

EVALUATING WEB USABILITY

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Web usability focuses on design elements and processes that make web pages easy to use. A website for college students was evaluated for underutilization. One-on-one testing, focus groups, web analytics, peer university review and marketing focus group and demographic data were utilized to conduct usability evaluation. The results indicated that an organization's mission, policies, user capabilities, and competitive environment all affect usability. The recommended interventions included interface redesign and update.

NIELSEN (1993) DEFINES *usability* as “a quality attribute that assesses how easy user interfaces are to use.” The word also refers to methods for improving ease of use during the design process. Nielsen identifies five components of usability: learnability, efficiency, memorability, errors, and satisfaction. According to the International Organization for Standardization (ISO-9241, 1998), *usability* also has these three dimensions:

- Efficiency: the level of resource consumed in performing tasks
- Effectiveness: the ability of users to complete tasks using the technology and the quality of output of those tasks
- Satisfaction: users' subjective satisfaction with using the technology

A performance improvement approach may be well suited for usability analysis because it requires the analyst to look beyond usability standards and understand how the organization defines desired performance. This approach helps in analyzing how the work environment is putting the organization's mission, vision, goals, and values to work, successfully or unsuccessfully, to influence an effective web presence. It also helps in evaluating an organization's policies, guidelines, and web development infrastructure, which can determine if its web presence is ultimately shaped to support users.

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The performance improvement approach begins with an analysis of the organization and work environment to identify the performance gap. A cause analysis further analyzes the performance gap by determining key causes of the gap. With the causes identified, interventions are selected, implemented, and evaluated (Van Tiem, Moseley, & Dessinger, 2004).

ABOUT THE PROJECT

The purpose of the project described in this article was to analyze an opportunity to make an investment in a university's website—specifically, to enhance the public face of the student page and provide a more valuable resource for the student community.

A website is a university's most visible resource and a reflection of what it has to offer. The university therefore formed a design evaluation committee to evaluate the site, addressing the need for an updated look, improved site functionality, and a better user experience. This study was initiated to gain perspectives on how the student page could be developed into a more valuable resource for the university's student community.

This project focused on using performance improvement and usability approaches to analyze the student page and address three areas of concern:

1. The student page is underused. Web analytics data indicated that the majority of visitors do not stay on the student page, but instead exit the page to go to university email, the learning management system, or the student portal.

2. The student page is not engaging. The design and content of the student page have an impact not only on current students but also on parents, the community, admissions, and future students. The student page should reflect what the school has to offer students.
3. Compared to the competition, the student page lacks focus and resources to complement the university's high-quality academic offerings. Competition among schools is getting tougher every day. Universities must showcase their unique cultural and academic culture long before students enroll.

The goal of the student page redesign effort was to build an accessible virtual home base for both current and prospective students that provides information about activities, student life, and student issues. Achievement of the goal would be evidenced in two ways:

1. An increase in the average time spent on the page, which, according to web analytics data in Table 3, is 33 seconds. A high average time spent on the page may indicate that the content on the page was interesting to a visitor. A low average time spent on the page is significant, but also depends on the nature of the page.

2. Fewer bounces off the student page to another area. Currently the bounce rate (the percentage of single-page visits or visits in which a visitor left a site from the entrance) is 27%; the goal is to lower this number. Bounce rate tells us about the quality of a visit to a page. A high bounce rate generally indicates that the page is not relevant to visitors. (See Google Analytics Support, <http://www.google.com/support/analytics>)

THE UNIVERSITY

This study was conducted at a southeastern university in the United States with 13,071 currently enrolled students. It offers 52 bachelor's degree programs, 31 master's programs, and 2 doctoral programs. Through its mission statement and strategic goals, it is clear that the university desires to provide not only excellence in education but also an environment conducive to individual growth, critical thinking, creativity, diversity and inclusion, and responsible citizenship.

Web presence is essential for communicating an intangible educational experience by something that visually represents what the university is about and the unique



FIGURE 1. RELATIONSHIPS OF THE DEPARTMENTS AND COMMITTEES

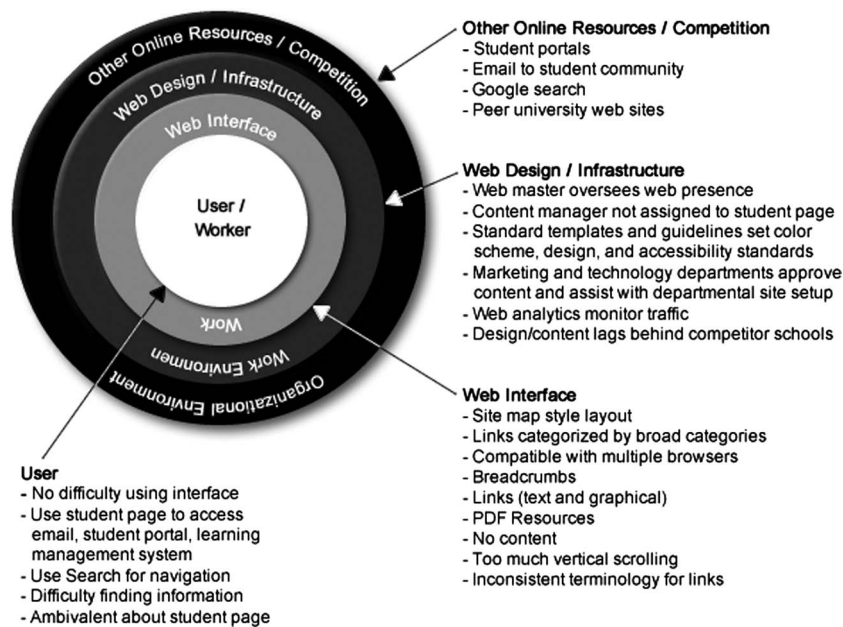


FIGURE 2. EVALUATING WEB USABILITY USING ROTHWELL'S ENVIRONMENTS OF HUMAN PERFORMANCE

experience it has to offer students. The university recognizes the critical need to invest in and improve its web presence, which is a reflection of its commitment to students, faculty, and the community. The web evaluation committee, represented by individuals from the marketing and technology departments, the webmaster, and web developers from several departments, was tasked with reviewing the university website and then driving a web experience that fully represents the university's quality and dedication to students. The committee had specific goals to support the university's mission: improve the user experience through easier navigation; foster brand recognition; highlight research, programs, and events that reflect the quality of the university; and develop a visually engaging design that draws the user. Figure 1 provides a summary of the relationship between departments and committees within the organization, as well as policies that dictate web presence.

THE ENVIRONMENT

Rothwell's (1996) environments of human performance provides the framework for evaluating how environmental forces within the organization (the organizational environment, work environment, and the work) affect workers and other performers. Adapted for web usability evaluation, Rothwell's model, shown in Figure 2, illustrates how other online resources and competition, web design, and web interface build on each other to affect

how users work within a university student page. This analysis provides some insight into why the students were underusing the student page.

Other Online Resources and Competition

The student page is just one of several ways that students can stay connected to the university community. A secure student portal provides access to news, events, and student-specific information, such as schedules and billing. Students also receive email from the university with information about upcoming activities. An interview with an entering freshman indicated that students also use Google to find information regarding university activities. The competition with other universities is an important consideration. Prospective students, when researching schools, look at how a university supports students with information, easy access to resources, and technology.

Web Design and Infrastructure

The resources and policies that support a website dictate content and how the site will be managed. This university has well-developed policies, procedures, and guidelines that define the web presence, set accessibility standards, and guide and approve content.

The technology and marketing departments play important roles in helping departments set up and maintain their own content. Not uncommon in organizations with large amounts of content, this structure

TABLE 1**ONE-ON-ONE USABILITY TESTING**

Goal	The goal of one-on-one testing was to understand how students used the student page by facilitating feedback from participants as they navigated the university and peer university websites and observing participants as they completed assigned navigation tasks.
Participants	One incoming freshman, three graduate students, one undergraduate student, and one community college student
Navigation comments	Google and the website's general search option was used as the means of navigation for half the students. Two participants commented that there is too much scrolling and it takes too many clicks to get anywhere. Participants gave up on a task because they had clicked too much and had "no idea where to go." All participants had difficulty finding the university activities page.
Comments on university site	"The university seems directed at juniors and seniors (a peer university seems directed at freshmen/sophomores)." "Liked breakdown of information on the student page, succinct style, and easy access (not crammed); student page is plain but gets the job done." "Normally, you can find what you need on the student page." "Already sold on the school; probably wouldn't look at the headlines." "It would be important for students out of the area to know what to expect." "Spend a lot of time searching for information; information needs to be more streamlined; there is so much stuff, so much information." "Applying for graduate school was very confusing; department information was not consistent with information on graduate school page." "Read news and events when logged into student portal, but don't seek out this information."
Comments on two peer university sites	Seems directed toward freshmen (peer university 1); appeals to a younger audience (two comments). Liked drop-down boxes on peer university 1 page (five participants liked drop-down). Liked that headlines and events had a small description with a link. Liked rankings on the peer university 2 student page. Liked seeing events on the first page (peer university 2 student page). Peer university 2 site is eye-catching (three participants commented). Items separated, easy to identify (five participants commented). Peer university 1 site is fancy, tech-savvy (three participants commented). Peer university 1 calendar is very easy to use (three participants liked the calendar), and it was easy for participants to find information. Strong photos; all participants commented on large photos; images.
Observations	Five participants felt academics most important, activities are secondary, news tertiary; student portal and learning management system very important. Participants feel overwhelmed by the amount of information. Information is not consistent throughout website. Common information may be handled differently by different departments. Overall, student page is useful; can get to almost any information from there. Too much clicking and scrolling on student page. Became frustrated if they had to click too many times. Participant kept count of the number of clicks, and after about five clicks gave up looking. Very visual; liked icons, a distinct arrangement of information. Influenced by the design. Participant uses university website often; feels strongly that information is difficult to find; the only chance of finding information is through search.

allows content management to be spread across several resources instead of residing solely with the university's only webmaster. Templates, which all content managers at the university site use, dictate color schemes, layout, and design. The student page is designed using one of the standard templates; however, it does not have a dedicated content manager and is infrequently updated.

Web Interface

The student page is designed in a site map style layout with information listed alphabetically and categorized in broad groups that are also listed alphabetically. The links connect to publicly available information, which can also be accessed elsewhere from within the university's website. A quick link section provides access to the frequently used student portals. The interface is straightforward: links, breadcrumb navigation, and one graphic link.

Rothwell's environments of human performance (see Figure 2) illustrates other resources and competition, web design, and web interface to shape the environment in which the user will work. Finally, the user is analyzed to determine if he or she has the skills and capacity to navigate and use the student page.

DATA COLLECTION

One-on-one testing, focus groups, web analytics, a peer university review and marketing focus group, and demographic data were used to conduct the usability evaluation.

One-on-One Usability Testing

One-on-one usability testing (Table 1) conducted with six students indicated that students have no difficulty using the elements of the student page interface: links,

TABLE 2 FOCUS GROUP RESULTS	
TOPIC	SUMMARY
Usage	<p>19 undergraduates in instructional technology class.</p> <p>33% use the student webpage on a regular basis.</p> <p>68% go directly to the student portal instead of accessing the portal through the student web page.</p>
Perceptions of current student webpage	<p>Initial perceptions:</p> <p>Boring, archaic, and does not grab your attention.</p> <p>Explanation or a short description of the links would be helpful. Links are not intuitive, and it is difficult to locate information on the website.</p> <p>Two of 19 students indicated satisfaction with the current student webpage; the page is well organized; different links are broken down by financial aid, campus activities, and so on.</p> <p>Suggested improvements:</p> <p>One password to access all applications: student portal, email, learning management system.</p> <p>Provide at-a-glance information to know what is happening on campus.</p> <p>Provide information about activities and news relevant to students.</p> <p>Provide important dates students need to know, as well as up-to-date information.</p> <p>Links to other sites such as Facebook, Twitter, and gmail, allowing better accessibility to other sites.</p> <p>Add graphical icons and pictures like Yahoo!</p>
Review and perceptions of the peer sites	<p>Students were prompted to comment on two peer university student pages and provide comments:</p> <p>Peer university 1: sleek, professional, better graphics. Drop-down boxes at the top of the page make navigation easy.</p> <p>Peer university 2: links to weather, social networks; site also provides a better list of campus activities.</p>
Observations	<p>The university's student webpage is in need of redesign to provide a more professional, tech-savvy, and appealing look. Students would also like to see effective and intuitive navigation, as well as news, events, and campus activities.</p>

breadcrumbs, opening PDFs, and clicking on graphical links. In general, student participants did not take issue with the design or layout. They felt the layout allowed easy scanning of topics and were happy with the links to the portals that they frequent. The students interviewed were primarily interested in academics: exam schedules, important dates, and so on.

Attitudes toward the student page were ambivalent. Students thought the layout was good, but also dated and uninteresting, especially when compared to the student pages of other universities.

Focus Group

The purpose of the focus group was twofold: to gather perceptions and opinions regarding the university's student page and then to gauge student response to an alternative student page design, specifically the student pages of other universities (Table 2). Students voiced opinions about difficulty in navigating the university's student page to find the information as well as the site's dated style. Two-thirds of the students indicated that they used the student portals, rather than the student page, for information. When shown the student pages from two comparable peer universities, students immediately liked the flash of and interesting information on these pages. Although the focus group participants indicated that they liked these pages, it is unclear from this study whether the layout or information would be useful to the university's students.

Web Analytics

The university webmaster uses web analytics to analyze website traffic and use. The analytical data confirmed that students were not spending time on the student page.

The web analytics data from May 1, 2009, to May 26, 2010, provided in Table 3 suggest the following:

Students thought the student page was easy to use, but their actual performance indicated they experienced difficulty finding information.

- Visitors to the student page stay an average of 33 seconds before moving to another page or leaving the site.
- Search is among the most visited pages, with visitors spending an average of almost 2 minutes viewing the page; however, half of the visitors leave the site, which may suggest that they did not find what they were looking for.
- After email, class-related resources, and search, the academic page was the most visited page.
- Academics had a low bounce rate and a high exit rate (percentage of visitors leaving the page), indicating that visitors stayed within the university's website, possibly to browse in academics.

Peer University Review

The student pages of 20 comparable peer universities were reviewed to assess their content and layout. The sampling was obtained from what the Princeton Review (<http://www.princetonreview.com/college-rankings.aspx>) identified as

TABLE 3

WEB ANALYTICS DATA: MOST VISITED PAGES, COLLECTED MARCH 1, 2009–MAY 26, 2010

RANK	PAGE	PAGE VIEWS	UNIQUE PAGE VIEWS	AVERAGE TIME SPENT ON PAGE	BOUNCE RATE	% EXIT
1	Home page	14,858,546	11,704,085	00:00:57	32.69%	28.31%
2	Student page	8,464,928	6,689,175	00:00:33	27.15	11.40
3	University email	4,256,758	3,885,440	00:07:10	37.65	81.72
8	Academics	1,004,763	724,436	00:00:20	15.44	6.83
9	Student portal	987,556	904,218	00:04:58	34.92	72.49

other schools students looked at when investigating the university studied for this project. Table 4 provides a breakdown of where peer universities provide types of information; on the student page versus on the university home page.

Although the web evaluation committee suggested that the university’s student page should contain news, student spotlights, events, and community information, the peer universities studied showed that most of them put this information on their home page. The most common types of information featured on the student pages were the calendar (45%), followed by news (30%), and events (30%). Exactly half of the schools reviewed used an integrated format of news, events, social network links, and academic links; the other half used a site map style of content similar to the university’s student page.

Marketing Focus Group and Demographic Data

In preparation for an evaluation of the university’s web presence, the marketing department conducted focus groups and surveys to gain an understanding of how the current website is perceived and how it can be improved. Although this analysis was not specific to the student page, demographic data and conclusions from this study were used to qualify data gained from focus group and one-on-one testing.

GAP IN WEB PRESENCE

The collected data strongly suggested that students use the student page as a passageway to the student portals, learning management system, and university email.

Current Web Presence

Both the one-on-one testing and a focus group study were consistent with the web analytics data: students go to the student page primarily to access the student portals, learning management system, and university email. For the study, students were prompted to complete certain tasks so that their performance could be observed. These observations showed a strong disconnect about students’ perceived performance: Students thought the student page was easy to use, but their actual performance indicated they experienced difficulty finding information.

In general, students had difficulty finding information that was not clearly identified in link text: current events and the schedule for when the pool was open. Two of the students in the study gave up looking due to too many clicks and difficulty in finding the topic they were looking for. Most of the students admitted to using search as their primary navigation tool because it was quicker than finding information through the student page or the university website. At the completion of the task analysis, students concluded that there is a lot of information, and finding that information is difficult without the search feature.

Desired Web Presence

The goals of the web evaluation committee indicated that the student page interface and design should fall within four categories:

- Align with university goals and strategies
- Provide useful and engaging content
- Drive efficient navigation
- Evoke a strong sense of student community

INFORMATION PROVIDED	% STUDENT PAGES	% HOME PAGES
News	30%	95%
About students (showcasing students)	15	85
RSS feed	20	65
Community (what is happening in the community)	5	50
Events	30	85
Calendar (a prominent calendar of events)	45	80

TABLE 5**THE GAP IN WEB PRESENCE**

	CURRENT WEB PRESENCE	DESIRED WEB PRESENCE	GAP
Alignment with university goals and policies	Aligns with web technology goals regarding templates and accessibility	Aligns with mission, strategic goals, and goals of web redesign	Lacks a focus on students Does not provide evidence of the university's mission, for example, to embrace diversity
Useful and engaging content	List of links confined to a template intended for content rather than a landing page for news, events, and other resources	Graphical layout with engaging news, events, student spotlights, calendar	Lacks a true purpose: a hub for student engagement Lacks interest in regard to style and content
Efficient navigation	Insufficient information to describe links Inconsistent terminology Too much vertical scrolling Too many clicks to find information Links listed in randomly ordered categories	Links and graphical elements that accurately depict link destination Consistent terminology for links and information Three-click minimum Hierarchical arrangement of information based on student needs	Lacks consistency in terminology Does not properly define text Requires too many clicks to find information Important information is not prominently displayed
Sense of student community	Student, faculty, staff spotlight link	Strong sense of student engagement	Students should be the prominent focus

The gap resulting from the analysis of current and desired web presence is summarized in Table 5.

CAUSES OF THE GAP

The results of the gap analysis were categorized into an adaptation of Gilbert's behavior engineering model (as cited in Van Tiem, Moseley, & Dessinger, 2004, p. 47) to help bring to focus the cause of the performance gap. It was found that the performance gap is rooted in a lack of environmental support, which is what management provides to make the performer effective. In the case of the student page, neither the web design nor interface is providing effective navigation, content, interactivity, or information to support the user or web presence desired by the web evaluation committee. Table 6 summarizes the possible causes of the performance gap.

Lack of Information

The university's website is robust with every kind of information. However, the student page contains no content and is essentially a list of links. As web analytics data suggest, visitors visit the student page to access the student portals, which contain news, events, and other student-related information. There is no reason to visit the student page for content.

Individual usability studies indicated that while the current student page is easy to scan, the information should be organized by importance and frequency of use in order to better serve busy students. Currently links are alphabetized. Feedback is critical for understanding how the student page is used and how it should be developed as a valued resource for students. The organizational and environmental analysis showed no evidence of feedback mechanisms or usability studies conducted specifically for the student page.

Lack of Instrumentation

In order to develop and maintain an engaging student page, there must be resources to support such a project. The organizational analysis revealed that the student page falls under the many responsibilities of the university's web master, who oversees the university's web presence. To evolve from a static page of links to a dynamic presence, the student page requires the support of additional human resources to manage development and content: architecture support from the technology department, content support from the marketing department, and oversight by a content manager.

The university's web standards and guidelines dictate color schemes, design, and layout, which is available in three standard templates. While the template option is appropriate for departmental home pages, it must be

TABLE 6 POSSIBLE CAUSES OF PERFORMANCE GAP

CATEGORY	DRIVER	POSSIBLE CAUSES
Information	Data	Students have other options for information
	Information	No feedback mechanism for performance improvement
	Feedback	Organization or availability of information is problematic for some content
Instrumentation	Environment Support	Resources to support development of student page (i.e., no content manager)
	Resources	Architectural accommodation for dynamic content
	Tools	Navigation standards
Motivation	Consequences	Static content; students are not motivated to browse the student page
	Incentives	
	Rewards	

assessed to determine whether it can architecturally and aesthetically accommodate dynamic content.

Individual usability studies, which were instrumental in assessing student page usability, indicated that navigation was an issue. Ambiguous and inconsistent link text, lack of navigational context, and too many clicks to reach a goal page were prominent issues in the study. In addition, students admitted to using search for their primary navigation because it was much faster to find information.

Lack of Motivation

Focus group, usability assessments, and web analytics data indicate that students visiting the student page are primarily interested in accessing the student portals, learning management system, and university email. During individual usability studies, students were asked to look at student pages from two peer universities, two sites that incorporate diverse, multimedia content. While students in the study contended that the university's student page was good and easy to scan, students liked the news, events, and contemporary look of the peer universities student pages. A student from the focus group commented that while these sites are full of information and flashy, the university's student page needs to address the specific needs of the student body in order to draw in the students.

RECOMMENDED INTERVENTION

The web evaluation committee as well as the students interviewed said the student page could use a facelift. Focus group and one-on-one testing further indicated

the need for improved visual image, message focus, and navigation. Applying a usability assessment intervention developed by Weiss (1999), two issues were identified to require intervention: presentation and navigation elements of user interface.

Presentation

Weiss (1999, p. 389) states that "the presentation is the system's public face." Krug (2000) also refers to presentation as the "big picture" of the page. Arriving at the student page, the visitor should know immediately what the page is for. In the peer university website review, the student pages that rated high in the review reflected a clear message that the page was for and about students. For example, several universities studied included an opening line on the student page, such as "Welcome [University name] Students." The university's student page would benefit from a message or a tagline that lets students know the student page is dedicated to them. In addition, the student page must exemplify the mission and goals of the university, as well as provide easy access to the resources that students use the most. The peer universities reviewed for this study accomplish the presentation very well.

Navigation

Weiss (1999, p. 390) states that "the navigation is the circulatory system of the page. . . . When navigation is cumbersome, users become frustrated at the effort required to get [somewhere]." One-on-one testing in particular revealed that information is not easy to find from the student page. Three issues were prominent regarding navigation:

1. *Lack of hierarchy of information.* Currently, the list of links is alphabetical by category. In creating a home page, Krug (2000) suggests that “a good visual hierarchy saves us work by prioritizing contents in a way we can grasp instantly” (p. 33). Morkes and Nielsen’s (1998) study of how web writing affects usability concludes that web users prefer a concise, easy-to-scan, and objective style. We confirmed this in our one-on-one testing. Students felt the page was easy to scan but not organized in order of importance.
2. *Inconsistent use of terminology.* This may be a result of multiple content managers not using the same nomenclature. For example, the link to the technology department is not consistent with the actual name. The marketing department may consider developing a guide on maintaining consistency throughout the website or a matrix of common nomenclature.
3. *Vague link destinations and too many clicks to reach goal page.* Since the student page links to the many components and sites of the main university website, it is easy to get lost or get back home after clicking two or three times into another section. For example, clicking a link to a specific department takes a user to that department’s home page. By clicking further into that department, a breadcrumbs display takes you back to the department home page or the home page of the university’s website. There is no way to get back to the student home page without browsing “back.” Nielsen’s (1995) study on navigating large spaces suggested that in a large information space, users become disoriented and that a good backtrack mechanism can help them from getting lost in vast amounts of information.

Finally, the design and infrastructure of the student page must be assessed to determine if it can support the dynamic content required for the proposed student page.

IMPLICATIONS AND RECOMMENDATIONS

As the research and focus group data have indicated, the university’s website is in need of a facelift, as well as an updated interface design to improve navigation. This conclusion can also be made of the student page. However, the student page requires an approach that is tailored to the unique requirements of the university’s students. Although more data are needed, the results of the data collected for this project do not necessarily suggest that students are in great need of superfluous information. Students are interested in resources that affect their academic life, a testament to the quality of the university’s student community.

Before beginning the student page redesign effort, more quantitative and qualitative data are needed to understand exactly what students require in resources. Because the student portal is a popular resource for news, events, and student information, the webmaster can use web analytics to quantify the type of information students are seeking. Because these portals already exist, the student page can be a valuable resource for at-a-glance information, campus activities, or campus news that do not require sign-in credentials or are not present through the portals. Additional surveys, focus groups, or testing specific to the student page will provide more data to drive decisions about content and design.

Usability studies offer great insight into a user’s experience using a website because the facilitator observes users in action. Including usability studies with actual university students during the iterative development phase can keep the project on task to provide the resources that students will use. 🌟

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NEW BOOK REVIEW GUIDELINES ESTABLISHED

Performance Improvement journal has developed new guidelines for writing and submitting book reviews. The book being reviewed should be relevant to applying performance improvement in the workplace; it should go beyond training and development. For example, ideas can be presented on the book's value in:

- furthering our mental models
- increasing our capacity to diagnose performance problems
- expanding our awareness of interventions
- increasing our understanding of the dynamics of behavior change
- applying systemic thinking to performance improvement, etc.

For a complete copy of the new guidelines please contact briang@ispi.org.

Note: Updated guidelines are also available for writing and submitting articles and commentaries.