Lesson 10: Multimedia and the Web

Objectives

By the end of this lesson, you will be able to:

✫ 1.3.2: Use Web content (e.g., text, graphics, code) properly, including original content, misleading/inaccurate information, copyrighted content, licensing, avoiding infringement.

✫ 2.2.5: Identify purpose and usefulness of multimedia.

✫ 2.2.9: Identify audience and end-user capabilities (e.g., lowest common denominator in usability).

✫ 4.1.1: Identify multimedia Web design principles, and choose appropriate multimedia technologies for a site based on usability criteria.

✫ 4.1.2: Identify accessibility issues and solutions related to Web images and animation (e.g., text-reader capability, captioning).

Pre-Assessment Questions

1. What are the three main types of multimedia?

   _____

2. What two major factors currently inhibit rapid technology adoption?

   _____

3. Which question is most important to answer before you begin planning a multimedia Web site?

   a. What do you want users to do at the site?
   b. Which multimedia is most recent and exciting?
   c. How can multimedia make the site more entertaining?
   d. How much multimedia will fit on the site without disabling the server?

OBJECTIVE
4.1.1: Multimedia Web design principles

NOTE:
Not every Web site uses multimedia. Do you think that a site must use multimedia to keep up or compete with other Web sites?

NOTE:
Although several higher-bandwidth options (e.g., cable modem and DSL) are now widely available to recreational Web users, you must still consider the lowest common denominator in your audience — dial-up connections are still used by a small percentage of the population.

Multimedia use must be considered during the site planning stages because the multimedia you choose may affect layout and navigation. Multimedia cannot usually be added as an afterthought or mere ornamentation.

NOTE:
It is important to understand that Web developers must work harder to capture and keep audience interest. This is why planning and design are so important.

Multimedia and Web Sites

Planning is the key to successful creation of a multimedia Web site. Although multimedia has existed for some time, applying it on the Web is not an exact science. Multimedia on the Web is made possible with various tools and technologies that are not always compatible. In this lesson, you will learn how to effectively plan a multimedia Web site.

Multimedia is gaining popularity on the Web because advances in Internet technology now allow developers to mix different media objects in Web pages. Multimedia such as animation, audio and video can supplement bland text or two-dimensional graphics, as well as complement the visual design, tone and message of a Web site.

However, multimedia technologies also present great challenges to Web developers. Predicting how they will react and display on various platforms and in different browsers requires planning, patience, and lots of trial and error. Further, the appeal of using complex technologies can sometimes overshadow the goals of a site, and even discourage or exclude some audience members from using it.

Current Multimedia Capabilities

The current capabilities of multimedia on the Web are astounding. For a Web designer, it is tempting to utilize these tools and technologies. However, today's designers are limited by two major factors that inhibit rapid technology adoption: bandwidth and browser support technology. To enjoy the full effect of many new technologies, a high bandwidth connection is usually required, as well as browser plug-in support or other third-party applications.

Therefore, Web designers should have a thorough understanding of the site's target audience before using the latest and most dazzling technology, because a user on a dial-up connection with a standard browser cannot support it. This limitation does not mean that you cannot use new technology, but you must be aware that you may exclude some of your audience. A balance in discipline is required to use the technology against the functionality of the site. If your defined audience will be able to support the technology and you are not concerned about users on dial-up, then use any technology that enhances the site.

Time factor

The Web has created a new paradigm by allowing users to change their minds and choose new sources with no consequence. For example, when a person subscribes to a magazine or purchases a book, he or she becomes a captive audience. The person has a vested interest in the magazine or book (the cost) and is therefore more likely to spend time reading it rather than purchase a different one. By contrast, the Web requires no vested interest on the part of the visitor. Users are therefore more likely to change their minds and visit different sites.

However, Web users do make an investment: their time. It is difficult to assign a value to the time spent by the average Web user; but from a design point of view, this user's time is valuable. Mere seconds can determine whether you keep or lose visitors. The correct choice of multimedia will help conserve your visitors' time, increasing the chances of longer visits and potential business.

Animation and the Web

Animation is an important component that distinguishes the Web from other media (except television). Levels of animation can range from simple animated GIF images to 3-D renderings and virtual environments. It allows for the sense of movement and engagement on the part of the user. Sometimes it is used to attract attention, and other times to illustrate a concept. Whatever the use, meaningful design and implementation will allow the benefits of animation to enhance the presence of the site rather than distract from it.

NOTE:
Do you think animation contributes anything more than entertainment value to a Web site? Can you cite any examples you have seen on the Web?

Like other types of multimedia, animation poses some specific accessibility issues for Web users with sight or hearing disabilities or specialized software. If you include animation in your site, you should provide alternative content to maximize accessibility for all users. Images in Web pages should always include the *alt* attribute to specify descriptive alternative text. Short animations that can be described in a few words can also use the *alt* attribute this way. For longer animations, however, you must take additional steps to ensure accessibility.

For example, if you create an animation that shows the way to fold a shirt, you might also provide step-by-step written instructions. By providing text descriptions of an animation file's content, you ensure that your site visitors who use text readers will be able to use the content. If your animation includes narration, you can include captioning to make the content accessible to users with hearing disabilities.

The most common types of basic animation are animated GIFs, rollovers and Flash files. Some other types of animation have proved unpopular or have not gained widespread support, and are best avoided.

Animated GIFs

NOTE:
You will have the opportunity to create animated GIF files later in this course.

As previously discussed, an animated GIF is a compilation of still images that is set into motion at a designated sequence, speed and repetition. Many banner ads are animated GIFs. An animated GIF can be very effective for displaying additional information in the same area of the screen. It can also attract the user's attention, and it adds motion to a normally static page.

Rollovers

NOTE:
You will have the opportunity to create rollover elements later in this course.

Rollovers are actions that are triggered by passing the mouse pointer over designated areas of the Web page. Rollovers are commonly used with navigation elements. They engage the user by creating a reaction to user actions (called events), and they also indicate that the object is a hyperlink. This practice deviates from the basic default hypertext link that is blue and underlined, but it has become an acceptable alternative. Using this type of navigation means that users will not have the benefit of a color indicator for a visited hyperlink. However, with effective use of other navigational aids and indicators, the user should notice little difference.

Flash files

NOTE:
You will have the opportunity to create Flash files later in this course.

Adobe Flash is now considered to be the de facto standard for animation in Web design. Flash introduced a new form of animation that was previously not possible: It offers media-rich content while conserving bandwidth. You will learn more about and work with Flash files later in this course.

The latest versions of Flash and the Flash Player include features for making Flash content accessible to a wider audience. These new features include support for screen

readers as well as the ability to create text equivalents of images. Visit *www.adobe.com/accessibility/products/flash/best_practices.html* to learn more about Flash and accessibility.

Microsoft Silverlight

Microsoft Silverlight is a competitor to Adobe Flash. Silverlight is a browser plug-in that enables rich Internet application features such as animation, vector graphics and audio-video playback. It is compatible with Internet Explorer, Firefox, Apple Safari and Google Chrome running on Windows and OSX platforms. Designers and developers can create content for Silverlight using Microsoft Expression Blend version 2 or Microsoft Visual Studio 2008.

To learn more about Silverlight, visit *www.silverlight.net*. You can also visit the Microsoft Silverlight For Developers site at *http://msdn.microsoft.com/en-us/bb187358.aspx*.

Animation to avoid

One type of animation that has proved to annoy users is scrolling text, whether used in Java applets, marquees or the browser status bar. Critical information should not scroll because the user will probably pay little attention to it.

Audio and the Web

Audio differs from other Web content in that it does not rely on the display for the user to experience the media. The constraints of monitor size, operating system and color bit depth do not apply.

Audio can now be delivered in two distinct ways. The user can download the entire audio file and then begin the playback process, or the audio file can be delivered in streaming format.

The playback quality of any sound recording is dependent on the process and formats used to create the digital file, and the quality of the output devices on the users' systems.

Downloaded audio

The first appearance of audio on the Web was downloaded files. A file could be embedded into an HTML page and downloaded with other files, such as images. After the audio file was downloaded, the playback began. As you can imagine, the larger the audio file, the more time required to download it. In contrast to images, audio files require much more memory to store and play. Thus, sound files take significantly longer to download compared to their relatively short playback length. This tradeoff is usually not acceptable to the user and becomes an annoyance.

MPEG-1 Audio Layer-3 (MP3)
Popular compression standard for audio files; retains most of the sound quality of the source.

Moving Picture Experts Group **(MPEG) Audio Layer-3** (or **MP3**) is currently the most popular format for storing and delivering audio on the Web. Although it is a lossy compression format, MP3 is capable of reducing an audio file's size by up to 12 times, yet retains almost the same fidelity with little or no noticeable difference to the average listener. For example, a 48-MB uncompressed audio file can be reduced to about 4 MB using the MP3 format. MP3 files are usually downloaded, although streaming MP3 is possible. To listen to an MP3 file, you must have an MP3 player (Windows XP/Vista/7 have built-in MP3 players). Many MP3 players are available as shareware and freeware on the Web. Any time a developer creates an application that uses the MP3 format, he or she must pay a license fee to use this format.

Table 10-1 lists common audio file types and their corresponding file name extensions.

Table 10-1: Audio file types

File Name Extension	File Type
.aiff	Macintosh native format
.au	UNIX native format
.mid	MIDI format; produces small files size by creating music algorithms
.mov	QuickTime Movie format; supports both audio and video
.mp3	MPEG Audio Layer-3 (MP3) encoding
.swf	Shockwave/Flash format
.wav	Windows native format

Embedded audio

Embedded audio differs from other audio formats in that it does not allow the user the option to download (or more importantly, to not download). Unless it is an integral and necessary component to the site, do not embed audio; instead, allow the user to choose whether to download and listen. Currently, the only acceptable form of embedded audio used on the Web is Flash files. Flash files have the ability to specifically control audio playback and timing. In addition, Flash applies compression to audio that immensely reduces file size and streams it to the user, which decreases download time.

Keep in mind that the term "embedded audio" only refers to the way the audio is offered. If you supply an audio file in a Web page in a way that it automatically downloads and starts playing when the page is accessed, then the audio is considered embedded. The more common (and more user-friendly) way to use audio is to make the audio file available for the user to download by linking to it if the user chooses to do so.

Streaming audio

Streaming audio differs from downloaded audio files in that the user does not wait to hear the file. As soon as the connection is made to the streaming audio server, a small buffer is created and the audio file begins to play.

Consider a 10-MB sound file. Downloading it over a dial-up connection would be prohibitive. In streaming format, the file would play while it is downloading, decreasing delivery wait time to the user. Livecasts demonstrate the benefit of streaming technology. Listening to a one-hour livecast that is streamed live to the user can be compared to listening to a live radio broadcast.

Audio formats that have the ability to stream include RealNetworks RealAudio files, Apple QuickTime files and Microsoft Windows Media Audio files. Although streaming MP3 is possible, MP3 audio files are usually downloaded.

Video and the Web

Video for the Web is another evolving technology that will eventually become as common as static images. However, the video currently available to users via dial-up connections is often considered low quality.

A visit to any major news site offers examples of current video files played using the RealNetworks RealPlayer, Windows Media Player, Apple QuickTime and other less common applications. This type of video typically provides low resolution, slow frame rates, small dimensions and pixilated images (in which the square pixels of color are visible). Nonetheless, it is generally viewable and understandable.

Like audio, video can be either downloaded and then played, or streamed down to the user using a streaming server and player application.

Options for video usage increase with high-bandwidth connections. Video conferencing, Webcasts and Web cameras use the Internet as a transport vehicle.

Video on the Web should never be mandatory for anyone outside of a network such as a LAN or an intranet. You should provide links along with file types and sizes to give users the option to proceed. For video longer than a few minutes, you should offer the option to stream the file to help conserve bandwidth and download time.

Internet TV

Internet TV has not yet evolved into a solid, universally accepted means of connecting people to the Internet, but most experts believe it will. In fact, Microsoft acquired this technology, formerly called WebTV, as part of its strategy to increase Internet usefulness to the consumer.

The controlling device is similar to a cable box and connects to the Internet through a high-speed line. To use Internet TV, the user needs only a phone line to connect his or her television to the Internet. When connected, users can perform almost all the same functions that computer-using Internet surfers can perform. They can visit a site, see all the latest graphics, experiment with interactivity, survey available products, and buy directly from the site — much as they would online or through a home shopping club. Companies such as Sony, Philips Magnavox and Microsoft Network have incorporated this technology in conjunction with WebTV Networks to form MSN® TV (*www.msntv.com/pc/*).

The possibilities for Internet TV technology are impressive. Imagine the increased number of potential customers your site might reach. Bandwidth and slow-connection constraints on multimedia content are not as restrictive with Internet TV as they are with a 56-Kbps modem.

Goals of a Multimedia Site

Multimedia provides so much content depth and so many ways to present information that its intent can be unclear. Early in multimedia development, Web professionals were so excited by its tools that they forgot the greater importance of content.

It is important to clarify the goals of your multimedia Web site before you create the first page or animation sequence. Ask yourself these questions before you get started:

- Who is your audience and what is your message?

- How will the setting or interface look?

- Which multimedia elements fit into the interface and complement your message?

- What types of tools and expertise do you need to create the multimedia elements and author the Web site?

Ultimately, the over-reaching question is this:

- What do you want users to do when they visit your site? Do you want them to browse? Do you want them to explore? Buy? Research? Sign up for your newsletter?

Consider these sample outcome statements:

- Users will be encouraged to complete a survey or sign a guest book upon entering or before leaving the site. This data will be collected and incorporated into the company mailing list(s) or followed up by sales associates.

- Users will purchase or request purchasing information about the products listed by responding via e-mail, calling a toll-free number or submitting an interactive form.

- Users will subscribe to our newsletter.

Multimedia Site Design Basics

Multimedia Web site designers must present elements onscreen so the users' expectations are met. Coordinating expectation and function is not an easy task, and must be planned in advance by the development team. Issues to be addressed include the following:

- What is the navigational structure of the Web site?

- Will frames be used?

- What is your target audience's viewing capability?

- With what speed are Internet users connecting? Which operating systems are they using?

- Will a text-only or low-resolution graphic version of the site be provided? How will users access it?

- Are necessary plug-ins readily and easily available? Where on the page will you place the link to the plug-in? Will you provide the plug-in on your site or will the user click to go to another Web site? How will the user return to your site?

Scene and setting

Multimedia Web site design is more than just random placement of text, graphics and multimedia. Consider the following excerpt from David Siegel's best-selling book, *Creating Killer Web Sites*:

> *Site designers carefully specify the position and relationships of all elements on the page, retaining fine control of the layout. Sites use metaphor and visual theme to entice and guide, creating a whole experience for surfers from the first splash screen to the exit.*

In other words, multimedia Web site design focuses on providing the proper mental model to which users can relate and interact. Even as the content changes, your style and function remain the same, especially if you expect return visitors. Contrary to some beliefs, most people do not want to have to relearn your content arrangement each time they visit. Much can be said in favor of consistency.

User Interaction

Web professionals can deliver content through a number of acceptable models. The most successful seems to be the "spiral" concept and its three elements: interest, activity and resolution. Each element is encountered in succession until the user's experience is completed or the Web site's navigable channels have been explored. For example, a "How To" Web site might attract the user with its intriguing original graphics (interest), provide menu options (activity), and lead the user to the desired goal (resolution).

Remember that the more focused the user's experience with your Web site content is, the more enjoyment he or she will have, and the greater the likelihood that he or she will return. For example, you may have lost track of time while "surfing" the Web. Users surfing top-quality Web sites are frequently unaware that time is passing and are in a state of complete engagement during this heightened level of experience. This state of mind on your prospective customer's part is likely to have a desirable outcome on his or her purchasing behavior.

One of the Web professional's objectives, then, is to create a user experience that elevates the potential customer into the heightened state. Psychological research has concluded that people achieve this state when they:

- Concentrate.

- Are challenged.

- Are focused.

- Lose self-consciousness.

- Lose sense of time.

Thus, to help your user achieve this frame of mind, you must provide a Web site that supports these characteristics.

An effective example is the Disney site (*http://disney.go.com*), which takes the user into an immediate state of heightened interest. The graphics and content intrigue sufficiently to encourage the user to start exploring. After this interactivity has begun, the user is quickly transported to a heightened interactivity phase. The Web graphics become more sophisticated, and the options for sound and video inspire more intrigue. With each click of a navigation button, the user is rewarded with additional content. This content model is important for any business: training, human resources, sales and marketing, or any other area.

A more business-related Web site might use less excitement and more conservative media for rapid content dissemination and delivery, such as well-written text to generate excitement and interest about the product or service. An exciting, non-standard image can intrigue the user and draw him or her to your online business presence.

Selecting Multimedia Elements

The most daunting task for the multimedia Web page designer is to manage screen space and select the most effective format for the media elements. The number of file formats from which to choose has grown exponentially for both of the dominant browsers (Firefox and Internet Explorer), as has the number of plug-ins available for use with each. Designers must perform careful research to discover the most widely used plug-ins for their audiences.

Web designers must plan their sites for users who do not have the necessary plug-ins. Rather than accepting a limited audience, you can provide links or instructions to help users find and install the plug-ins your site requires.

Also consider how the multimedia you use in your site affects accessibility for Web users with disabilities or specialized software. Many multimedia formats now provide support for text readers and captioning. If these capabilities are not supported by a format that you use on your site, the best practice is to provide alternative content in a more accessible format (such as plaintext).

Function and purpose

> **NOTE:**
> The most important aspect in choosing multimedia elements for a site always comes back to function and purpose.

As you think about which file format to use, consider the many technical aspects of each multimedia element. For example, ask yourself if Flash files are important to the Web site or if you want to add them merely because you can. Similarly, there are good reasons to use a Java applet or JavaScript pop-up window.

A good Web designer will create content and graphical design to satisfy user expectations about the interface. Rollovers (i.e., mouseover effects) can provide interaction and feedback. Designers need to consider that some software applications, such as Adobe Director and Flash, have offered cross-platform availability for some time but others have not.

> **NOTE:**
> Remember that file size is an extremely important consideration when choosing multimedia. Even the most exciting content will not receive much attention if the site that delivers it is prohibitively time-consuming to use. This is true even with users on broadband — they have come to expect almost immediate results. If the server is slow in delivering multimedia, it can create a negative experience for the user.

Figure 10-1 shows relationships between file size and several multimedia formats. This model is useful for determining which multimedia formats to use. Note that you can achieve the same results with various file formats.
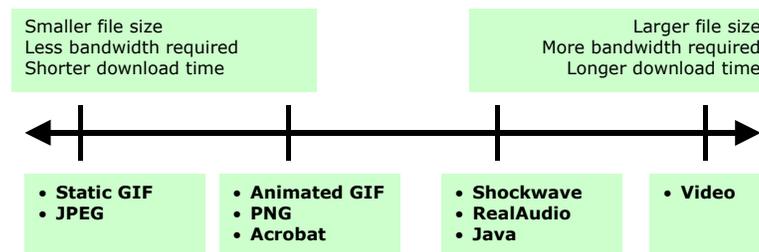

Figure 10-1: Relationships between file size and media format

The best Web designers have some programming knowledge and understand how to implement some multimedia elements. Non-designing programmers should learn the rudiments of design or consult a design professional for assistance. Web professionals must consider their site's purpose, the tools they have, and the resources they know best. They must also try to determine what percentage of the intended audience has Java-enabled browsers or the willingness to download a plug-in.

Multimedia authoring

Each multimedia application can be an exciting new tool that helps you construct robust multimedia elements and, ultimately, your Web site. Because each application has its own characteristics, each must be carefully selected to maximize the viewing potential. The size of your design team will determine how many roles you must play yourself and how many other professionals, such as graphic artists, you must involve. In the design phase, you must understand the strengths and weaknesses of the new multimedia opportunities. Given the considerable time and money required to learn the new technologies, Web design must be given proper attention and not treated as a minor "additional duty" for someone who is already overloaded.

Many corporations are rethinking their overall information strategies. Content areas must be transmitted successfully to the consumer. Electronic-commerce strategy, and interoperability between different operating systems and hardware platforms, must be addressed by the Web professional.

Designing, implementing and maintaining a Web site that can deliver content with advanced multimedia capabilities and state-of-the-art interactivity is easier than it was in the past. New applications are constantly introduced to put bigger and better multimedia on the Web. In the current developmental stage, no multimedia standard is agreed upon to which every Internet application developer can work. The challenge in building multimedia-rich Web sites is in deciding which methods, resources and tools are necessary for successful deployment. With the growth in consumer interest and online buying activity, your question becomes this: How can my company best use its knowledge of Web interactive programs and multimedia content to successfully reach customers before the competition does? This business question differs from the traditional only in its emphasis on Web technology.

Like a magazine cover on a magazine rack, a Web page gives its author only a few seconds to convince the reader that the information inside is of interest. The page's "look and feel" (its overall impression of appearance and functionality) is an important tool in this effort. Graphics play an important part in your user's experience. For this reason, interesting graphics are important at this level of Web development. The first page of your site must also display exact pathways for the user to gather information; this navigability should also help users in an intuitive way.

Copyright infringement

Although users can view and retrieve source code for just about anything on the Web, inappropriate use of other people's work is illegal. As the Web develops and programs are invented to track site visitors, anonymity will decrease. Remember that it is illegal under copyright law to use any published Internet material (text, art, music, code, etc.) without permission from its creator or owner. To avoid legal penalties, all Web designers should opt for a conservative interpretation of intellectual property issues.

Recall the discussions about copyright infringement from the lesson about Web graphics. A conservative interpretation of intellectual property issues is as follows: If you did not create it, you probably should not use it on your site. However, remember that many services — some free — offer Web content that you can use on a Web site with some restrictions, often a required attribution or limitation to only personal (non-commercial) sites.

Java vs. plug-in

A Web designer must also think in terms of choosing between, for example, a plug-in architecture that requires the user to perform a one-time download, or a Java applet, which currently requires the user to download the Java files for every playback. For many, this design selection is critical. You will learn more about Java applets later in this course.

Since Java was released, a serious debate has ensued over whether plug-ins or Java applets are superior. Many prefer the wisdom of sending both content and the necessary engine to drive it across the bandwidth (as is the case with Java applets) rather than just sending the content itself. Many also feel that a few security problems remain with Java. Others say that many of the virtues attributed to Java come not from the language but from the environment in which it runs. The converse is also true: Many of its drawbacks come from the environment as well. However, the Web designer has little control over the user's environment.

Visualize and understand the user

First, create a mental picture of your Web site user. If you really know who your users are, you should have a good sense of the hardware, software and browsers they use.

How big are their monitors: 15 inches or 21 inches? What kind of graphics accelerator cards do they have? Which type of memory do they have and how much? A video card's primary duty is to hold onto a picture to allow the monitor to display it. So the more RAM your users' video cards have, the larger graphics they can handle, in terms of both numbers of colors and pixels. A single 640x480 256-color graphic demands more than 300 KB of memory. For your users to see your image in true color demands at least 2 MB. So for whom do you design your Web site? The user with the best and most equipment? The least equipment? Or somewhere in between?

Performance

You can create smaller, more compressed graphics, animation, video and audio with applications specifically designed for online usage. These applications allow you to apply a number of graphic optimization processes to still image and movie files. The end result of simple compression is smaller files with little or no loss of quality.

Another option is to store the multimedia files locally, while keeping the logic (or code) on the Internet or intranet. Some multimedia-authoring programs, such as SumTotal Toolbook, Adobe Authorware 7 and Adobe Director 11.5, allow you to call multimedia files from a local source (such as a network or CD-ROM).

Case Study

No Day at the Fair

As the new marketing manager for the annual state fair, Franck was responsible for working with a design team to create a new Web site.

The existing state fair site was simple but functional. In other words, Franck thought, totally boring. He reviewed the market research collected by his predecessor a couple years earlier, which concluded that fair visitors in general were not technologically savvy or affluent. But surely that had changed by now. It was time to create the best state fair Web site ever.

Franck envisioned a Web site that was as exciting as the state fair itself — neon text everywhere, animation and audio clips playing, everything constantly in motion. He wanted Web site visitors to get a taste of the fair experience so that they would rush to the fairgrounds for more. Franck instructed the Web design team to use only the latest and greatest technologies, advising them that money was not an issue.

Within a week of the Web site's launch, the state fair's customer service representatives were overwhelmed with complaints and questions about the new site. The volume of e-mail doubled, with site visitors asking for simple information that was already posted on the site. A few people wrote to Franck and complimented him on the exciting new site, but the site's traffic declined.

*   *   *

Consider this scenario and answer the following questions.

• Franck encountered a common pitfall in designing this Web site. What should he have done before deciding on a multimedia-intensive site?

• What are some ways that Franck could have used multimedia appropriately and made the site engaging without turning away visitors?

• Is Franck solely to blame for the decline in traffic after the launch of the redesigned site?

• This scenario does not specify any measures that might have been taken to accommodate users with disabilities or computer limitations. If you were designing the site, how would you make sure that it is accessible to the widest possible audience?

Lesson Summary

Application project

Visual design can entice users to stay and interact. How will you now use multimedia and Internet technology to help add value to your Web sites?

If you are planning to use an abundance of multimedia on a Web site, consider this question: If your screen is filled with visual elements of all kinds, how will users distinguish hotspots, key content or navigation components from the rest of the screen?

Skills review

In this lesson, you learned about types of and current trends in multimedia. You studied the use of animation, audio and video. You considered the challenges to accessibility that multimedia poses. You also studied multimedia in relation to basic Web site design principles. You should now be able to choose which technologies make the most sense for your business's Web presence.

NOTE:
You can review multimedia types and terms in **Activity 10-1: Identifying multimedia elements**.

Now that you have completed this lesson, you should be able to:

✓ 1.3.2: Use Web content (e.g., text, graphics, code) properly, including original content, misleading/inaccurate information, copyrighted content, licensing, avoiding infringement.

✓ 2.2.5: Identify purpose and usefulness of multimedia.

✓ 2.2.9: Identify audience and end-user capabilities (e.g., lowest common denominator in usability).

✓ 4.1.1: Identify multimedia Web design principles, and choose appropriate multimedia technologies for a site based on usability criteria.

✓ 4.1.2: Identify accessibility issues and solutions related to Web images and animation (e.g., text-reader capability, captioning).

Lesson 10 Review

1. What factors should a Web designer consider when choosing multimedia for a Web site?

2. What investment do Web users make in a Web site, and how does this involve the use of multimedia?

3. Which type of animation multimedia are Web designers advised to avoid, and why?

4. Name at least two audio file formats (or their corresponding file name extensions).

5. Briefly describe the process used for streaming video.