

Training for Impact on Sexual Harassment: A Case Study in Applied Learning Theory

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Abstract: In this study, principles drawn from behavioral and cognitive theories and related empirical studies were translated into practical guidelines instructional designers can apply in the process of developing e-learning courseware. The guidelines were then applied during the analysis and development phases of two new series of e-learning courses on the topic of sexual harassment prevention. One series was geared toward an audience of managers and the other to non-management employees. Comparisons are made with the previous e-learning series on the same topic developed by the same e-learning provider. Total course pages were reduced from 264 to 55 and 85, respectively; the percentage of content pages that use audio and imagery, without text, rose from 8% to 67% and 57%, respectively; total display of words on content pages decreased by 92%; and interactivity rose from 29% of total course pages to 38% and 39%, respectively.

Keywords: e-learning, cognitivism, behaviorism, cognitive load, multimedia, sexual harassment, compliance, Sweller, Mayer

Sexual harassment prevention is one of the most common topics for formal training in the workplace. A 2010 survey by the Society for Human Resource Management (SHRM), the world's largest human resource management organization, found that 80% of its membership of HR professionals work for companies that provide sexual harassment training to their employees (SHRM, 2010). Commercial e-learning providers have been eager to develop courseware relevant to this topic and to periodically upgrade their offerings. Development of sexual harassment courseware runs parallel to the evolution of the industry as a whole, from early courses that offered on-screen text and questions, to the addition of audio, to the application of animation, video, and more sophisticated forms of interactivity.

A full range of media elements are now available to instructional designers, which presents opportunities for relatively full application of learning research

to the selection and blending of media. This study examines the application of research from the behavioral and cognitive schools of learning theory to the development of workplace sexual harassment training. Major findings from the research are examined, translated into concrete development standards, and applied in the process of developing two series of sexual harassment courses, one aimed at managers and the other at non-management employees. Data are then compiled regarding the usage of various page types, followed by analysis of the connection between page type usage and the application of specific development standards.

Training Objectives

The training initiative under discussion in this study focuses on sexual harassment in the workplace, including sexual harassment law, the steps that can be taken to prevent harassment, and how to respond to

incidents when they occur. The audience consists primarily of employees at companies in the United States, with separate modules offered to managers and non-management employees.

The training has three main objectives. The first is to provide a solid basic understanding of workplace sexual harassment issues, including the law, expectations regarding workplace behavior, strategies for prevention, and steps that can be taken when an incident takes place.

The second goal is to meet the requirements of state laws in California, Connecticut, and Maine, where workplace sexual harassment training is legally mandated. California requires at least two hours of training for management and supervisory employees. All three states require coverage of the provisions of Title VII of the Civil Rights Act of 1964 that underlie most sexual harassment law. All three also require coverage of the types of conduct that constitute harassment and remedies that are available to victims of harassment. California and Connecticut require coverage of strategies for prevention, practical examples drawn from case law, and the essential elements of a corporate sexual harassment policy (California Code of Regulations 2 §7288; Connecticut General Statutes, §46a; Maine Revised Statutes 26 §807).

The third primary objective is perhaps the most important. With a target audience that includes virtually anyone in the United States with a job, the full range of attitudes and perspectives on this controversial topic can be anticipated. Grappling effectively with the issue of workplace harassment involves impacting both the broad perspectives of employees at most workplaces and the perspectives of those who may be at risk for engaging in inappropriate behavior. The third training objective is to impact the perspectives of both sets of employees. Both the general workplace atmosphere and the attitudes of some sets of employees are key considerations if training is to contribute to meaningful change in the workplace.

Reaching this audience requires a balanced and realistic approach, one that learners can readily connect to the everyday workplace environment. It requires content that conveys both a strong sense of authenticity and substantial emotional impact. A review of training currently in the market underscores the difficulty in meeting this objective. The video vignettes commonly used to illustrate harassment often

fail to match, in substance or impact, the real cases of harassment a training professional may learn about while developing relevant courseware. Giving the learner a genuine and substantive sense of the topic requires careful deliberation and novel approaches.

Cognitive and Behavioral Learning Theories

Over the last half century, empirical research has made great strides in clarifying the processes that take place in the brain when human beings learn. Studies in the cognitive and behavioral schools of learning theory dramatically broaden and deepen our understanding of the factors that influence learning outcomes. These two schools converge on the subject from opposite directions, with behaviorists building an external model of environmental conditioning, and cognitivists focusing on internal processing that takes place in the brain.

Cognitive Theories

The cognitive school has been broadly influenced by the rise of information technology in recent decades and the insights computers give us into the ways in which information may be efficiently processed. Cognitive models trace the way information enters the system through the senses, how it is maintained in short-term memory, how it interacts with previously acquired knowledge, and how it is processed and ultimately stored in long-term memory. The brain is viewed as an information processing system with input, storage, and processing components that interact in dynamic ways (Huitt, 2003).

Recent research in the cognitive school carries special significance for practitioners in the field of E-learning. When training is delivered electronically, it often involves packages of media elements that are combined to create multimedia experiences for the learner. The focus in the cognitive school on the way the senses take in media elements and how they are processed addresses the practical issues faced by e-learning developers in their everyday work.

Recent empirical research in the cognitive school led to the development of two major learning theories. The first is Multimedia Learning Theory, associated with the research and theoretical analysis of psychologist Richard Mayer (Mayer, 2001). The second is Cognitive Load Theory, developed by psycholo-

gist John Sweller (Sweller, 1998). These two theories are strongly related, with interconnected research programs and largely complementary perspectives. Empirical support has steadily increased for both theories.

Basic research into the audio and visual channels of short-term memory provides the foundation for both theories. Each of the two channels is limited in capacity, and each is partially independent of the other. This means we can store more information if both are used than we can with either channel alone (Penney, 1989). This basic finding provides the foundation for multimedia as a learning tool. It tells us that multiple sensory channels can access greater capacity in working memory than any single channel.

Multimedia Learning Theory. From the perspective of Multimedia Learning Theory, the brain takes in information through the audio and visual channels, and it constructs verbal and visual models to make connections between information in the two streams. After processing the information, the resulting mental constructs are saved as schema in long-term memory and integrated with related information that was previously learned. Learning is the building of these schema in persistent, long-term memory (Mayer, 2001; Mayer & Sims, 1994).

Instructional design principles drawn from Mayer's work suggest that designers should utilize both the auditory and visual channels to present information, and that related information should be contiguous so as to facilitate connections between the information and the building of verbal and visual models (Mayer & Moreno, 1998).

Recent research into the audio and visual channels of short-term memory clarifies some of the important differences between them. In the auditory channel, information is taken in automatically. A learner who is exposed to an auditory stimulus will, in the absence of another stimulus, automatically draw it into the auditory buffer. The information is stored in an acoustic code (A-code) in short-term memory. If the information is verbal in nature, it also generates a phonetic code (P-code). Generation of the phonetic code suggests that humans automatically make language sounds out of the verbal acoustic signals they pick up (Baddeley, 1986; Penney, 1989).

In the auditory buffer, information persists over time. The acoustic code produces an echo effect that reverberates in the buffer and keeps the informa-

tion in short-term memory. It may stay there for as long as sixty seconds, in the absence of another audio stimulus (Engle & Roberts, 1982). The echo effect causes acoustic information to associate in sequential fashion, so the brain correlates audio information in temporal sequence (Penney, 1989).

The visual channel has substantially different characteristics. It processes non-linguistic visuals (such as pictures, charts, and diagrams) efficiently. This is why Mayer and others found a combination of visuals with audio to be pedagogically robust (Mayer & Anderson, 1992). However, when language is conveyed visually (e.g., on-screen text), it is not taken in automatically in the manner of audio signals. The learner must make an effort to read.

Text taken in visually also lacks the quality of persistence found with audio. Language going through the visual channel has to be processed into the phonetic code, and the learner must attend to the task. The learner must then rehearse the phonetics mentally in order to maintain the information in short-term memory (Penney, 1989).

These empirical findings on the attributes of auditory and visual memory strongly influenced the way cognitive learning theorists such as Mayer and Sweller modeled the learning process. Their experiments show that combining non-linguistic visuals with linguistic audio is particularly effective at promoting learning (Mayer & Anderson, 1992; Sweller, 1998).

Cognitive Load Theory. Sweller's analysis of the learning process begins with the same broad observations of Mayer and others regarding the use of sensory information to store short-term information. He observed that working memory is limited, so it is important to use that capacity to process learning content while leaving aside unrelated information (Sweller, van Merriënboer, & Paas, 1998). Information we take in through these channels represents "cognitive load," partially or wholly filling our limited short-term capacity.

This, for Sweller, was a key finding with sweeping significance for instructional design:

The implications of working memory limitations on instructional design can hardly be overestimated. All conscious cognitive activity learners engage in occurs in a structure whose limitations seem to preclude all but the most basic processes. Anything beyond the

simplest cognitive activities appear to overwhelm working memory. Prima facie, any instructional design that flouts or merely ignores working memory limitations inevitably is deficient (Sweller, van Merriënboer, & Paas, 1998, pp. 252-253).

This finding led to the development of the first of Sweller's three concepts of cognitive load. Elements of instruction that do not contribute to schema building are referred to as "extraneous cognitive load" (Paas, Renkl, & Sweller, 2003, p. 2). They occupy part of the learner's working memory with no instructional benefit, so they are harmful to the learning process.

Sweller's second type is "intrinsic cognitive load," which represents the information or content one is attempting to convey to the learner. Inclusion of this information is central because it constitutes the substance of the learning experience (Paas, Renkl, & Sweller, 2003).

The third type is "germane cognitive load," which involves the mental activities that take place as a learner processes information and uses it to build schema in long-term memory. Germane cognitive load and intrinsic cognitive load are thus necessary components that function together as learning occurs. Extraneous cognitive load is to be avoided so as not to take up limited short-term memory with information unrelated either to the subject matter or the mental resources needed to process it (Paas, Renkl, & Sweller, 2003).

Behaviorism

From the behavioral perspective, learning involves increasing or decreasing the frequency of behaviors. Early behavioral studies focused on simple stimulus-and-response models, while later studies focus on operant behavior, or behavior that is initiated by the learner. The concepts of operant conditioning developed by Edward Thorndike and B. F. Skinner show the relationship between learner-initiated behavior and the stimulus that follows the behavior. Behavior is conditioned -- increased or decreased in frequency -- by the consequences that follow (Thorndike, 1933; Skinner, 1953; Graham, 2010).

Skinner tested the impact of various conditions on animal behavior using the operant condition-

ing chamber (widely referred to as the Skinner box). The controlled environment of the Skinner box allowed him to introduce different types of reinforcing or punishing stimuli and to vary the schedule of delivery. He found that reinforcers tend to work better than punishers, and that the optimum schedule for learning involved consistent reinforcement given with each episode of the behavior (Skinner, 1953).

While consistent reinforcement was best for initial learning, Skinner discovered that another schedule -- intermittent reinforcement -- worked best for maintaining behavior over time. One variety of the intermittent schedule (variable ratio reinforcement) is the principle upon which most gambling devices work. Rewards are given occasionally, and the number of behaviors that occur between rewards is determined randomly. Thus, a slot machine player continues to feed coins into the machine, and he may be rewarded after a single pull of the lever, or it may take eight or ten pulls. He cannot know how many it will take. This intermittent schedule maintains behavior over time, so what is learned is retained (Skinner, 1953; Ferster & Skinner, 1957; Zuriff, 1970).

Thorndike, another leading behaviorist, found that one of the most powerful reinforcers for human subjects was simply to say "right" to the learner after he got something right. Responding to incorrect answers was not as effective as giving positive feedback for correct answers (Thorndike, 1933). This finding suggests that frequent interactions with the learner in which he has the opportunity to provide a correct answer are effective reinforcers. Setting the learner up to provide frequent correct answers may be more effective than providing more challenging interactions that elicit greater proportions of wrong answers.

Behavioral learning strategies often provide reinforcers in a sequence of stages in which the learner acquires the necessary behavior for the first step, then builds on the first behavior with another behavior, and so on, until a complex task is learned.

Translating Learning Concepts into Concrete Development Standards

Courses were produced for the two series discussed in this study using a proprietary tool set developed and modified over a period of fifteen years by a commercial e-learning provider. The tools permit audio, text, still images, animation, video, and user inter-

actions to be combined in packages using an assortment of page layouts. Each course page is an individual HTML file viewable through a web browser. Courses are launched in a browser-based course player with built-in navigation elements.

How do learning concepts backed by empirical research translate into concrete standards that can be applied to the development of e-learning courseware? In this case, certain pedagogies drawn from learning theory were built into the standard tools and development processes as they evolved over the last decade or more. Others were addressed as a set of development guidelines to be applied specifically to the two new sexual harassment series. Both sets of guidelines -- standard and series-specific -- are listed below.

Standard Tools and Processes

The following guidelines are standard parts of the course development process with significant support in learning theory:

Provide a simple, visually appealing course player with intuitive navigation elements. Both major cognitive theories emphasize the limitations of working memory and the importance of eliminating extraneous information. Thus, an e-learning course player should be simple and clean, lacking in busy visual elements, and it should offer navigation methods that are limited in number and easy to understand upon first encounter.

The sexual harassment series under discussion in this study was released shortly following a full redesign of the standard course player that was released in November, 2011. While the previous course viewer was reasonably simple and intuitive, the new design offers more streamlined, icon-based navigation elements arranged around a larger, plain white content stage. The use of a white stage permits flow between the navigation elements and the stage without boxing of the stage as a visually separate element. More importantly, it permits flow between visual content elements, the stage, and navigation elements through the use of content imagery with transparent backgrounds. The new design minimizes extraneous elements and focuses the learner's attention on meaningful course content that represents intrinsic cognitive load to the learner.

Apply a pre-production media treatment to the series. Development of a series-specific media treatment early in the process, before individual courses are developed, allows color schemes and standard media elements to be coordinated and applied consistently to the series. The learner encounters similar icons, imagery, and color schemes as she proceeds through the course. This requires fewer cognitive resources than would be called upon if she encountered unfamiliar schemes or imagery with each new course page.

Pre-production treatment for this series called for the consistent application of photographic and video imagery to illustrate content, rather than a mixture of drawn images and photographs. It also involved developing a standard format for icons that presents them in the form of common office imagery. Finally, it included a collection of standard legal and court-related imagery to be used throughout the series.

Scale the content to match needs of the learner. A key consideration in the development of e-learning courseware is the scaling of content to meet the learners' needs, which means the course should not present too much or too little information. Mayer confirmed the significance of this factor in his seminal study on science textbooks, in which less information provided to the student resulted in 50% greater performance on subsequent problem-solving tasks (Mayer, Bove, Bryman, Mars, & Tapangco, 1996).

While a scaling standard seems relatively straightforward, and has long been included in the course development process, it is surprisingly challenging in application. The natural tendency of series analysts and course developers is to offer richer or fuller sets of information, with the expectation that learners will retain more when larger sets of information are presented, or that richer presentations make stronger impressions that support the recall of central points. Cognitive research suggests otherwise, that the limitations of working memory are so profound as to make inclusion of significant amounts of extra information counterproductive, however accurate or relevant to the topic the information may be.

Source materials for this series were obtained from a law firm that specializes in sexual harassment litigation. Part of the firm's work involves giving short presentations that summarize key information to audiences of employees and managers at various corporations. The presentation materials developed by the

firm were used as the content foundation for this series. This facilitated high-level treatment of most topics and in-depth treatment of a smaller set of key issues.

The series analyst reworked materials obtained from the law firm into content documents with appropriate pacing, examples, and interactive elements for development of e-learning courseware. The analyst then worked with a subject-matter expert (an attorney at the law firm) to verify that key topics were adequately covered. The analyst wrote video-based activities using real cases drawn from sexual harassment case law, which the subject-matter expert reviewed and revised. These activities were branded "You Be the Judge" to reinforce for the learner the sense of grappling with real events that sometimes take place in the workplace. The attorney who served as a subject-matter expert was ultimately video recorded in a courtroom setting giving brief explanations of each case, and these videos were used to initiate each "You Be the Judge" interaction.

The analyst discussed additional options and methods for increasing learner impact at length with the subject-matter expert and other training professionals. After reviewing a number of video vignettes available in the marketplace, a less common option was selected by the analyst and SME that involves testimonial-type videos. In that, they were influenced by a series of testimonial videos produced by the Minnesota Department of Human Rights (MDHR, 2008). The analyst wrote scripts for testimonial videos in which actors described the experiences of individuals with different facets of a sexual harassment incident or investigation. The subject-matter expert reviewed these scripts to confirm that they accurately reflected real sexual harassment cases.

Finally, the analyst made the decision to split the material into two series aimed at different audiences -- one for managers and another for non-management employees. Customization of content made it possible to eliminate material from one series that was only relevant to the audience of the other series. The result was an employee sexual harassment series estimated at 1.5 hours in length and a manager series estimated at 2.4 hours. These two series replaced a single previous series estimated at 3.3 hours.

Use full audio for the course. Broadly speaking, content pages for these courses convey informa-

tion in two forms: text and imagery. Applying full audio ensures that the text portion of the content consistently has an audio component. Some text may be conveyed on-screen, but in those instances the text is also available to the learner as audio.

Full audio applied series-wide reflects a heavy design and resource lean in the direction of audio that is strongly backed by empirical research. Penny, Engle, Mayer, and others identified the special attributes of audio that facilitate easy retention in short-term memory and integration of audio with visual information from pictures, illustrations, and other non-text visuals (Penny, 1989; Engle, 1982; Mayer, 1992).

The courseware development toolset and standard processes applied to these series prompt the creation of audio for every course page. The course player presents audio and associated imagery as the standard and automatic delivery method, with an option provided to turn off audio and view a transcript for learners who either prefer to read or who do not have headphones or speakers.

Series-specific Guidelines

In addition to the four standard guidelines listed above, the series analyst developed five series-level guidelines based on pedagogical principles drawn from learning research.

Use on-screen text sparingly. This is an enhancement of guideline #4 in the standard section above. Full audio is provided for the course, and in some cases text is also shown on screen, but special attention should be paid to the circumstances in which the developer uses on-screen text.

Most content should be conveyed through a pairing of audio with non-text visuals. On-screen text is used sparingly, though it may be used in the following circumstances:

Key terms and concepts. When a major term or concept is introduced, visual display often carries significant benefit for the learner. For example, the first course in the employee series defines the two main types of sexual harassment (quid-pro-quo and hostile work environment). The learner may not know how to spell the Latin phrase "quid-pro-quo" and may feel more comfortable with the term once he sees it. Part of the benefit of displaying major terms has to do with the learner's ability to remain on the page and review the text at her own pace before proceeding to a

new page.

In some cases, major terms or concepts may be listed sequentially on the page as bullet points. On-screen text may be appropriate for bullets that convey concepts the learner is expected to remember and apply later in the course, or, more importantly, that he will need to remember when applying information in his work. On-screen text is less appropriate for concepts or lists when names of the list items are not critical. In the latter case, it is often best to present the information as icon bullets rather than as text bullets. (Icon bullets are small images that signify items in a list and roll out sequentially while the items are being described more fully in audio.)

Extended quotations. The introductory courses in both series call for occasional quotations from sexual harassment law. State-specific requirements in California, Connecticut, and Maine require coverage of the relevant provisions of Title VII of the Civil Rights Act. The analyst felt the most reasonable approach was to cite a paragraph from the law. The course developer's original treatment involved a combination of audio and non-text imagery (so the learner would hear the definition while seeing relevant non-text imagery, such as an image of the U.S. Capitol Building, where the Civil Rights Act was passed). However, upon review of the course page, the quotation seemed difficult to understand in the absence of on-screen text. Legal terminology in the quotation and uncommon phrasings made it difficult to follow. Treatment of the page was then modified to show the quotation on-screen, with a parchment background to signify the law, along with related imagery. The learner can thus read the quote on the parchment at the same time she is hearing it in audio.

Interactions. When the learner is asked to respond to a question or scenario, the basic facts of the query generally need to remain on-screen after the audio has finished. This gives the learner the opportunity to review key information regarding the scenario, think about it, and consider various aspects of the question at her own pace before answering.

Introduction and summary pages. Each course lesson begins with an introductory page and ends with a summary page. Both pages provide a list of the learning objectives covered in the lesson. These are cases when it helps the learner to be able to pause and consider the topics that are about to be covered (intro pages) or were just covered (summary pages).

An on-screen list of the objectives as concise bullet points facilitates those deliberations.

When text is used under any of the above circumstances, it should be phrased as concisely as possible, as bullet point lists or short phrases and sentences. For example, the page that introduces quid-pro-quo as a type of harassment displays the following text while the relevant audio is being heard:

“Quid-pro-quo = this-for-that.”

Using the equals symbol allows the developer to avoid more wordy formulations, such as:

“The term quid-pro-quo means this-for-that.”

Consistently presenting shorter sentences and concise bullet-points allows the learner to digest on-screen text with minimal application of the phonetic processing resources in short-term memory. It also allows the developer to leave behind information on the screen that the learner can digest and contemplate at her own pace before moving forward in the lesson.

Avoid combining the appearance of new imagery with new on-screen text. When information is conveyed via on-screen text, its appearance on the screen should be isolated temporally from the appearance of other visual elements. Thus, when text appears as a bullet point, it comes in as a singular visual change. This avoids compounding the cognitive stress of new text with the stress involved in simultaneous processing of new imagery.

Use a high proportion of interactivity. Both behavioral and cognitive principles support a course design that includes a high proportion of interactive pages in relation to content pages. Interactive pages selected for this series include questions addressed to the learner and video-based activities that present scenarios and ask the learner to evaluate and respond to them.

In behavioral terms, frequent use of interactivity facilitates positive reinforcement for correct answers. In cognitive terms, it places some limits on the amount of content conveyed in a given number of pages (intrinsic cognitive load), and it increases the number of pages that prompt integration of the information and application to examples or cases (germane cognitive load used to build schema in permanent memory).

Apply a variable ratio schedule of intermittent reinforcement to interactions that occur in the content portions of the course. Interactions can go either in the

content sections of the course or at the end of lessons to prompt recall and integration of material. Interactions in the content section provide the course developer with an opportunity to apply a variable ratio reinforcement schedule. Interactions are frequent, but the number of content pages between them varies, so the learner cannot anticipate when they will occur. Interactions should be easy enough for the learner to get right most of the time, thus triggering the positive feedback Thorndike determined to be effective with adult learners.

Apply a left-side range theory when gauging the level of difficulty of interactivity. E-learning professionals often discuss the relative value of questions and interactions that are easy for the learner in comparison to more challenging interactions. A combination of behavioral and cognitive principles can be applied to support a certain perspective on this issue.

One can think of interactions on a scale, with less challenging interactions on the left side of the scale and more difficult questions or activities on the right. In Cognitive Load Theory, difficulty is generally measured in terms of element interactivity. Easier questions involve material that can be understood individually, without reference to other information, while more difficult questions or activities have multiple interdependent parts so that the task as a whole cannot be understood without understanding the parts (Paas, Renkl, & Sweller, 2003).

Consider a scale that goes from low elemental interactivity (LEI) to moderate (MEI) to high (HEI), as follows:



Figure 1. Interactivity Range

Behaviorism suggests that the LEI side of the scale has substantial instructional value. Allowing the learner to be right, and telling him so, promotes retention of the information. Cognitive research also supports frequent use of LEI for building basic schema, which can be called upon later for completion of more complex MEI tasks. Interactions at the most complex end of the scale should be avoided whenever possible because they are likely to overrun the capacity of

working memory.

Cognitive and behavioral principles suggest an ideal range of difficulty from the left end of the scale to roughly the middle:

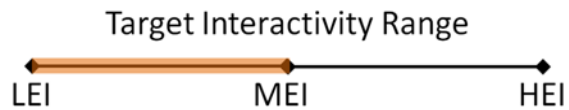


Figure 2. Target Interactivity Range

Within this range, there should be a large number of LEI questions and a smaller number of MEI, with the middle interactions drawing on schema developed using LEI questions. In all cases, the developer should strive to make the format of questions easy to digest and interpret, leaving cognitive resources free for the processing of relevant information.

Applying the Standards

The guidelines described above can be summarized as follows:

Table 1

Courseware Development Guidelines

Standard Guidelines	Series-Specific Guidelines
<ol style="list-style-type: none"> 1. Use a simple, intuitive course player. 2. Apply pre-production media treatment. 3. Scale content appropriately. 4. Apply full course audio. 	<ol style="list-style-type: none"> 1. Use on-screen text sparingly. 2. Avoid simultaneous appearance of imagery and text. 3. Use a high proportion of interactivity. 4. Apply variable ratio intermittent reinforcement to content interactions. 5. Apply a left-side range theory to interactivity.

These guidelines were applied by course developers in the process of developing both the manager and employee sexual harassment series. Data was then

collected regarding the number of pages in each course that apply various combinations of media, as shown in the following four tables. Application of guidelines B1, B3, and B5 can be assessed, in part, in terms of this data.

Table 2

Page Usage: Sexual Harassment (employee series)

Course Title	Intro & Summary	Audio +Image	Audio +Image +Text	Text (words)	Vid.	Ques.	Act.	Ex.	Total Pages
What Is Harassment?	2	7	6	208	4	7	6	0	32
Prevention and Response	5	5	3	56	2	7	1	0	23
Totals	7	12	9	264	6	14	7	0	55

Course Title	% A+I (content)	% A+I (total)	% Interactivity	% Questions	% Activities
What Is Harassment?	65%	34%	41%	22%	19%
Prevention and Response	70%	30%	35%	30%	4%
Totals	67%	33%	38%	25%	13%

Table 3

Page Usage: Sexual Harassment Awareness for Managers (manager series)

Course Title	Intro & Summary	Audio +Image	Audio +Image +Text	Text (words)	Vid.	Ques.	Act.	Ex.	Total Pages
What Is Harassment?	2	7	6	208	4	7	6	0	32
Prevention and Response	2	2	11	307	1	8	0	0	24
Preventing Harassment	2	7	3	36	5	7	3	2	29
Totals	6	16	20	551	10	22	9	2	85

Course Title	% A+I (content)	% A+I (total)	% Interactivity	% Questions	% Activities
What Is Harassment?	65%	34%	41%	22%	19%
Prevention and Response	21%	13%	33%	33%	0%
Preventing Harassment	80%	41%	41%	24%	10%
Totals	57%	31%	39%	26%	11%

Above we have two data tables for the employee series and two for the manager series. The first table for each series provides the raw data and the second a set of calculations based on the data. Column three of the raw data table (Audio+Image) is key for considering guideline B1, the presentation of content through images and audio without use of on-screen text. Column six (Vid.) indicates the number of video pages. It also applies guideline B1, because videos in these courses included imagery and audio, but no on-screen phrases, bullet points, or other text.

Thus, in the second table, column two -- % A+I (content) -- the percentage of Audio+Image content for each course and each series is calculated, consistent with guideline B1, by adding values in the Audio+Image column to the Vid. column and dividing by the total number of content pages (columns 3, 4, and 6). Content pages that used audio and imagery, without text, accounted for 67% of content pages for the employee series and 57% for the manager series.

Calculations were also made for A+I pages as a proportion of all course pages, including intros, summaries, questions, activities, and exercises. For the employee series, A+I content pages constituted 33% of the total, while for the manager series, they were 31%.

Notice that one of the five courses accounted for a large proportion of the total number of pages that use audio, image, and on-screen text (Column four, Audio+Image+Text pages). There were eleven content pages that used on-screen text in the second course in the manager series, more than twice the average for the other courses. This boost in on-screen text reflects coverage of certain key topics. A manager needs to be familiar with the process that may occur in her department in the event that a sexual harassment complaint arises. The second manager course presents eight guidelines for handling sexual harassment investigations, with each guideline covered on a separate page. With each new page, a numbered item is added to the growing list of guidelines. On-screen text for each

guideline ranged between two and four words, so each page added a small number of words to the previous page layout.

In this case, it was possible to apply the principle of minimizing on-screen text while also providing the learner with a key list of procedural items he can review at his discretion on any page in the sequence and print out once the list is complete. The application of guideline B1 is not fully reflected in the data, because each page in the sequence had some text and thus counted as an Audio+Image+Text page.

Guideline B3 (interactivity) can also be assessed in terms of the collected data. In the employee series, 38% of total course pages consisted of interactive elements (questions, activities, and exercises, as indicated in columns seven, eight, and nine -- the Ques., Act., and Ex. columns). The manager series had a 39% interactivity rate.

Guideline B5 is reflected in the types of interactivity used. Activities generally call for more complex processing of course content in ways that involve integration of the material. Questions usually take the form of multiple choice or true/false interactions that require fewer cognitive resources. The courses in these series present a large number of questions (25% of total course pages in the employee series and 26% in the manager series, as indicated in the % Questions column). They also present substantial numbers of the more challenging activity interactions (13% in both cases, as indicated in the % Activities column), but these are roughly half as frequent as questions. Altogether, close to 40% of the pages in these courses involve some form of interaction with the learner.

Comparisons to the Previous Series

The courses in these two sexual harassment series were designed to replace a previous series developed by the same e-learning company. Development guidelines A3, B1, and B3 can be assessed by comparing the new series to the previous series. The follow-

¹The first course in the earlier series was a single 17-minute video, while the other three were standard HTML-based courses. The video course had different attributes that make it difficult to compare to anything else in the new or old series. Videos for the new series are all brief (less than 3 minutes) and do not display text, while the 17-minute video displayed text periodically in bullet-point format, in addition to audio and visuals. For purposes of measurement, the 17-minute video course was counted as a single video page. The video page was not classified as one of the A+I pages in calculated percentages due to text being displayed in the video.

Table 4

Page Usage: Sexual Harassment in the Workplace

Course Title	Intro & Summary	Audio +Image	Audio +Image +Text	Text (words)	Vid.	Ques.	Act.	Ex.	Total Pages
What Is Harassment?	0	0	0	838	1	5	0	0	6
Prevention and Response	7	4	47	3,269	0	14	3	4	79
Preventing Harassment	7	3	50	2,535	0	16	2	4	82
Responding to Sexual Harassment	7	4	67	3,749	0	14	3	2	97
Totals	21	11	164	10,391	1	49	8	10	264

Course Title	% A+I (content)	% A+I (total)	% Interactivity	% Questions	% Activities
Why Can't We All Just Get Along?	0%	0%	83%	83%	0%
Defining Sexual Harassment	8%	5%	27%	18%	4%
Preventing Sexual Harassment	6%	4%	27%	20%	2%
Totals	8%	5%	29%	19%	3%

ing two tables compile data for the four courses of the earlier sexual harassment series.

An adjustment to the scaling of content (guideline A3) is suggested by the 135 total course pages for the new series compared to 264 pages in the old (column ten). The difference is even more dramatic considering the split of new courses into two series aimed at different audiences. Employees in non-management roles complete 55 total course pages, while managers complete 85 pages.

Guideline B1 is reflected in the dramatic increase in A+I content pages (column three). For the old series, 8% of content pages presented imagery and audio, but no text. For the new, the employee series has 67% A+I content pages and the manager series 57%. Total word count (column five) tells a similar

story. The old series displayed a total of 10,391 words on content pages, while both new series combined display a total of 815 words, a reduction of 92%.

Interactivity (guideline B3) was boosted substantially from 29% in the old series to 38% and 39%, respectively, in the new employee and manager series. Both the simpler question interactions and the more complex activity interactions were increased in the new series.

Learner Response

Both new series of sexual harassment courses were released in March, 2012. After taking a course in the series, learners were given the option to complete a course evaluation form. A total of 89 surveys for the

employee series and 47 for the manager series were received by the end of July, 2012.

Learners provided ratings for three questions on a six-point Likert-type scale, including their overall level of satisfaction with the course, how relevant it is to their job or career development, and how likely they are to take another course. They also provided qualitative feedback on what they liked most and least about the course, how they would change it to make it better, and what additional course topics they would find most helpful. Average ratings for the three quantitative questions are provided in the table below.

Table 5

Quantitative Learner Feedback

Series	Overall Satisfaction	Job Relevance	Likelihood of Taking Another Course
Sexual Harassment in the Workplace	4.8	5.0	4.7
Sexual Harassment Awareness for Managers	5.3	5.5	5.4

The highest quantitative scores were recorded for Job Relevance, which tends to be consistent with successful application of guideline A3 (appropriate scaling of content). Relatively high satisfaction rates may be consistent with a number of other guidelines, but it is not possible to evaluate the guidelines individually based on these data. It is interesting to note the substantially higher ratings for the manager series than for the employee series. The manager series is almost an hour longer than the employee series, which is normally a challenge in an e-learning context, but managers have responsibilities to monitor the workplace and respond to incidents that may cause them to view this subject matter more seriously.

Qualitative feedback gives us more insight into the way learners experience these courses. The "like most" and "like least" feedback included a few issues that were mentioned by more than one learner. Comments with multiple mentions are listed in the two tables below, along with their frequency.

Table 6

Qualitative Feedback: What Learners Liked Most

Aspect Learners Liked Most	Sexual Harassment in the Workplace (employee series)	Sexual Harassment Awareness for Managers
Quick pace / conciseness	4	4
Use of realistic case studies / court cases	5	2
Ease-of-use	2	4
Richness / completeness of information	1	3
Quality / frequency of interactivity	1	3

Table 7

Qualitative Feedback: What Learners Liked Least

Aspect Learners Liked Least	Sexual Harassment in the Workplace (employee series)	Sexual Harassment Awareness for Managers
Slow pace / length / repetition	2	2
Technical difficulties (e.g., audio/video not playing)	3	0

Pacing and length of the courses were mentioned most frequently in both the "liked most" and "liked least" feedback, further underscoring the importance of guideline A3 (appropriate scaling of content). It was mentioned eight times as a positive factor, in addition to four positive comments on the richness or completeness of course information. Compared to the four negative mentions, this suggests there were more learners who felt the material was appropriately scaled than those who felt it was too long or too slow. Scaling is a key issue, and may be close to the right level in these courses.

Ease-of-use received the third highest number of positive comments (a total of six), which may reflect a decrease in cognitive stress achieved through application of guidelines A1, A4, B1, and B2. Finally, the quality or frequency of interactivity received four positive comments, suggesting positive learner impact of the application of guideline B3.

Conclusions

Highly skilled e-learning developers are often tempted to design courseware in a spirit of abundance - - applying a broad assortment of media types and using more of each type in a continual effort to enrich the learning experience. However, extensive cognitive and behavioral research suggests there are some combinations of media that work better than others for conveying information in ways that are readily digested, processed, and stored as schema in the human brain. Variety is good, but the right elements, in combination, boost the learning experience substantially.

Principles drawn from behavioral and cognitive research can be translated into practical guidelines instructional designers apply in the process of developing e-learning. The guidelines suggested in this study

call for limiting the use of extraneous visual elements, applying full audio, appropriate scaling of content, limiting the display of on-screen text, frequent inclusion of interactive elements, and formulation of questions and activities in a defined range of difficulty.

Application of these guidelines resulted in a reduction of total course pages from 264 in the previous sexual harassment series to 55 pages and 85 pages, respectively, for the employee and manager audiences in two new series. The percentage of content pages that use audio and imagery, without on-screen text, rose from 8% to 67% and 57%, respectively. Total display of words on content pages decreased by 92%, and interactivity rose from 29% of total course pages to 38% and 39%, respectively.

These measurements suggest a dramatically more concise learning experience for the target audience, which encourages completion of courseware and makes it easier to integrate formal learning into the employee's workday. Comparative data also demonstrates the usage of media combinations that synchronize naturally with the learner's cognitive processes, thus drawing in the learner and keeping the learner engaged. Through a broad application of learning theory, course designers can engage with learners in ways that feel natural to the learner, making e-learning experience both more enjoyable and impactful.

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