Integrating usability and accessibility into the interactive media and communication curriculum

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Abstract

One of the challenges of developing an interactive media curriculum is the need to balance production skills, such as coding and using development tools, with visual design and design best practices, such as usability and accessibility. Usability, or how easy it is to use a site, is critical because if a site is difficult to use, users will go elsewhere for the information or service. In addition, poor usability has been demonstrated to undermine overall site credibility. Accessibility is essentially how usable a site is by users with disabilities such as impairments in vision, hearing, cognition, and motor skills. While students need to understand accessibility on a legal level, particularly given the number of lawsuits related to website accessibility, they also need to understand the issue on an ethical level. This article discusses the importance of usability and accessibility and how to integrate these ideas into both interactive media creative classes as well as lecture courses such as media and society and media law courses, and it includes a discussion of sample exercises, sample assignments, and recommended resources.

Keywords: Usability, Accessibility, Curriculum, Teaching

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The Internet, and particularly the web, have become critical communication channels and have fundamentally changed communication on both a one-to-one and a one-to-many level. Teaching students how to design effective online communication tools, such as webpages, is more than a matter of teaching them how to write code or use a WYSIWG editor. Faculty need to balance teaching students the basic building blocks, such as HTML and CSS, with teaching students visual design and design best practices, particularly usability and accessibility. Usability, or how easy it is to use a site, is critical. If a site is difficult to use, users will go elsewhere for the information or service. In addition, poor usability has been demonstrated to undermine overall site credibility (Wang & Emurian, 2005), and a loss of site credibility poses a potentially critical problem for companies in fields that rely heavily on user trust, such as e-government, e-commerce, e-health, and e-banking. Website accessibility is the usability of a site for users with disabilities such as impairments in vision, hearing, cognition, and motor skills (W3C, 2008). When web sites are not accessible, disabled users are at a disadvantage in an arena that should serve as an equalizer rather than a barrier. Tim Berners-Lee, the inventor of the World Wide Web and founder of the World Web Consortium (W3C), argues that "the power of the Web is in its universality. Access by everyone is an essential aspect" (W3C, 1997). Thus, there is an ethical imperative for designers to take accessibility into account when designing a website or other interactive product. There are also legal reasons for designers to take accessibility into account as federal and state laws in the United States mandate that specific web sites be accessible, particularly e-government sites. Recent court cases, particularly the National Association of the Dead et al. v. Netflix, Inc. (2012), have raised the possibility that these

accessibility laws may be more broadly applied, and the federal government is consider applying the Americans with Disabilities Act (ADA) to the web, particularly for e-commerce and local e-government sites (Department of Justice, 2010). This change will mirror how accessibility is applied in the brick-and-mortar world, where most public buildings are required to have wheelchair ramps and other accessibility features.

Given the importance of website usability and accessibility, it should not surprising that scholars involved in teaching web design, have called on faculty to integrate usability and accessibility into the curriculum. These calls have encouraged faculty to move beyond simply addressing the cognitive objective of students learning guidelines, but to set affective objectives as well. For example, Hayes (2002) argues for teaching students to take the role of the user advocate when designing interactive material. Rosmaita (2006) calls for faculty to take "an accessibility first" (p. 270) approach when teaching web design, requiring students to engage in accessible design practices from the very beginning, noting that "it's no fun writing accessible web pages if you have to go back and unlearn everything in order to make your pages accessible. If you keep accessibility in mind from the beginning, it's much easier to implement" (p. 274). In addition, Rosmaita argues that having students engage the material from an accessibility perspective early on may mean more designers moving into the workforce who not only understand how to make an accessible website, but also believe that accessibility is important and "a good idea" (p. 274). Scholars from diverse fields have been calls for teaching accessibility as part of the web design process, including scholars in information systems (Lazar, 2002), technical communication (Palmeri, J. (2006) and mass communication (Royal, 2004).

This combination of students understanding how to make an accessible website and embracing the idea that accessibility is important has the potential to counter some of the

problems Lazar, et al. (2004) identified in a survey of 175 web managers, addressing the challenges designers faced in making websites accessible. Among the problems the web managers identified were a lack of training and resistance by management. In several instance, web managers expressed an active hostility toward modifying their designs to make their sites more accessible. Incorporating accessibility throughout the teaching process gives educators an opportunity to help students address these potential problems. The problems the study identifies suggest that faculty should approach accessibility using both cognitive objectives, such as having students understand how to build an accessible website, and affective learning objectives, such as understanding why accessibility is important. In addressing these objective, students need to understand usability and accessibility issues at a variety of levels including technical, legal and ethical levels.

That said, it is also important that faculty talk about these issues in other classes. Faculty need to address accessibility in media law classes so that students understand what the laws are and the changing nature of how these laws are being applied, particularly the issue of the ADA and the web discussed above. Faculty should also be talking about usability and accessibility in media and society classes. For instance, usability can play a role in the success or failure of a web-based technology or site, a particularly important issue in areas such as e-government. Usability can also play a major role in bridging or widening the digital divide, particularly as mobile devices have come to be seen as the great equalizer in the divide. Similarly, promoting accessibility is a critical element of bridging the digital divide, as taking accessibility into account during the design process helps prevents the marginalization of users with a disability.

As fundamental issues in Internet-based communication, faculty need to address usability and accessibility across the curriculum. In doing so, faculty may need to look outside of mass

communication or communication literature and take a more interdisciplinary approach. Faculty teaching web design should not see use usability and accessibility as areas that are only in the domain of specific disciplines, such as technical communication, computer science or information architecture. All design students need to be familiar with these issues, particularly as they move into the workforce. This article addresses these issues by outlining what usability and accessibility are, identifying courses that these issues might be taught in, and suggesting how to integrate these concepts into both interactive media creative classes and lecture classes, including a discussion of recommended readings, exercises, and assignments.

Background

Usability

Usability is a measure of quality, essentially assessing how easy something is to use (Nielsen, 2012b). In the case of interactive media, usability experts usually look at quality in terms of the interface. As Nielsen (2012) points out, usability has also come to mean the part of the development process that focuses on making the interface easier to use. Nielsen breaks the components of usability quality into five areas:

- Learnability: How easy is it for users to accomplish basic tasks the first time they encounter the design?
- Efficiency: Once users have learned the design, how quickly can they perform tasks?
- Memorability: When users return to the design after a period of not using it, how easily can they reestablish proficiency?
- Errors: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?

- Satisfaction: How pleasant is it to use the design?

Each of these areas represents an opportunity for a website to succeed or fail. Users unable to easily navigate a website or easily complete a needed task are likely to leave the site. In addition, usability problems may also lead to credibility problems for the website's organization (Wang & Emurian, 2005).

Why usability is important. When a website has usability issues, it presents several problems. The first, and perhaps most obvious, is that poor usability keeps users from easily completing the tasks that they came to the website to complete, which impedes communication. Assuming the user can go elsewhere for the information or services, he or she likely will. This is not, however, the end of the problem. Poor usability also undermines credibility. Wang & Emurian (2005) argue that interface design, including usability, plays a significant role in building trust, a "dimension of credibility" (p. 114). Credibility is a critical issue for sites that require trust such as commercial sites (Chen & Dibb, 2009), corporate sites (Fogg et al., 2003), and e-government sites (Huang, Brooks & Chen, 2009). Without trust in a site, users will likely avoid it if possible, particularly in areas such as e-government (Teo et al., 2008; Warkentin et al., 2002).

Usability problems can also undermine attempts to bridge the digital divide. Smith (2011a) found that 35% of American adults own a smartphone and that 87% use their smartphones to access the Internet, with 25% of smartphone owners using their phone as their primary Internet access point. In a related study, Smith (2011b) found that overall, 45% of all English- and Spanish-speaking cell-phone owners (Smartphone or feature phone) in the United States used their phones for browsing the web. Phone-based web browsing was particularly pronounced among groups typically included in the have-not side of the digital divide—non-

Hispanic Blacks (56%) and Hispanics (51%)—when compared to non-Hispanic Whites (39%). These figures suggest that if designers do not pay attention to site usability on mobile devices, they will tend to further disadvantage groups that lean more heavily on mobile devices as their entry point for the Internet.

The need to pay attention to usability of websites on mobile devices underscores the need to teach usability as more than just design standards. Design standards, such as the former standard of using a house icon to indicate the home link, change. Usability principles, such as those outlined by Nielsen, are less mutable, though, and can be applied to new communication tools and changing trends as they develop. Understanding these principles and being able to apply them to new technologies helps set students up to be able to play multiple roles in the workplace. Students not destined to be designers come away with the ability to communicate effectively with designers, putting them in the position to work on development teams, to be able to evaluate designs, and to be an advocate for the user.

Accessibility

Teaching students to be user advocates is particularly important in accessibility, the more narrowed application of usability, accessibility. An "accessible" website or product is one in which functionality and content can be easily accessed by users regardless of their disabilities. When designing for accessibility, designers need to create products that can accommodate a variety of disabilities, including those related to vision, hearing, mobility, speech, cognition, and learning (W3C, 2008). As with usability, however, faculty should be teaching students to move beyond thinking about simple heuristics and think about "universal design," the idea that designers should create sites and applications so that everyone should be able to use them, regardless of the technology the user selects to access them or the physical or cognitive

challenges of a user (Chisholm & May, 2010). This trend is by no means limited to websites and applications, but extends beyond the computer and into architecture in the real world (Goldsmith, 2001). The current W3C accessibility standards, WCAG 2.0, call for website designs to meet four basic accessibility principles that designers can use to help evaluate their websites. The remember using the acronym

POUR (W3C, 2008).

- Principle 1: Perceivable - Information and user interface components must be presentable to users in ways they can perceive.
- Principle 2: Operable - User interface components and navigation must be operable.
- Principle 3: Understandable - Information and the operation of user interface must be understandable.
- Principle 4: Robust - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

WCAG 2.0 standards also spell out specific guidelines based on these principles, such as providing text alternatives for any non-text content (i.e., images) "so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language"; making sure the site can be operated with just a keyboard; keeping navigation relatively the same between pages and designing sites to maximize compatibility with future accessibility technologies and software, such as browsers (W3C 2008).

Why accessibility is important. Accessibility is an issue for many Americans. The U. S. Census Bureau's 2008 American Community Survey data (United States Census Bureau, n.d.) reported that about 19% of non-institutionalized Americans have some sort of disability and that this percentage increases to 38% in Americans over age 65. Internet use among Americans with

a disability is substantially lower (54%) than abled Americans (81%), and 2% of American adults report having a disability or illness that limits their use of the Internet (Zickuhr & Smith, 2012). Internationally, over 600 million people have disabilities (Loiacono & Djamasbi, 2013). W3C Director Tim Berners-Lee, who is also the chief architect of the web, argued early on that there is an ethical imperative for making the web accessible and empowering users with a disability, pointing out, "The power of the Web is in its universality. Access by everyone is an essential aspect" (W3C, 1997). This call has been championed by both national and international governments and non-governmental organizations. W3C accessibility standards and the premise of equal access have formed the basis of national level accessibility laws in a number of countries, including the United States (Donker-Kuijer, de Jong & Lentz, 2010; U.S. Access Board, 2011) and Australia (Conway, 2011), as well as Japan, New Zealand, and members of the European Union (Shi, 2007). The United Nations has also expressed its support for equal access through the widely supported Convention on the Rights of Persons with Disabilities, which calls for countries signing the convention to "promote access for persons with disabilities to new information and communications technologies and systems, including the Internet" (United Nations, 2006; United Nations, 2007).

Despite these regulations, there are long-standing problems with website accessibility. This includes not only e-commerce sites (e.g., Isa et al, 2011; Lazar et al., 2012), but also corporate (e.g., Gilbertson & Machin, 2012; Loiacono, 2009) and governmental sites at all levels (e.g., Olalere & Lazar, 2011; Youngblood & Mackiewicz, 2012; Yu & Parmanto, 2011). And the problem is far from limited to sites in the United States (e.g., Goodwin, et al., 2011). Researchers have raised a variety of concerns about the access issues posed by these problems, including placing blind users at a disadvantage when they apply for jobs using online applications (Lazar et

al., 2012), obtain government information (e.g., Olalere & Lazar, 2011; Youngblood & Mackiewicz, 2012; Yu & Parmanto, 2011), accessing e-learning information (e.g., Fichten, et al, 2009), and conduct e-commerce tasks (e.g., Kim & Lehto, 2012).

In some instances, these disparities have triggered lawsuits. While in-court victories have been rare, in several cases, disability advocacy groups have negotiated out-of-court settlements with major corporations, including the retailer Target Corporation and the video streaming and rental company Netflix. In the case of National Federation of the Blind, et al. v. Target Corp. (2006), the retailer agreed to make its website more accessible and agreed to a substantial financial settlement, which included legal fees (National Federation of the Blind, et al. v Target Corp., 2008). In National Association of the Deaf et al. v. Netflix, Inc. (2012), the settlement included agreeing to make all of its Internet-based content closed captioned by 2014 as well as paying legal fees. In many cases, including the Target and the Netflix cases, plaintiffs have based their arguments on the Americans with Disability Act of 1990's (ADA) mandate of equal access to public space. The courts are supportive of this argument, and the judge in the Netflix case, Michael Ponsor, argued strongly that "the fact that the ADA does not include web-based services as a specific example of a public accommodation is irrelevant" and that "Congress intended the ADA to adapt to changes in technology" (National Association of the Deaf, et al. v. Netflix, Inc., 2012, p. 8), which requires courts have begun to agree with advocacy groups that the Internet is a public space similar to a brick-and-mortar store (Palazzolo, 2013). As of 2010, the Department of Justice is reconsidering how ADA should be applied to the Internet (Department of Justice, 2010). Daniel Goldstein, an attorney for the National Federation of the Blind, refers to these court cases as "eat your spinach" cases. Much as children may not want to their spinach, even though it is good for them, these court cases, while problematic for companies, often result, in

companies making sites more accessible, which brings with it advantages as "the market share you gain is more than the costs of making your site accessible" (Palazzolo, 2013).

Although students need to understand accessibility from ethical and legal perspective, they also need to understand that universal design has added benefits, and that these benefits can help them make the case for pushing accessibility in the workplace, particularly during the development process, where accessibility is easy and inexpensive to implement, in contrast to having to retrofit an existing site, which can be time consuming and expensive (Loiacono, E. T., & Djamasbi, S., 2013). First, making a site accessible opens it up to new clients. In the case of Netflix, providing closed captioning opens the door to the 7.8 % of Americans with a handicapping hearing loss (Agrawal, et al., 2008) to subscribe to the service. Studies of e-commerce website accessibility have also pointed to companies increasing their customer base by making their sites more accessible (e.g., Maswera, 2008; Gutierrez, 2005; Xiong, et al., 2009). Accessible design can also help make sites perform better on mobile devices (Brown et al., 2010). Vanderheiden (1997) noted that as computer users became more nomadic and began carrying computing devices with them, interfaces needed to more flexible. For example, having alternative text for images might allow a sighted user to use a device at time when it would be awkward or impossible to look at the device. In addition, the ALT attributes make sites more accessible when sighted users turn off web images to conserve bandwidth and/or speed load time, such as in areas without broadband and on mobile devices. Conversely, as mobile sites and applications need to be more flexible, they are sometimes easier for non-sighted users to use (Wentz & Lazar, 2011).

Teaching Usability and Accessibility

Having examined why it is important for students to know about usability and accessibility, the article will now shift to pedagogical techniques for teaching students about these issues. These techniques were developed with an eye toward creating low-to-no-cost exercises. The exercises include both commercial and e-government sites. E-government sites are particularly useful as looking at them can help attune students to the importance of usability and accessibility because e-government sites fulfill an important role in providing information to the public. These assignments, of course, could easily be adapted to other types of websites, opening the door to classes that might deal with other types of critical public information, particular those looking at health communication.

Usability

Usability testing can incorporate a wide range of techniques. Usability.gov, a U.S. government website designed to be a "primary government source for information on usability and user-centered design" (Usability.gov, n.d.a), lists a range of usability methods that can be adapted to in-class exercises.

Card Sorting. Card sorting is an inexpensive, quick, and easy method for gathering user input for designing the information architecture (essentially the outline) of a website. This method typically involves a user sorting physical or virtual cards identifying types of information and sorting this information into logical groups. The information card on the card could be based on a specific web page on a site, a category of information, or a task the user might complete on the site. In some cases, a facilitator might ask the user why he or she made a specific decision. Card sorts are usually conducted as either open or closed sorts. Open sorts allow the user to define the categories, while closed sorts require the user to place the cards in predetermined

categories. Card sorting can help identify how users group information; determine which information should go together; as well as identify information labels that are confusing. It can also help define site navigation structure by giving a designer better understand how users think about information (Kaufman, 2006). As an example, a card sort might reveal that home improvement store customers have two different approaches to organizing information. One group may think about information in terms of strict categories, such as tools, power tools, drills. A second group may be more task-oriented and think about items in terms of what room the user might be working on. This finding might lead a designer to offer users two ways to find information, through a categorical navigation system and a task/room-based navigation system. Kaufmann (2006) offers a thorough and easily understandable discussion of setting up a paper-based card sort, and the work is good option for a class reading assignment.

Web-based virtual card sorts offer an alternative to paper-based tests and have the advantage of allowing designers to conduct multiple tests at the same time. It should be noted, however, that Petrie, et al. (2011) caution that some users may find virtual card sorts more cumbersome than paper-based ones. That said, they found little difference in the reliability of the two methods. Readers interested in a comparison of virtual card sorts should look at Chaparro, et al. (2008).

UX Punk's WebSort (http://uxpunk.com/websort/) is a good virtual card sort resource for students because it allows designers to create a free 10-person study, a sample size appropriate for many class projects, particularly those not involving a real-world client. Students should be aware, however, that real world testing should involve at least 15 users (Nielsen, 2004). WebSort also allows users to participate in a sample study, and this is really where WebSort shines as a teaching tool, particularly as the class can look at the results of the sample study. The WebSort

sample study is prebuilt and asks participants to sort a list of 42 items into categories using a drag-and-drop interface. Some of the advantages of WebSort are that it runs in a web browser, is platform independent, and does not require administrative privileges to run. The website can be introduced as being a list of items for a hotel/resort website. This scenario is particularly useful if you are using Felke-Morris's (2013) web development textbook in class, which includes a case study series based around a resort. Kaufaman's (2006) and Usability.gov's (n.d.b) discussion of card sorting are good readings to pair with the in-class exercise.

Before getting students started on the exercise, it is useful to introduce it in much the way one would when conducting a real world usability test, discussing the goals of the exercise, its benefits to developers who might look at the results, and emphasizing that they are not being tested. As with most in-class exercises, it is helpful to monitor how students are doing and, when needed, remind them how the card sort works. The idea behind this approach is to model facilitator behavior to help them prepare to run their own tests. It may be useful to base the script for class on the recommendations from Kaufman (2006). Of note, while a faculty member might not want to go through the consenting process with the students, it may be worth discussing what the consenting process is and why it is important.

Setting up the exercise. A possible script might begin as follows:

> "I'm working with a team to design a Website for a new resort on the southern California coast. In order to make the site easy to use, we're gathering input from people from some of our target audiences. To do this, we're going to run a simple card sorting exercise that will help us understand how you think about the different pieces of content and functionality on the site."

Next, have students open the WebSort page (http://uxpunk.com/websort). Underneath "Check it out," have them select "Be a participant." The faculty member should also open this screen on his or her own computer, particularly if the computer can be projected on a screen. Once the sample study is open, return to the script:

> "On the left side of the screen is a list of terms that represent different pieces of content and features of the site. I'd like you to group these terms into your own categories. You'll do this by dragging an item from the list on the left into the window on the right. You can stack terms on top of each other to create categories. The names of the categories are up to you. Let me know if you have any questions. You can begin when you are ready."

It may be helpful for the faculty member to demonstrate how the system works by creating one or two categories on screen and show students where the green "I'm Done!" button is in the bottom right corner of the screen. Plan to allot at least 10-15 minutes for this part of the activity.

Looking at the results. Once students have completed the demo study, the faculty member should click on the "I'm Done!" button on the screen. When the study is completed, the user automatically is moved to the results section. The results page has a list of recent users on the right with the most recent user results, usually beginning with "anon" at the bottom of the list. The instructor may find it is easier to be the last one to complete the card sort sot that their name is at the very bottom of the list. On the right, the user is given a list of report to run. The report view allows the selection of multiple users. Typically a faculty member would select enough users at the end of the list to match the number of students who participated. This can be

done by clicking on the first user in the list and then shift-clicking on the last user in the list. Next, go over the information in Category Summaries, Categories x Items, and Items x Items, and discuss what might learn be learned from the data and why students made some of the decisions they did. Typically, Category Summaries help identify how participants are thinking about the information and what category names might be used in a navigation system, something that is particularly helpful when working with dropdown menus. Categories x Items shows how many times an item was placed in a specific category and helps when deciding which labels should go with which page title or content heading. It may also help indicate that links to certain menu items need be in more than one group. Items x Items shows the percentage of times each item was grouped with another item, also helping with identifying items that might need to be in more than one location.

When conducting the discussion on the results, faculty should consider encouraging students to arrive at their own conclusions and to share their conclusions with the class, rather than just explaining what conclusions the faculty member has drawn from the data.

Think Aloud Protocol. A think aloud protocol (TAP) study is usually a task-based analysis in which a facilitator asks a user to complete a task while explaining what he or she is doing and why he or she is doing it. Although it takes some users a little bit to get the hang of talking through the process of completing the task, the results can prove very useful, even with a limited number of users. Nielsen (2012a) says that for this type of study, you only need five users to get good results, as additional users do not necessarily identify substantially more problems. It is worth noting that the point of this type of study is to identify problems that need to be corrected and not to prove a design or usability principle. Head's (1999) article "Web site redemption," offers a good introduction to both task-based analysis using think aloud and to

usability testing in general. This exercise is a good first introduction to user-based usability testing as it provides a clear demonstration of the power of usability testing in identifying problems in a website.

Usability.gov (Usability.gov, n.d.c) offers a great example of a facilitator's guide and serves as the basis for the script described below. One of the goals of teaching students about usability is for them to understand how it affects user access to information, and having them participate and conduct a task-based study using an e-government site is a good way to drive home the implications of website usability. In this exercise, students administer the test to each other. It is helpful to give them two warnings at the beginning. First, it might get loud as people begin talking. Second, while it may take a bit for users to get comfortable talking through their actions, it is even harder for the facilitator to learn not intervene when a user has a problem.

Setting up the exercise. Before starting the exercise with the class as a whole, consider modeling what students will be doing by having a volunteer come to the instructor workstation and complete a task-based study with the instructor serving as the facilitator. Rather than having the student repeat what he or she will be doing in the main exercise, consider having them complete tasks on a website that they are already familiar with, such as the college or university website. Possible tasks include having the student try to apply for graduate school or locate the final exam schedule (this process should take about 5-10 minutes). Afterward, have the class discuss what they have learned about the site from the demonstration. Next, have the students get into pairs and pass out the following document for the think-aloud exercise, which borrows heavily from Usability.gov's (n.d.c) facilitator guide. Each student in the pair will take a turn as a facilitator and participant. The sites listed below are local county websites in state the author resides in; however, faculty should substitute counties and companies in their own regions.

Instructions for the facilitator:

- Before starting, clear the browser history to prevent visited links from previous studies from showing up.
- Don't be afraid to let the user get stuck. This is part of the testing process. Wait until they are completely stuck before offering assistance or moving on to the next task. Be sure to note the problem.

Read the following instructions to the user:

Thank you for agreeing to participate in this website evaluation. Today we are asking you to serve as an evaluator of this website and to complete a set of tasks. Our goal is to see how easy or difficult you find the site to use. We will make notes on your reactions and opinions; so, we may ask you to clarify statements that you make from time to time. We may also ask you to explain why you said or did something.

Here are some things that you should know about your participation:

- This is not a test of you; you're testing the site. So don't worry about making mistakes.
- There is no right or wrong answer. We really just want to know if we designed the site well for you.
- If you ever feel that you are lost or cannot complete a scenario with the information that you have been given, please let me know. I'll ask you what you might do in a real-world setting and then either put you on the right track or move you on to the next scenario.

- Finally, as you use the site, please do so as you would at home or your office. I do ask that when looking for information, you do so as quickly and as accurately as you can.

Open up one following municipal Websites as directed:

- http://www.leeco.us
- http://www.mobilecountyal.gov

Ask the user to complete the following tasks while talking through his/her decision making process. Be sure to take notes on a separate piece of paper for the discussion.

1. Find out how to register to vote.
2. Locate information about what properties the following companies own and what their property tax was last year.

   Lee County: McDonalds Corp. Mobile: Smith & Bar-Stool Inc.
3. Find out how to pay your property tax and whether or not you can pay it online.
4. Find out when the most recent county commission meeting was and locate a copy of the minutes.
5. You are thinking about adding on to your house. Locate the basic information on when you need a building permit.

At the end of the exercise, ask the user to classify each task and record the appropriate number:

1. I thought it would be easy but it was difficult
2. I thought it would be easy and it was easy
3. I thought it would be difficult and it was difficult
4. I thought it would be difficult but it was easy

Looking at the results. Once the class completes the tasks, which may take up to 30 minutes depending on how many of the tasks they are asked to complete, have the students discuss what they found. Students are often surprised if they have problems finding information on the sites, and this is an excellent opportunity to talk about credibility and trust issues. Another issue that often comes up in the discussion is surprise that so much information is available online. Many students are unaware that one can find out, at least to some extent, who owns what property through a county website. Some counties will also let users check car registrations. This opens up the opportunity to discuss privacy issues and the importance of privacy policies and statements.

Accessibility. Introducing students to basic accessibility principles and guidelines such as those found in Section 508 of the US Rehabilitation Act and WCAG 2.0 are good starting points for teaching about accessibility. Knowing these basics does not, however, get students to really grasp how important accessibility is. One approach to help get them to think about the issues is to draw a direct comparison between accessibility in the physical and virtual worlds early on, noting that much like it is expected that public buildings have wheelchair ramps, braille signage, and accessible bathrooms, it should be expected that public virtual spaces should also be accessible. It is also important to point out that it is much easier to design a site to be accessible from the very beginning rather than going back and refitting it, much like it easier to design a new building to be accessible rather than trying to retrofit it once you have built it. Usability.gov and the non-profit Web Accessibility in Mind (webaim.org) are both great resources for providing additional readings for classes, as is the chapter on accessibility in Health and Human Services' (2006) *Research-based web design & usability guidelines*.

WAVE and Accessible University. Visuals can be quite useful in helping students understand usability. WebAIM's online Web Accessibility Evaluation Tool (WAVE) does a great job showing students the extent of HTML-based accessibility problems on a web page. It allows designers to test a webpage for accessibility: the user enters the page's address, and then WAVE analyzes the code. In addition to providing a list of errors and warnings, it also shows users a visual map of where the errors are (see Fig. 1). WAVE will also let the user select which standards to use, including WCAG 2.0 and Section 508. Combining a demonstration of WAVE (http://wave.webaim.org) with the University of Washington's Accessible University 2.0 website (http://www.washington.edu/accesscomputing/AU/) can be a particularly effective way to demonstrate how easy it is to miss accessibility problems without looking at the code. Accessible University provides two versions of the website of a fictitious university, one that has severe accessibility problems and one with the accessibility problems fixed. It is important to show the students that despite the changes, the two sites look the same. Accessible University offers a chance to send students on a scavenger hunt to find problems as well as the opportunity for them to see what problems a user unable to use a mouse might encounter on a website. The site is also a good opportunity to introduce WAVE by testing the problematic version of Accessible University (see Fig. 1).

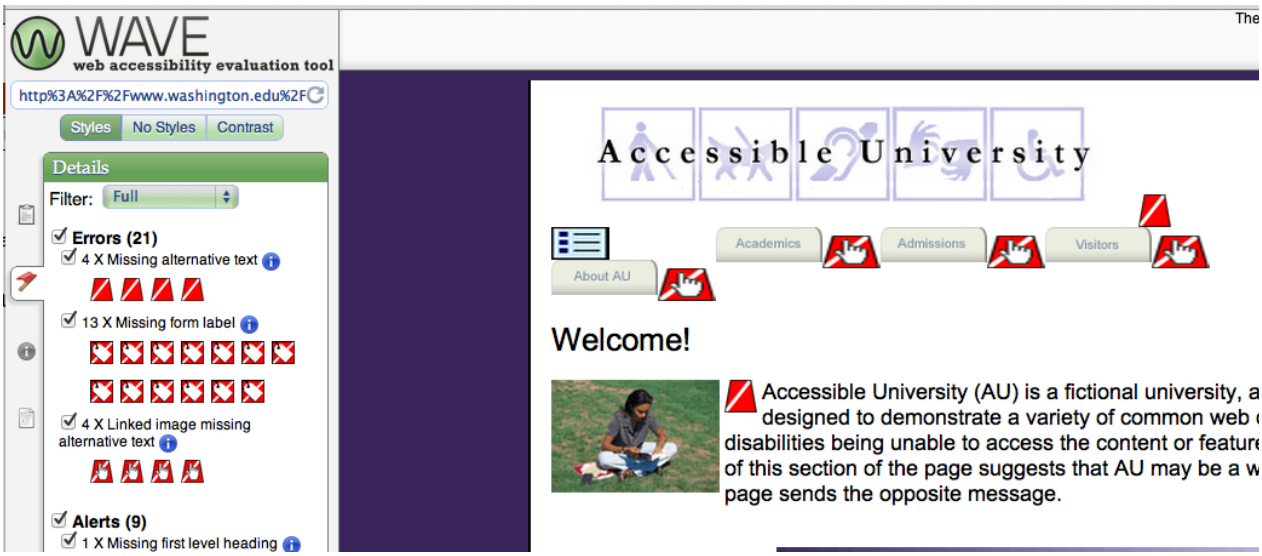

Figure 1. Screenshot of a WAVE analysis of Accessible University.

In Figure 1, WAVE has found 21 errors, including linked images with missing ALT attributes and missing form labels. One of the nice things about the current version of WAVE is that it allows the user to click on the error and pull up the code so that the user can get a better feel for what caused the error. As useful as WAVE and similar tools are, it is critical that students understand that automated testing tools are not a panacea. The software cannot identify all accessibility problems. For example, if a designer set the ALT attribute for an image-based home button to "sample image" rather than "home," WAVE would not identify that section of code as having a problem. The ALT attribute "sample image" is, of course, useless to someone with a text reader. Faculty can reinforce the importance of accessibility to students by requiring students to turn in WAVE reports for webpages they create.

Videos can also be quite helpful in getting students to better understand accessibility, and one of the best is "Accessibility Introduction to the Screen Reader" featuring Neal Ewers of the Trace Research Development Center (Anderson & Ewers, 2001). Ewers, who is blind, takes the audience through the process of a blind person using a computer, highlighting problems

posed by both structural and code-based problems. He notes that one of the challenges blind users face is that, unlike sited users, they do not have a visual overview of the page as a starting point. Ewers presents Greg Vanderheiden's analogy of this lack of an overview to reading through a drinking straw. The video not only offers students an opportunity to build empathy and to more fully appreciate the challenges blind users face, but it also helps students develop a greater appreciation of the skills blind users develop. When Ewers sets his text reader on the speed he usually has it on, it speaks so quickly that most people, including myself, are unable to differentiate the words. The video does a wonderful job sparking class discussions and can also be used as an out of class viewing assignment to set up a reading response.

After students have watched the video, faculty can help students get a hands on feel for blind users accessing the web by having them use the Firefox add-on Fangs. Fangs (2010) mimics a text reader by converting the web page to text with the additional descriptions that a screen reader would give. Figure 2 shows an example of the Accessible University page rendered using Fangs. Fangs offers several important advantages to having students try using an actual screen reader such as JAWS (Youngblood, 2013). First is the cost—free. This is good for IT budgets as well as for student budgets. Second, it can be installed on any computer using Firefox, and installation does not require administrative privileges. This means that faculty do not have to get IT staff involved unless they want to. Third, and this is important, students can use the software in the lab and at home. As Youngblood (2013), drawing on Gilbert & Urquhart (2011), points out in an article on teaching accessibility, blind users develop special skills for using computers. Sitting a student down blindfolded at a computer with JAWS or some other screen reader only simulates the experience of the recently blind, not the reality of an experienced blind

user. Readers interested in a more detailed discussion of teaching accessibility for users with a vision disability should read Youngblood (2013).

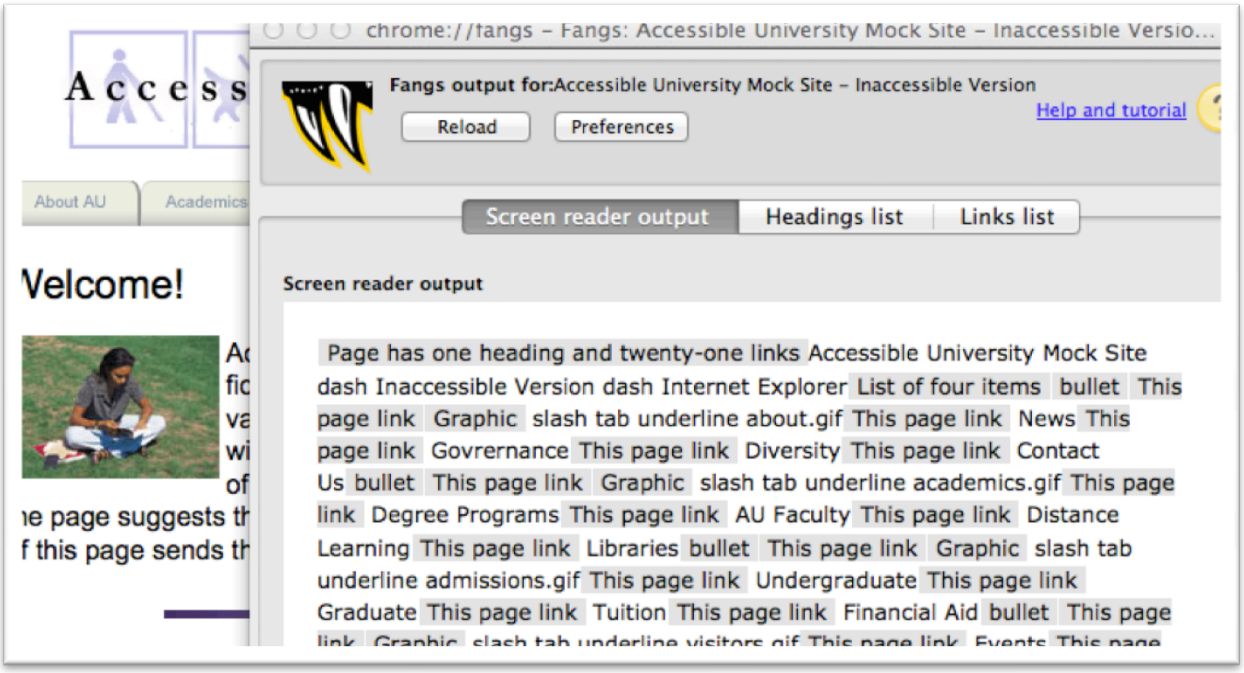

Figure 2. Accessible University as rendered by Fangs.

Discussion

As with most skills, if students do not get a chance to employ usability and accessibility best practices on a regular basis, they will not master them, thus it is important for faculty to incorporate these issues throughout the course. Usability should be limited to just tasks. Incomprehensible or poorly formatted text can make a site just as unusable as poorly designed navigation. Faculty need to address this type of usability as well. One option to consider is having students rewrite a section of text from an e-government website to better understand how writing and formatting material correctly can make accessing information easier for users. This type of exercise offers an opportunity for students to better internalize the problems users face when trying to decipher poorly written copy. As an example, students reading text describing

what services are available in a county building might express confusion as to what the term "probate" means, suggesting that the site designers may need to be clearer about what that service is. Health and Human Services (2006) has several chapters that work well with this assignment and explain why particular types of formatting, such as lists, help users scan material more easily. Faculty might also consider having students conduct a usability/design analysis of existing web sites using heuristics. A number of good heuristics are available including in Felke-Morris (2012). This makes a great starter assignment for a web class at the beginning of the semester as it helps introduce students to the idea of best practices as they are learning to write code. Faculty should also consider requiring that students incorporate usability and accessibility testing into web design projects. One option is to require students to write out a testing plan early on in the development process and then have them document these processes in an end of project report. Faculty might also consider bringing in a speaker from their campus students with disabilities office. In most cases, this office will have someone knowledgeable about accessibility as it applies to education, particularly Internet-based education. Faculty should also keep an eye on court decisions and comments on web accessibility cases as well as Department of Justice rulings on accessibility. As mentioned earlier, the Department of Justice is likely going to adjust how ADA is applied to the Internet. These court cases and changes to ADA are fertile discussion topics not only in production classes, but also in media law and media and society classes.

Conclusion

This article offers justifications for including accessibility and usability in the media curriculum, particularly in classes discussing interactive- and computer-based media. It also provides faculty with sample exercises suitable for production courses. It is critical that students

involved in these course not learn how to implement an accessible and usable website, but why it is important to do so. In teaching this, educators need rely on both cognitive and affective goals so that future web managers not only use best practices, but have internalized why these concepts are valuable and can be an advocate for all users. There are a number of good resources to draw on for teaching students about usability and accessibility. One the keys to teaching students about these issues is to use a textbook that incorporates usability and accessibility, preferably one such as Felke-Morris (2012) that deals with the issues throughout the book rather than in individual chapters. The advantage in this approach is that the students learn the skills as they go, which may make them more likely to incorporate them into their workflow. It also stresses the importance of the issues rather than treating them as an afterthought. This approach should help with some of the concerns raised by the web managers in Lazar, et. al (2004), particularly their concerns about lack of training. Health and Human Services' (2006) research-based book on usability is a good supplementary textbook and is available for free as a PDF through Usability.gov. And students do love free textbooks. Here are some other sites that readers may find helpful. Some of these sites are in the reference section, some of them are not. Most are free.

- Usability.gov. This is the US governments website on usability. (http://wwww.usability.gov)
- Nielsen Norman Group Articles (http://www.nngroup.com/articles/)
- Pew Internet & American Life Project (http://pewinternet.org)
- W3C's accessibility training modules. These have detailed discussions of how to plan accessibility training (http://www.w3.org/WAI/training/)
- WebAIM (http://webaim.org/)

- AccessibleTech.org. Provides information on a range of issues on information technology and accessibility. (http://www.accessibletech.org)
- AccessibleTech.org's page on web accessibility court cases (http://accessibletech.org/access_articles/legal/courtCases.php)
- Lynda.com. In addition to tutorials on software, Lynda.com also includes tutorials on accessibility. (http://www.lynda.com)

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