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WHY DO UNIVERSITIES MAKE DISCONTINUOUS CHANGES TO THEIR WEB SITES? EXAMINING THE RELATIVE IMPORTANCE OF FOUR REASONS FOR CHANGE

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Abstract

An examination of prior Web pages shows that the typical university will sometimes make a discontinuous change to its Web site (i.e., a sudden, major shift in a Web site between two points in time). This study empirically examines reasons for such discontinuous changes, surveying university Webmasters at a variety of institutions where discontinuous Web site changes had occurred. Universities varied by type (public, private), by level (Bachelors, Masters, PhD), and by nation (Canada, USA). Four reasons for discontinuous Web site change, identified in an earlier study of discontinuous Web site change in state governments, were compared: rational, marketing, political, and institutional. According to the university Webmasters surveyed, rational reasons for change were most important, followed by marketing, institutional, and political reasons, in that order. The ordering of reasons reflects statistically significant differences among types of reasons. Results did not vary by type, level, or nation.

Keywords: Discontinuous change, universities, web sites, rational, marketing, institutional, political

Introduction

In the fall of 2001, the Internet Archive (web.archive.org) made available “the Wayback Machine,” a free tool for gaining access to archived versions of over 10 billion Web pages. This site provides a capability for viewing many, if not most, Web sites published to the Web from 1996 to the present. Our exploration of this archival site led us to look at many Web sites and how they had varied.

In our first study of official US state government Web sites (i.e., those having the Web address www.state.xx.us, where xx is one of the 50 two-letter state codes), we noticed that 48 of 50 had undergone at least one *discontinuous change* in the period 1996-2001. We defined discontinuous change as a sudden, major shift in a Web site between two points in time. We make a distinction between discontinuous changes and incremental ones, such as those that occur with normal maintenance of Web sites. Discontinuous changes to sites involve more than mere alterations in appearance, such as changes in the number, nature, and organization of pages that constitute a site.

We wondered what the reasons for discontinuous Web site changes could be. What might cause a state government to change its Web site in a discontinuous way, rather than an incremental one?

To answer this question we looked at the academic literature to identify classes of explanation for why such changes might occur. The literature about change is immense and diverse, with change being understood as being either discontinuous (episodic) or continuous (Weick and Quinn 1999). Change research draws on many different perspectives and backgrounds, including rational models of decision making (Dawson 2000; Gooderham et al. 1999), communicative analyses (Barrett and Heracleous 2001), political ideas (Dawson 2000), marketing concepts (Chandrashekar et al. 1999; Massey 1999), and institutional theory (Gooderham et al. 1999), to mention only a few. Participants in change processes can be seen to adopt distinct roles in terms of reliance on rationality, opportunism, comprehensiveness, and the like (Hirschheim and Sabherwal 2001).

Van de Ven and Poole (1995) provide a comprehensive typology of change models. Their four categories are:

1. **Teleological** theories (goal oriented) – Change occurs for rational reasons. People have goals in mind for their organization and seek change to try to meet those goals. Theories of this type would explain Web site change in terms of better accomplishing the organization's objectives.
2. **Dialectical** theories (conflict) – Change occurs in a process of competition between ideas or for resources to accomplish different objectives. Theories of this type would explain Web site change in terms of changes in the organization's political landscape.
3. **Life cycle** theories – Change is seen as a normal progression through phases, analogous to the well-known marketing model of brands having a life cycle. The brand is established (birth), enters a youthful phase when the product is seen as fresh and young, matures into a well-known product, and then dies when the brand is old and stodgy. Theories of this type would explain Web site change in terms of desire to refresh an aging brand image.
4. **Evolutionary** theories – Change occurs because a poor fit exists between the organization and its environment. Theories of this type would explain Web site change in terms of providing a better fit between the organization's Web site and the Web sites of organizations seen as peers or competitors in the institutional field.

These theoretical ideas were operationalized into the following statements, which were used to construct survey questions that could be asked of Webmasters to test each concept. We believe that these four types of explanation for discontinuous change represent a thorough coverage of the reasons that we had been able to find in the literature and in correspondence with other researchers.

1. **Rational Change:** When Web sites are changed to increase effectiveness or efficiency. Change is required for the organization to accomplish its stated goals. The focus of the change is on the work to be done, the task to be accomplished, and the objectives to be met. Objectives may be internal, focused on efficiency and internal processes, or external, focused on better customer relations. The manager seeking rational goal change will set objectives and establish clear expectations for changing outcomes.
2. **Political Change:** When Web sites are changed to reflect a new regime. A new executive officer or technology officer required the Web site to change as a way to show his/her influence, the "new broom sweeping clean," or to clear out images and mechanisms from the previous regime. It was not a requirement that the site work better or adhere to better-accepted design principles, just that it be different from the previous site. Users should see that the new site is clearly connected to the new blood in the organization.
3. **Marketing Change:** When Web sites are changed to freshen up the organization's brand image. Web site design for an organization is a reflection of the organization itself and its "brand". All brands need occasional refreshing. This brand freshness will keep the brand in the consumer's eye and keep the look contemporary. Without routine brand image change a once-novel look will become old and dated, leading to a consumer perception of staleness and stolidity. A changing organization needs a changing brand image.
4. **Institutional Change:** When Web sites are changed to improve fit with peers. The organization sees itself as being part of an 'organization field,' a collection of similar organizations. These other organizations are the focal organization's reference group. When enough of the reference group changes in a given direction, or even one key referent changes, then the focal organization changes in the same way to maintain a match with the other. The organization changes to keep its membership in the group, so that others can see it as falling in the same group of organizations.

Next we developed a questionnaire to measure the extent to which Web site change was caused by each of the four identified reasons for change. A study of the U.S. state sites received usable responses from 34 state Webmasters (53% response rate), representing 26 different states (59% response rate).

We then employed reliability estimates (Cronbach’s alpha) to pare down each scale from five to three items, which we felt was the minimum for analytic purposes. Table 1 shows the reliability estimates for the three-item versions of each scale. The values attained for these scales are acceptable.

Table 1. Reliability Estimates for Survey Scales

	Rational	Political	Marketing	Institutional
Alpha	0.81	0.81	0.82	0.93

Scale items are shown in Table 2. Scores for the scales represent the importance of the types of explanations for change. The simplest way to compute scale scores is to sum the ratings for items that constitute the scale, with no adjustments. Such totals can be thought of as raw scale scores. Table 3 shows the average raw scale scores for the U.S. state survey for all participants. Higher scores indicate higher importance. The highest possible score for a scale is 15.

Table 2. Change Scale Items

Change Type	Item
Rational	1. The home page was changed to make it more user-friendly.
Rational	2. The Web design team redesigned the organization’s home page to make it easier for users to find the information they need.
Rational	3. The home page is providing our clientele with better information and services now that it has been redesigned.
Political	4. The home page was changed because we had a new executive officer who wanted it changed.
Political	5. We changed the look and feel of the site to reflect the new administration of the organization.
Political	6. When new executives joined the organization, one of the first things they did was ask for the home page to be changed.
Marketing	7. The old home page had gotten ‘old’ looking and needed to be freshened.
Marketing	8. It had been a while since we changed the organization’s home page and we needed a new look.
Marketing	9. The organization had been changing and we needed to change the home page to better reflect what the organization had become.
Institutional	10. We had to change our home page to meet our competition.
Institutional	11. Other organizations we compare ourselves to had changed their home pages and we needed to match them.
Institutional	12. We could see that other organizations like us were changing their home pages so we changed ours.

Table 3. Average Raw Scale Scores for U.S. States

	Rational	Political	Marketing	Institutional
Mean (N=34)	13.6	6.8	11.9	9.0
Std. Deviation	1.89	3.08	2.83	2.93

After we became confident we had a reliable instrument for measuring home page change reasons, we decided to study a larger population. We chose universities for a number of reasons. The most obvious of these, if not the most important, is that we are all university employees and have an interest in how they, as a population of organizations, work. Universities are important organizational forms, having existed for many years and likely to continue to exist for many years to come. Understanding why universities make discontinuous changes to their Web sites seemed to us to be a worthwhile goal. A second reason we chose universities as the focus of the study is that almost all of them in the United States and Canada have Web sites, even if unsophisticated ones. There is a great deal of variation in what universities do with their Web sites, how long they have been doing it, and (presumably) why. This seemed to be fertile ground for research. Another reason we chose universities is that a large number of them exist in the United States and Canada. A final reason we chose to study universities is that they can be categorized easily by the highest degrees they grant and by their statuses as public or private institutions, among other

characteristics. We felt that universities of different types might differ in terms of the reasons they had made discontinuous changes to their Web sites. We decided to study the importance of the four types of explanation for discontinuous changes in Web sites, discussed above, across different types of universities.

Method

As a first step in conducting this study we decided to test home page change in public compared with private universities, and by university highest degree level (Bachelors, Masters, PhD). A comprehensive list of U.S. universities provided by U.S. News and World Report was consulted and 72 universities were randomly selected from each of six groupings (public/private by Bachelors/Masters/PhD).

We then went to the Web and compared the most recent version of the home page to archived versions of the university's home page at the Internet Archive (web.archive.org). We examined successively older versions of the home page, until we found a discontinuous change. In some instances, the first discontinuous change had occurred only a month or two before the most recent university page; in other cases it had occurred a year or two before. Two screen capture images were created of the two sites – one before the discontinuous change and one after it.

Next we retrieved Webmaster email addresses from their university site. Where one could be found we sent an email message to the potential participants. The message contained hyperlinks to the two site images and a third hyperlink to a Web based questionnaire. The site image links were included to clarify for the participant what we meant by a discontinuous change and which specific change we were talking about.

Some university sites did not provide a Webmaster email address but instead provided a form for comments. In this case the form was completed by cutting and pasting in the email message described above. Several weeks after the initial survey email message, a follow-up message was sent to Webmasters who had not yet responded.

Other questions used in the survey included the following. The first two of these were associated with possible responses as shown. The last two were open response questions, allowing participants to type free-form answers into a text box.

1. I would rate the process of changing from the older to the newer home page as very effective. [The scale allowed responses from “strongly agree” (5) to “strongly disagree” (1).]
2. Rate whether your work on the home page is more of a managerial nature or a technical nature. [The scale allowed responses of “more managerial” (1) and “more technical” (2).]
3. If there are other reasons for the change in your university's home page, please enter the information below. [Free-form response.]
4. We would also be interested in any details that you might like to provide about the process your university went through in changing from the one home page design to the second design and your plans for the next version of the home page. [Free-form response.]

The second step of this study was to extend the survey to Canadian universities and colleges. A comprehensive list of these was available from the University of Waterloo Canadian Universities list (<http://www.uwaterloo.ca/canu/>). The same methodology was used as in the previous United States survey, except that a French version of the questionnaire was sent to colleges and universities in Canada with a home page in French.

Results

The overall response rate to the U.S. survey was 156 out of 405, or 38%. Response rates within each of the six cells (public/private by Bachelors/Masters/PhD) varied from 34% to 44%. The number of responses in the analyses reported below varies from 156 because some universities had more than one respondent and some respondents did not include identifying information that would allow placement of their data into one of the six cells.

Table 4 shows the average change scale scores by university level. For each scale there were three questions answered from 1 = strongly disagree to 5 = strongly agree. These three questions were summed. There are no significant differences in the mean scores by university level for each of the four theoretical reasons for change.

Table 4. Average Change Scale Scores By University Level

Level		Rational	Political	Marketing	Institutional
PhD (N=65)	Mean	13.2	6.2	11.1	8.5
	Std dev	2.2	3.0	2.4	3.0
Masters (N=51)	Mean	13.1	6.6	11.2	8.8
	Std dev	2.4	3.0	2.2	2.6
Bachelors (N=47)	Mean	13.3	6.3	11.1	8.6
	Std dev	1.9	3.0	2.1	2.8

Table 5 shows the average change scale scores by public versus private type of university. There are no significant differences in the mean scores by university type for each of the four change reasons.

Table 5. Average Change Scale Scores By University Type

University Type		Rational	Political	Marketing	Institutional
Public (N=82)	Mean	13.2	6.2	11.0	8.5
	Std dev	2.4	3.0	2.2	2.9
Private (N=81)	Mean	13.2	6.4	11.3	8.7
	Std dev	1.9	3.1	2.3	2.7

Because there were no significant differences in the mean scores by university level or type the responses can be aggregated. The upper part of Table 6 below shows this aggregation. Comparing the mean change scale scores to each other by paired sample t-tests, it was found that the rational model explained best the reasons for home page change. Next in importance and significantly lower than the rational model was the marketing model ($t=9.224, p=.000$). Institutional theory was the next most powerful explanation of home page change. It was significantly lower in importance than the marketing model ($t=11.481, p=.000$). The least most important model for explaining home page change was the political model. This was significantly lower than the institutional model ($t=8.111, p=.000$).

Table 6. Overall Average Change Scale Scores

		Rational	Political	Marketing	Institutional
Overall University (N=165)	Mean	13.2	6.3	11.1	8.7
	Std dev	2.2	3.0	2.2	2.8
States (N=34)	Mean	13.6	6.8	11.9	9.0
	Std dev	1.9	3.1	2.8	2.9

Comparing the upper and lower parts of Table 6 we can see that in two different populations of Webmasters – state government and universities, this ordering of the reasons for home page change is constant. The mean scores of each model are also similar. University Webmasters were also asked to rate the process of changing from the older to the newer home page as very effective (1=strongly disagree to 5=strongly agree). Table 7 below shows an indication that university Webmasters rated the change process as more effective the lower the degree level granted by their institution. This tendency was not statistically significant ($F=1.903, p=.152$). There was no difference between public and private universities in ratings of effectiveness made by their Webmasters.

Table 7. Average Rating of Change Effectiveness by University Level and Type

Level		Effectiveness
PhD (N=65)	Mean	3.86
	Std dev	1.12
Masters (N=51)	Mean	3.98
	Std dev	0.99
Bachelors (N=47)	Mean	4.23
	Std dev	0.84
Public/Private		Effectiveness
Public (N=82)	Mean	3.98
	Std dev	1.03
Private (N=81)	Mean	4.04
	Std dev	1.01

University Webmasters rated their work on the home page as more of a managerial nature or a technical nature. Table 8 below shows that university Webmasters who reported that their work is of a more technical nature saw the process of home page change as more political than did their more managerial colleagues.

Table 8. Average Change Scale Scores By University Type

Webmaster Role		Rational	Political	Marketing	Institutional
Managerial (N=80)	Mean	13.3	5.6	10.8	8.2
	Std dev	1.9	2.7	2.5	2.8
Technical (N=78)	Mean	13.2	7.1	11.5	9.0
	Std dev	2.2	3.2	2.0	2.8
F Significance		0.009	9.964	3.673	3.345
		ns	.002	.057	.069

An analysis was made of the correlations between the rated effectiveness of the change process and the change type (see Table 9). Webmasters who reported that the discontinuous changes in their universities' home pages were made for rational reasons also reported a more effective change process. The same was true for marketing reasons, but the relationship, while still statistically significant, was much less strong. There was no connection found between Institutional reasons for change and an effective change process. The more the reasons for change were political, the more our respondents reported that the change process was less effective.

Table 9. Correlations of Effectiveness Ratings by Change Type

	Rational	Political	Marketing	Institutional
Correlation	.605	-.205	.214	.023
Significance	p<.01	p<.01	p<.01	ns
N=165				

For the Canadian sample of 124 colleges and universities, 43 responses were received, a rate of 35%. Table 10 shows that the mean scores for each change reason. An analysis of variance found that there were no significant differences between the means for each change type between the two countries.

Table 10. Average Change Scale Scores by Country

Country		Rational	Political	Marketing	Institutional
U.S.A. (N=165)	Mean	13.2	6.3	11.1	8.7
	Std dev	2.2	3.0	2.2	2.8
Canada (N=43)	Mean	13.1	6.1	10.8	8.3
	Std dev	2.4	2.7	2.6	3.2

Discussion

The results of the study show that, at least in the opinion of university Webmasters involved in discontinuous Web site changes, rational considerations were the most important determinants of change. Across all participants, the reasons captured by the rational scale ranked as the most important. Marketing reasons were next in importance, followed by institutional reasons and political reasons.

The results are interesting in many ways. Although it was not obvious in advance that rational motives would dominate the others, it is appealing to believe that the overriding concerns of those designing Web sites for universities and state governments should involve such notions as providing students and citizens with better information and services. The general finding of this study that this is so is in accord with much wisdom in IS research and practice. It is frequently the case that justifications for systems development projects have to do with improving functionality, ease of use, and so on. The findings here echo that line of reasoning.

A second interesting finding is that, in retrospect, it makes sense that marketing reasons would be viewed as having been second in importance. Organizations of all kinds, including universities and state governments, can be thought to be in competition for the attention of people using the Web. When pages go unchanged for a while, it may well be that people cease to find them interesting. It may also be that Web sites are subject to laws of fashion. If this is the case, a Web site developed at one time, and perhaps in fashion then, would come to be viewed as out of style after some time. An "old" looking Web site could reflect lack of anything new to say or lack of awareness of how sites are currently constructed. Either way, these are not judgments that most organizations would want their potential Web site visitors to form. University Webmasters who reported that they filled a more technical role in the change process saw political reasons for change as significantly more important than did the Webmasters who had filled a more managerial role. Perhaps the Webmaster managers were simply more used to political reasons for change and thus rated them as less important.

A third result of interest from this study is that reasons for change did not vary by university level or type. We thought that Webmasters at universities offering doctoral degrees might be more sensitive to institutional reasons for change than their counterparts at Masters and Bachelors schools. We also expected that private universities would compare amongst themselves more than to public schools. The data did not support this interpretation.

A fourth interesting finding from this study is that the lack of differences in the results by country implies that university Webmasters in the two countries are similar in their reasons for home page change.

There are potential limitations to the conclusions that one can draw based on the data collected in this study. As is true with many other survey studies, it could be the case that the responses of participants reflect factors other than accurate perceptions of the situations and events in question. It could be true that some of the university Webmasters responding to the survey were unaware of the real reasons for the changes in which they participated. It also could be true that for some of the participants it is not acceptable to admit the "real" motives for change. Perhaps there exists a social norm among university Webmasters, whether technical or managerial, to justify their actions in rational, rather than political or other, terms. This study does not allow explicit investigation of such possibilities. However, given the large sample size in this study and that results were consistent across university level and type, it does not seem likely that social desirability caused our results.

An additional limitation of this study, one that is true of most studies, is that it does not address a number of interesting, tangential issues. One of the most interesting of these issues has to do with differences in the kinds of rational (or marketing or institutional or political) reasons that are used in justification of discontinuous Web site change in university settings. It could be argued, for example, that some rational reasons have more weight than others. Many modern universities might view their primary Web sites

as entrances to their e-learning systems, although others might employ distinct e-learning sites on the Internet or on an intranet. For these universities, reasons for Web site change related to changes in their e-learning systems might dominate other rational reasons (such as recruitment, advancement, enrollment, etc.); for others, e-learning as a driver of Web site change might be less important. Additional research into the relative importance of e-learning system support vis-à-vis other rational reasons for Web site change would seem to be called for. This study lays the groundwork for such research by establishing that rational reasons (as a broad category) are important in explaining discontinuous changes in university Web sites.

The findings of this study have several implications for those who are involved in managing the change of Web sites for universities. First, the results here imply that the most compelling reasons for Web site change are rational ones--those that involve increasing effectiveness or efficiency. Changes required for the organization to accomplish its stated goals will be the ones that are viewed as 'normal', perhaps leading to perceptions of the change being reasonable. When the focus of the change is on the work to be done, the task to be accomplished, and the objectives to be met, the motive for the change will be easily understood and familiar. Although objectives may be focused on internal processes or external matters, managers will need to set objectives and establish clear expectations for the change. Rational reasons for Web site change may be the preferred ones to use in arguing for the approval of Web projects, especially if the argument occurs in a typical university context.

Next, marketing reasons for Web site change are also likely to be viewed as plausible in university settings. In situations where a university's brand image is important, decision makers may view proposed projects to freshen up a Web site as reasonable endeavors. Arguments based in such marketing notions are likely not to be perceived as unusual, perhaps raising their chances of success. Changes to promote brand freshness can be seen as normal, with the intention of keeping the university's brand in the consumer's eye, as well as assuring a contemporary look.

Finally, arguments for Web site changes that are based on institutional or political reasons may be viewed as more unusual. While this does not mean that such arguments are inappropriate or unlikely to succeed, they are may be more likely to make proposals for Web site change stand out from other proposals, which could mean that they will be overly scrutinized by decision makers. This may mean that proposals with such justifications will be rejected by decision makers more frequently than those justified by rational or marketing arguments. While this study does not allow a definitive answer to such a question, it suggests the need for additional study. Future research might fruitfully examine the types of arguments that are employed in proposals for major Web site changes and the disposition of such proposals. By better understanding the reasons that discontinuous changes in Web sites occur, it may be possible to appreciate when and for what reasons proposals for such changes succeed. To the extent that Universities and other institutions gain such understanding, they will improve their abilities to manage their Web site change processes more effectively.

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