japanese universities (including the one publishing this journal) have noticed their generally low positions in these rankings of web presence and resolved to make more and better information available online, especially in English.

The creation of websites in Japanese national universities—the following subsection will make clear why I am not covering private universities—since the mid-1990s has been a highly decentralized process. Top-level sites have been created by universities' central administrations. Faculties, graduate schools and other large internal organizations such as libraries and computer centers have created and maintained their own sites using internal administrative and academic staff. Finally, there is a myriad of sites run by smaller research projects and centers, and by individual faculty and students. Faculty members' sites often focus on the professor's students (*zemi*) and many are created and maintained by a student. Universities place few restrictions on the establishment of websites by internal organizations or staff; setting up a server and obtaining a subdomain name is simple for any faculty member with the requisite technical skills. The only real restriction is the lack of IT support staff, which means that academics and administrators must either be willing to learn how to create and maintain sites themselves, or find the money to pay students or outside companies to do the job for them.

---

<sup>3</sup> For example, of 26 respondents to the survey of those attending Hitotsubashi University's Institute for the Study of Global Issues explanatory meeting for prospective students on 28 June 2008, 24 had found out about the meeting from the graduate school website, two by word of mouth, and none from the (expensively produced and distributed) poster or other sources of information. These figures were in line with the results of previous years' surveys.

## 1. Decentralized Design

The decentralized nature of website creation in national universities is reflected in both the design of websites and the technology used to run them. As far as design is concerned, top sites tend to have a consistent design supplied by a web design company. Websites of individual departments and organizations which have been created independently of the main university website tend to have their own designs; many have also been professionally designed (or re-designed) while others continue in their first incarnation. Finally, smaller-scale websites of departments, research projects or centers and individual faculty members tend to be designed, built and maintained in-house by academics and administrative staff for whom web publishing is not a main work task.

To give some objective substance to these observations, which are based on the author's experience of web publishing in national and private universities in Japan, I undertook a simple analysis of the design of Japanese-language faculty and library websites in ten national and ten private universities; Table 1 summarizes the results. The universities were selected at random from wikipedia.jp's lists of 86 Japanese national universities and 500 Japanese private universities.<sup>4</sup> For each university, the designs of the websites for undergraduate faculties and the university library were visually compared to the top site and to each other. Faculty and library websites were chosen because they are common to all universities. Faculty and library websites with designs substantially different from that of the top site and from each other were given a score of 0; those with designs substantially similar to that of the top site were given a score of 1; and those with designs that were substantially different from that of the top site but substantially similar to at least one other faculty site were given a score of 0.5. The score for "faculty website uniformity" in Table 1 is the average score for all the faculties. Finally, website URLs were noted to check for the existence of subdomains; for example, the University of Tokyo uses subdomains, so its top site is [www.u-tokyo.ac.jp](http://www.u-tokyo.ac.jp) and the Law Faculty's site is [www.j.u-tokyo.ac.jp](http://www.j.u-tokyo.ac.jp); Osaka International University does not use subdomains, so its top site is [www.oiu.ac.jp](http://www.oiu.ac.jp) and the Business Faculty's site is [www.oiu.ac.jp/gakubu/business](http://www.oiu.ac.jp/gakubu/business).

The most striking result of this simple visual analysis on a small sample of universities is the much higher degree of design uniformity of faculty websites in the private universities sampled compared with the national universities. However, we cannot safely extrapolate these numbers to private universities as a whole; in particular, the private universities in the sample are much smaller than the largest institutions such as Keio and Waseda. In fact, an analysis of the Keio and Waseda sites shows similar characteristics to the national universities. Given the higher scores for faculty website uniformity in the random sample of private universities, this article restricts its comments to national universities.

With the notable exception of Saitama University, all the national universities in the sample show zero faculty site uniformity; in other words, every faculty website had a different design. The fact that website designs are different does not necessarily mean that the creation and maintenance of those sites is being carried out by different people and organizations within the universities, but it does strongly suggest it.

The scores for library website uniformity are almost exactly the same in the two samples,

---

<sup>4</sup> <http://ja.wikipedia.org/wiki/日本の国立大学一覧> and <http://ja.wikipedia.org/wiki/日本の私立大学一覧>

TABLE 1. DESIGN UNIFORMITY OF JAPANESE UNIVERSITY WEBSITES

		number of faculties	faculty website uniformity	library website uniformity	subdomains
national	Akita University	3	0.00	0	yes
	Saitama University	5	1.00	0	yes
	University of Tokyo	10	0.00	0	yes
	Tokyo University of Marine Science and Technology	2	0.00	0	yes
	Niigata University	9	0.00	0	yes
	Tottori University	4	0.00	0	yes
	Okayama University	12	0.13	0	some
	Yamaguchi University	7	0.00	0	yes
	Ehime University	6	0.00	0	yes
	Kyushu University	12	0.00	0	yes
private	Kiryu University	1	1.00	0	no
	Chiba Institute of Science	2	1.00	0	no
	Kyorin University	4	0.75	1	no
	Sugiyama Jogakuen University	6	0.67	0	yes
	Osaka International University	4	1.00	0	no
	Tezukayamagakuin University	2	1.00	0	no
	Konan University	8	0.63	0	some
	University of Occupational and Environmental Health Japan	2	0.00	0	no
	Kwassui Women's College	3	0.00	0	no
	Nippon Bunri University	2	1.00	0	no
large private	Keio University	9	0.00	0	yes
	Waseda University	13	0.19	0	some

i.e. all but one of the university library websites examined were substantially different in design from the main university website. We can hazard two reasons for this: first, that university libraries were among the first organizations within the universities to establish websites, at a time when university-wide design was not yet being considered; the costs of integrating their content, design and systems with the top site and faculty sites may be judged to outweigh the benefits, especially as library sites may not be considered an important part of the university's online "show window" attracting students and donors. Second, university libraries, even in private universities, have both the technical resources in terms of skills and hardware and the institutional autonomy to establish and maintain their own websites without depending on the central university administration.

The analysis also suggests a relationship between uniformity and the existence of subdomains. Of the ten national universities sampled, eight had both zero uniformity and subdomains; of the ten private universities sampled, six had both high uniformity (greater than 0.5) and no subdomains. The use of subdomains does not prevent sites from having a uniform design, as the case of Saitama University demonstrates. Neither does it necessarily mean that sites in the various subdomains are created and maintained in a decentralized fashion—it is, after all, elementary to configure a single web server to serve multiple domains. However, combined with the author's experience and the findings from interviews, both of which suggest a high degree of decentralization in the administration of faculty and library websites in

national universities, we can take the use of subdomains to indicate decentralized web publishing, where the sites for each subdomain are created and administered separately.

The above analysis of designs and subdomains, then, offers support for our argument that faculty and library websites in national universities are created in a decentralized fashion.

## 2. Content Management Systems

Faced with the need to publish an ever-increasing amount of content generated by numerous departments and individuals, some for public consumption, and some for access only by students or members of staff, Japanese universities and individual faculties have become increasingly conscious of the limitations of traditional, static HTML-based web publishing. Such publishing essentially requires a responsible individual or group to gather the new or updated information, process it into HTML using the site's style conventions, edit other pages to include links to the new or updated content, and upload to the server all the newly created or modified pages. The creation, for example, of a page announcing a public lecture can require the creation of the page itself, modification of the events index, modification of the top page, and modification of the "next" links on at least one other events page; in other words four pages need to be created or updated. If the site is being published in both Japanese and English then eight pages need to be created or updated. Finally, all the new links need to be checked for human error. This work is not difficult but it is time-consuming and it needs to be accurate. The above scenario also assumes that a single member of staff has the authority to edit not only the events pages but also the top page. In fact, the person organizing an event, most likely a professor, probably does not have the authority to update the top page, so the information must be communicated to the person with the necessary authority by email or other medium.

A content management system (CMS) can help increase the efficiency of this process in a number of ways. A CMS generally consists of a database of content, a webserver, and a set of rules which allow the creation and modification of content by users with certain privileges, and the display of content to users depending on their privileges. The system can manage links between pages, and provide workflows between different users. It also takes care of applying the site's standard layout and formatting to content, and allows content editors to create pages without any knowledge of HTML. For example, in the case of the public lecture announcement, the professor organizing the lecture opens her web browser, logs into the site, creates a new event object and fills in the details such as date, venue, speaker and title. She submits the announcement for publication, and an email is automatically sent to her colleagues asking them to check the details. One of her colleagues clicks the link in the email, reviews the announcement and publishes it with a click. The announcement now appears on the index of events, and on the site's top page. An email is also sent to the person responsible for publishing the English website asking him to translate the announcement. In total, only two pages need to be manually created or modified.

Section 3 below will discuss aspects of CMSs in more detail. Here, it is sufficient to observe that, as the above example suggests, two key issues in the successful deployment of a CMS are the design of the system and the training of people across the organization to use it.

CMSs were adopted first in the late 1990s by newspapers and other media organizations publishing large amounts of information online; they were either custom-made or commercial applications sold for sums beyond the reach of individuals or small organizations. However,

competition in the sector helped to bring down the prices of commercial applications rapidly; for example, the pioneering CMS Userland Frontier sold for 99 USD to academic users in 1999. Open source CMSs also started to be adopted around 2000. Today, a huge number of CMSs are available: Wikipedia lists 93 open source and 58 proprietary CMSs.<sup>5</sup> The individual user who simply wants to publish standard kinds of content such as a weblog or photographs can choose from many free online services that do not require any technical skills; she can also choose from a variety of designs to give her site a more individual appearance. Organizations adopting CMSs, however, usually require extensive customizations.

### III. *Factors Affecting the Diffusion of Open Source CMSs in Japanese Universities*

Rogers' study of the diffusion of innovation lists five main factors determining the rate at which a given innovation is adopted:

1. attributes of the innovation
2. the type of decision to adopt
3. the communication channels through which information about the innovation is transmitted
4. the nature of the social system deciding whether to adopt the innovation
5. promotion efforts (Rogers, 2003, 222)

Rogers defines rate of diffusion as the number of individuals or organizations adopting an innovation over a fixed period e.g. one year. A quantitative survey of CMS adoption by and in Japanese universities is beyond the scope of this article, so we are unable to comment on the rate of adoption itself; nevertheless, Rogers' list of factors offers a useful framework for evaluating the characteristics of CMSs and the nature of their adoption by Japanese universities. In the following subsections, we evaluate CMSs from the point of view of Japanese universities in each of the above categories.

#### 1. **Attributes of the Innovation**

Rogers finds that from 49 to 87 percent of an innovation's rate of diffusion is due to its attributes (2003, 221). He identifies five kinds of attributes:

1. Relative advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability

Let us consider open source CMSs in terms of these attributes.

---

<sup>5</sup> [http://en.wikipedia.org/wiki/List\\_of\\_content\\_management\\_systems](http://en.wikipedia.org/wiki/List_of_content_management_systems)

### **Relative advantage**

The performance advantages of CMSs over static HTML sites have been outlined above: CMSs make it possible for people throughout an organization to add, edit and check information according to their level of authority and area of expertise. The result is to reduce the problem of one or two people responsible for updating the website becoming bottlenecks in the information publishing process. This wider participation in web publishing in turn encourages the publication of even more information, with benefits for the institution in terms of higher domestic and international visibility and better communication between faculty and students. CMSs eliminate the repetitive tasks involved in updating a site, allowing sites to offer more up-to-date content. CMSs can also make sites easier to use by realizing a more consistent appearance across pages, offering accurate and complete navigation and search systems, and streamlining the publication of content in more than one language.

The economic benefits of CMSs for universities are harder to judge. First, universities do not derive any income directly from their websites, for example through advertisements. The clearest indicator of a university's income, i.e. numbers of students applying to enter the university, is affected by so many other factors that the contribution of an improved website would be impossible to measure. Increased access to the website, measurable by analyzing server logs, could be one measure of the effectiveness of CMSs, but this is not translatable into an economic benefit. As mentioned above, some university rankings do focus on institutions' web presence, but these are by no means the most widely quoted rankings, and in any case there is no relation between a university's position in one of these rankings and its income.

The costs of introducing CMSs are considerable. First is the cost of the hardware on which to run the system, or the monthly payments to the hosting provider if the university chooses not to run the server itself. CMSs serve pages dynamically, which places greater demands on the machine than serving a pre-assembled static HTML file. This means that a faster computer with a lot of memory is required to achieve similar speeds to static sites; in addition, a well set-up caching system will be required that serves pre-assembled pages quickly to site visitors but also shows editors latest versions of pages at all times. Central university sites will also probably need several servers with a load-balancing system between them, which again needs considerable expertise to set up right. Second is the cost of the software; this is zero if an open source CMS is chosen (but see below for a discussion of the choice between proprietary and open source CMSs). Third is the cost of clarifying the university's needs and customizing the system to meet those needs. If a system is to achieve the necessary flexibility to be used by different faculties and other internal organizations then a lot of time will have to be invested in establishing what these organizations require. A professional designer will probably be required to design the top and second and third level pages, and the design will then need to be transferred to the template system of the CMS; this process can be very time-consuming and/or expensive. Fourth, staff need to be trained to create and edit content in the new system. Fifth, the system will need to be updated in response to feedback from staff using it, new demands from central university staff and the faculties and other organizations, and the release of new versions of the software.

There are potential benefits in terms of reducing the cost of processing static HTML pages. However, if the CMS is successfully introduced, the volume of information being published will increase, so these savings may well be outweighed by the increased costs of generating

online content.

Costs tend to be clearer when the university, faculty or library outsources all or part of the process of introducing the CMS. However, in many cases some or all of the work of planning, implementing and maintaining a CMS is done by administrative and academic staff, for whom website work is only part of their duties. The amount of time these people spend on the website is unlikely to be monitored accurately enough for a total system cost to be estimated. Particularly in the case of academic faculty who become responsible for deploying CMSs, the cumulative cost in terms of time and neglected research can mount to the point where they feel forced to abandon any involvement with the CMS; this was the case with one interviewee who had pioneered the adoption of Plone at a major national university, and chimes both with the author's own experience and that of academic members of the Plone community outside Japan.

In the question of proprietary vs. open source CMSs, the Japanese Ministry of Education has not set any guidelines on software acquisition to favor proprietary or open source solutions; universities are thus free to choose any kind of system. Companies offering website solutions will provide both proprietary and open source CMSs; similarly, if in-house development is chosen, the university might either purchase a proprietary system or install an open source system—in either case considerable customization will be necessary. One common justification for open source software is that it prevents vendor lock-in; in other words, because the producer of a proprietary software package has the exclusive rights to distribute and modify the code, its customers run the risk of being forced to pay excessive charges to update their software, or being left with unsupported software if the company decides to discontinue the product or goes out of business. In the arena of CMSs, it is not clear how large a factor the avoidance of lock-in is in customers' purchasing decisions. This is because most of the value (and hence cost) of introducing a CMS into an organization is customization work, which will not be very different whether the system is proprietary or open source. The more extensive the customizations and the fewer the customer's technical skills, the greater the risk of de facto lock-in to a particular company, even if the underlying system is open source. In addition, customers who are unaware of the meaning of open source are unlikely to think about the risk of vendor lock-in when making an adoption decision. In interviews carried out by the author with members of staff implementing websites using the Plone open source CMS, respondents did not mention considering any proprietary systems as alternatives to Plone.

### **Compatibility**

The major open source CMSs generally run on all mainstream server hardware, so compatibility with existing hardware is unlikely to be an issue. It will be necessary to import existing static pages into the CMS, but this is a common task for all CMSs and relatively simple, so long as the HTML of the static pages is consistent enough to distinguish accurately between content (page title, text, etc.) and style (headers and footers, navigation bars, etc.). Compatibility with existing databases and other CMSs is more of a problem. For example, universities will have their library catalogues on one dedicated system, teaching syllabi on another, and perhaps faculty publication databases on yet another. Read and write access rights to these systems are likely to be managed separately, and APIs might not be available that allow for machine-to-machine transfer of data between them. For example, in the author's case, his faculty has established a publication database into which he can directly add details of his publications. More recently, the university has established a similar but incompatible system. In



addition, the author is required to upload publication details to the national ReaD database. In each case the formats are different, and the APIs are not published, so it is not possible for the faculty and university databases simply to query the ReaD database for the author's data. In addition to the obvious problem of motivating faculty to input the same data in three different locations, the lack of APIs makes it difficult for those administering websites at different levels to add information about staff members.

Compatibility with the culture of the university can also be an issue. Given sufficient training and pressure from the university and faculty authorities, both administrative and academic staff can quickly learn how to add and edit content. However, there can be cases where academics resist the preservation in a public and unchangeable<sup>6</sup> medium of comments which they consider insufficiently mature for publication. This might be because they are working on politically sensitive topics, or because they are want to restrict circulation of their ideas until they have achieved publication in a refereed journal. Because CMSs make it easier to publish all kinds of content, whether in text form or as multimedia, they can exert pressure on academics to express themselves online, a pressure which may sometimes be unwelcome.

### **Complexity**

For content creators and editors, CMSs should if well-designed, be easier than static HTML, because they generally do away with HTML code and file transfer. For systems administrators and the "integrators" who customize CMSs for particular use-cases, CMSs are complex. Indeed, the ones that appear simple to site editors are especially complicated, because they must hide their complexity behind an easy-to-use interface. This complexity, which is unavoidable given the number of tasks that CMSs have to perform, must be dealt with when customizing the system for a particular use-case. The question for universities is whether to master the complexity in-house, which may reduce costs long-term as the staff becomes able to maintain and upgrade the CMS-driven site itself, or to outsource the work to a company, which implies long-term dependence on the company for support.

### **Trialability**

It is usually quite trivial to set up an experimental server running a CMS, and to create some content and workflows in order to get a sense of how the default system works. However, a lot of design and other customization works needs to be done before a CMS can be deployed, and technical or procedural problems will almost inevitably arise either at the design and customization stages or after deployment. It is difficult although not impossible to semi-customize a CMS for a site. Thus, the university cannot really be sure of the pros and cons of the system until it has established and deployed it. Trialability may therefore be said to be a weakness of CMSs. Some vicarious trialling may be possible by asking about the experiences of other institutions, but differences between universities in terms of staff expertise make such comparisons less than reliable.

### **Observability**

CMSs also score rather low in terms of observability. Few visitors to a university website will notice whether it is static or dynamic; for them a web page is a web page. Some systems,

---

<sup>6</sup> While content can be edited or deleted, copies may be permanently saved by search engines and archive projects.

for example those that use PHP, betray themselves by the suffixes on URLs. CMS developers encourage their users to increase observability by placing small logos such as “Plone powered” at the bottom of their pages, but universities tend not to use these. Indeed, many system administrators follow the rubric that as few details as possible of the system should be disclosed in order to prevent crackers from mounting attacks. They therefore also remove tell-tale traces of code from the web pages served. It is thus often not clear whether a CMS is being used or which one is being used. As a result, most university staff only become aware of which CMSs are being used in which universities by word of mouth. Furthermore, even if they do know that a certain CMS is being used in a particular institution, they are rarely able to see behind the public face of the website to see how many people are editing it, what amount of training they have received, and so on. In other words, observability of CMSs is low.

Taken together, these attributes of open source CMSs suggest that their adoption by Japanese universities will be rather slow.

## 2. The Type of Decision to Adopt

Rogers (2003, 221) distinguishes three kinds of decision to adopt an innovation. With individual-optional decisions, people can decide themselves whether to adopt an innovation or not; diffusion is generally most rapid when innovation depends on this kind of decision. With collective decisions, everyone in an organization must agree to adopt an innovation before it can be introduced. With authority decisions, a senior person or group decides to adopt an innovation and imposes this choice on those further down the hierarchy.

In the case of the adoption by Japanese universities of open source CMSs, we can see a mixture of all four kinds of decision. First, individual-optional decisions are made by academic and administrative members of staff who are in a position to freely decide to use any CMS for their personal, small project, or small department websites. In this case the decision to adopt is often motivated by hearing about the CMS from a colleague or an acquaintance outside the university. While adoption for small-scale sites does not impact directly on the adoption of CMSs at faculty or university level, my interviews showed that small-scale adoption is an important way of establishing awareness of and expertise in a particular CMS within the university, which can help to build consensus towards wider adoption.

Consensus decisions are required in the case of introducing a common CMS across decentralized faculty web publishing operations. The process of gaining formal agreement on one CMS is likely to be difficult, particularly if some faculties have gone ahead of the university and invested time in a CMS of their own; the staff responsible for the faculty sites may find many arguments against the proposed common CMS. In the case of one very large national university that recently introduced the Plone CMS for its top site, the central university staff made no attempt to achieve a consensus among the faculties to introduce Plone university-wide. Instead they are concentrating on making an attractive top-level site and on training administrative staff to add information to the site. They hope that the faculties will over time notice the benefits of Plone and switch their systems to it. If a critical mass of faculties adopt the CMS, then a university-wide consensus decision to adopt the system may become possible.

Authority decisions also play a role. Most obviously, a central university authority can simply introduce a CMS and then require all organizations and staff to use it. This is what happens in the case of online syllabi and other systems where there is a clear requirement for

information to be managed on a university-wide basis. However, it is very difficult for university authorities to pronounce that long-established faculty and library websites are to be replaced by a new system, given the traditional autonomy of individual faculties within national universities. Some faculties will likely complain that the proposed common CMS lacks features that their existing sites boast; others might complain that they do not have the resources to add the content required by the new system.

The decision to adopt a CMS can be a mixture of individual, collective and authority decisions. For example, those formally in charge of a faculty website might leave the decision of whether to adopt a CMS and which system to adopt to a technically well-informed, junior member of staff. If he is already familiar with a particular CMS as the result of a previous individual decision, he is likely to recommend that system to the faculty, which will then make an authority decision to adopt it. Over time, the CMS may be adopted by the whole university as a consensus decision.

### **3. Communication Channels**

Rogers (2003, 222) notes that innovations which are communicated through personal contacts are likely to diffuse more slowly than those that are communicated through the mass media. He also remarks that complex innovations are unlikely to be communicated effectively through the mass media. While Japanese publishers publish a host of books and magazine articles about open source CMSs, the complexity of CMSs means that potential adopters are likely to rely on the testimony of acquaintances. The availability of personal contacts with experience of a given CMS is likely to reduce the uncertainty associated with the adoption decision; user groups operating through mailing lists, online chat and physical meetings are one way of providing these personal contacts to a wider number of people.<sup>7</sup>

### **4. Nature of the Social System**

As the first section of this article argued, the web publishing activities of Japanese national universities tend to be highly decentralized. Given that two major motivations behind the adoption of CMSs are an increased volume of published information and the need to have more people and departments processing information, the fact that most top-level, faculty and library sites are still produced independently implies that their producers may not yet have been confronted by the unmanageability of their online information. In other words, one or two people in each faculty may still be able to cope with their roles as processors of online information published as static HTML; the gatekeepers, to mix metaphors, have not yet become bottlenecks. Furthermore, the maintainers of the university top page, who in a centralized organization might be expected to push for the introduction of a CMS, may have relatively few pages to create or update if most of the content is produced in the individual faculties. When they upgrade the top site, the cost of manually reprocessing a limited number of static pages on the top site may be less than the cost of designing and deploying a CMS.<sup>8</sup> Finally, some or all

---

<sup>7</sup> In the case of Plone, a total of 11 people with academic (ac.jp) addresses from Okinawa to Hokkaido posted to the plone.jp and Japanese zope-users mailing lists between April 2006 and October 2008.

<sup>8</sup> This was judged to be the case at Hitotsubashi University in 2007.

faculties may have independently invested in their own CMS solutions, making a shift to one central CMS politically and even technically more difficult than simply importing static pages into a CMS. The interviews carried out by the author with site administrators and companies providing open source CMS solutions to universities suggested that individual faculties and libraries are free to decide whether to adopt CMSs, and that in most cases the decision to adopt a CMS for the top site is made independently of the faculties.

## 5. Promotion Efforts

Rogers (2003, 223) argues that at an early stage in the adoption of an innovation—“somewhere between 3 and 16 percent adoption in most systems”—opinion leaders in an organization or a community decide whether or not to adopt it. Up until the point when opinion leaders make their decision, so-called “change agents” may be able to exercise considerable influence on the innovation decision. In the case of open source CMSs in Japanese universities, who are the opinion leaders and who are the change agents? Based on my interviews, the opinion leaders tend to be academic faculty who have adopted an open source CMS for their seminar or other project website, have invested considerable time in understanding the system, and have established some ties in the user and developer communities for the CMS. Their experience tends to be “rewarded” by their being put in charge of the faculty website, and in some cases of the top-level university web-site. They then have the authority to introduce their CMS of choice at the faculty or university level.

The presence of change agents is rather more difficult to establish. While this article has not established the adoption of CMSs across Japanese universities, the interviews suggested that even non-technical staff responsible for the creation or renewal of large websites are now broadly aware of the benefits of CMSs over static HTML. This suggests that adoption has gone beyond the stage where change agents are likely to play a key role.

## IV. *Conclusions: Recommendations for Universities and CMS Communities*

The above analysis has tended to dwell on the negative factors slowing down the adoption of CMSs by Japanese universities. In particular, I have argued that the decentralized nature of web publishing makes the adoption of CMSs difficult. While the faculties of national universities generally prize their autonomy from central control, it is difficult to argue that the continued autonomy of their web publication efforts benefits anyone. Ten or more years ago, when web pages were created manually, students and other users relied less on them for critical information, and principles of design and usability were less well established, it made sense to let a thousand flowers bloom. Today, however, the disadvantages of decentralized web publishing are manifold. First, visitors to university sites have to pick their way through a maze of sites with different structures and designs. This makes for poor usability, violating for example Krug’s commandment not to force the visitor to think about navigation (Krug, 2006). Second, the university misses a valuable opportunity to communicate a consistent corporate identity. Third, valuable information remains buried in faculty sites and does not make it to the university site, resulting in a loss of efficiency; if a faculty pays a visiting scholar to give a lecture to but the announcement is only seen by visitors to the faculty website, the return on

investment in terms of listeners attending the lecture is likely to be lower than if the announcement is also on the university's top site. Fourth, administrative and academic staff will waste time inputting the same information twice on faculty and university websites, or asking somebody to copy it for them. Fifth, the days when an academic website could be designed by an amateur are almost gone; just as with print publications, readers have become accustomed to professional design. For each faculty to pay for its own professional website design represents a considerable cost; this money can be saved if all the faculties adopt a common design, and by implication a common CMS.

While the benefits of a more centralized approach to web publishing are clear, they sit uneasily with the existing decentralized social system. What factors might accelerate the adoption of open source CMSs? First, a recognition by open source communities of the role played by academic opinion leaders in the adoption of CMSs within universities, and more active support of them in terms of shared know-how, code and perhaps public relations stunts such as awards. Opinion leaders themselves should do more to establish networks of academic open source CMS users. This would help to increase the efficiency of their efforts and reduce the risk of them suddenly abandoning their role. Second, an exploration of technical means of bridging the gap between disparate CMSs. For example, there is the potential for WSGI middleware such as Deliverance<sup>9</sup> to allow websites served from different CMSs to be given a consistent appearance; this technology may be particularly valuable in the decentralized setting of Japanese universities. Third, it would be worth investigating the establishment of an internal market for IT services including the provision of CMS-based web hosting; an example of one such system is at Penn State University in the United States, where the WebLion team provides web publishing services to all faculties; it also contributes much excellent code to Plone. Faculties, projects and academics could set up standard websites free of charge, and pay for improvements and customizations. These improvements and customizations would be provided back to other users both in the university and the wider community.

HITOTSUBASHI UNIVERSITY

### REFERENCES

- Aspeli, M. 2004. Plone: A model of a mature open source project. Master's thesis, London School of Economics.
- Krug, S. 2006. *Don't make me think! : a common sense approach to Web usability*, 2nd edition. Berkeley, Calif.: New Riders.
- Rogers, E. M. 2003. *Diffusion of innovations*, 5th edition. New York: Free Press.

---

<sup>9</sup> <http://www.openplans.org/projects/deliverance/introduction>