HTML5 & CSS3 Workshop – Motivational Revision



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A motivational review complete with revisions was performed on the initial HTML5 & CSS3 Workshop.

Purdue University EDCI 588: Motivation Dr. Hruskocy

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Description of Material

Target Learning Objectives

Utilizing a blank sheet in the Notepad software to create a web page using HTML5 and CSS3 according to W3C (World Wide Web Consortium) standards is the target learning objective of this workshop. The purpose of this objective is to provide foundational knowledge of web page programming from which to build for future use for Visual Communication program courses, as well as workplace settings where HTML and CSS skills are highly desired in multimedia professionals. The specific target objectives are a single properly structured HTML5 web page including document declaration, header, and body tags with the accompanying CSS3 modification tags. A successful web page will incorporate all of the necessary content and tag structure as detailed in the program of instruction, as well as receive zero errors when processed through the W3C validator tool.

Audience

The audience for this workshop is comprised of individuals enrolled in the Associates for Applied Sciences degree with a concentration in Visual Communication (AAS-VC). The age range of the audience is varied including recent high-school graduates and lifelong students acquiring new skills. Students participating in the workshop have necessarily passed a required mastery test of basic computer operation and Internet navigation skills thus displaying their sound foundational skills and their readiness for acquiring higher level technical concepts.

The level of familiarity with HTML5 is heterogeneous. Some of the participants have limited knowledge of HTML5 or previous versions of HTML, and for others it is new. The majority understands the practical uses of HTML and how it relates to CSS. The applications of this topic

in business and industry are well understood across the student population. Intrinsic motivation of the audience is high as the majority of the participations are looking for a speedy route to the job market as they have selected a two-year associate's degree option. The tangibility of the skills to the job market is appealing to these students.

Context /setting

The application of HTML/CSS is essentially the same each time you code from the overall structure, but the environment in which it will be used varies wildly as web sites are created for a variety of reasons and the functionality from one web site to another also varies significantly. In the design of this course, a focus on the structure necessitates uncluttered and clearly represented information as it will be used repeatedly and in a relatively similar (same) fashion each time. The nuanced HTML/CSS customized for specific content allows for creativity elevating the motivational aspect. Choice is given to simulate the real world options that occur in web programming. The end result of the workshop will be a successfully completed web page started from a blank Notepad document using HTML5 and CSS3 according to W3C (World Wide Web Consortium) standards as determined by the W3C validator tool.

Future setting

Future settings in which these skills will be utilized are two-fold. Academic projects that require or encourage the use of HTML5 and CSS3 web pages that are in the AAS-VC program are immediate future settings for this content. Long-term future contexts are a workplace setting in which former students can apply the aforementioned skills in their post-graduation job.

Instructional setting

The school computer lab fitted with twenty workstations with Notepad and browser (e.g., IE)

software compromise the tools for the workshop. An in-person instructor workshop is the delivery method. Participants are familiar with face-to-face guided instruction as opposed to an online learning environment. They prefer the accessibility of an in-person instructor to learn technical skills. Questions are able to be asked throughout instruction at the point of confusion.

Instruction Materials:

- Welcome PPT with learning objectives
- CSS Basics PPT
- Notepad Creating and HTML Document PDF takeaway & reference guide during instruction
- TextEdit Handout takeaway (for future reference only)
- Sample Text Notepad document for visual presented for reference/checking
- Assessment: HTML & CSS Rubric

Analysis of Original Materials from Motivational Perspective - (includes completed rubric)

Completed Rubric

Motivational Rubric Instructions

When reviewing this checklist, consider the specific examples that exemplify the motivational attribute listed. Are you accounting for this motivational attribute? In some case, an N/A is applicable. If so, indicate why this element of motivation is not necessary in this instance. If you are implementing the motivational attribute, provide examples of how are you accounting for this motivational aspect of instruction. If the motivational element has not been included, indicate with a "No" in the "implementation" column.

Instructional	#	Motivational aspect	Implementation		Examples, Comments
Design Process					
Analysis	1	Student's level of interest in the topic is ascertained	N/A No	Yes	No specific question was asked to the focus group regarding level interest;

	2	Students' understanding of the relevance of the topic was ascertained	N/A	No	Yes	however, it can be reasonably assumed that some level of interest in the topic is present as the material relates directly to the AAS-VC major selection. <i>Area for</i> <i>improvement.</i> A focus group with leaners that have similar technical skills was asked why this material might be relevant in real world applications.
	3	Student's entry-level skills have been evaluated as appropriate for the instruction.	N/A	No	Yes	Students are required to pass a computer basic- skills workshop and assessment prior to entry into the HTML/CSS workshop.
Design	4	Students are given choice in some aspect of the learning	N/A	No	Yes	Although one assignment is given, creative license is allowed for in the design choices of the CSS3 implementation. Further choice options could enhance instruction. <i>Area for improvement.</i>
	5	Goals are clear and specific	N/A	No	Yes	The Welcome PPT is used in the opening minutes of instruction and contains the learning objection for the workshop.
	6	Appropriate amount of time is reserved for each activity	N/A	No	Yes	Time slots are provided for each activity to the
	7	Modification to time requirements are made to accommodate learning challenges (i.e., anxiety)	N/A	No	Yes	tag level. Self-checking enables students who are advanced to move to the next item, while those who have questions have instructor and peer support to maintain task compliance.
	8	Learning goals are clearly stated and appealing (Keller, 1987, p. 5)	N/A	No	Yes	Stated – yes. This could be improved by making the goals more appealing. <i>Area for</i> <i>improvement</i> .

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Development	9	Materials include information that is relevant to the students in a clear and uncluttered manner	N/A	No	Yes	Students will use HTML/CSS in their AAS-VC coursework as well as future workplace settings. Information is presented line by line in order to direct the focus of the student in an uncluttered manner.
	10	Materials are appropriate for the age level of the students (Dick, Carey, & Carey, 2005, p. 170)	N/A	No	Yes	N/A: A variety of adult ages are represented in this workshop. Material is appropriate for adult students but the more important focus for motivational purposes is ensuring that the content is at the right knowledge level for the leaners. It is as a pre-test has determined their entry level skills of operating a computer with basic skills, navigating the Internet, copying/pasting, and knowledge of the existence of HTML.
	11	Materials are novel and varied (Schunk, Meece, Pintrich, 2014, p. 223)	N/A	No	Yes	Yes. Materials are presented in different formats, pdf, ppt, and word document, text document. Presentations and takeways are provided.
	12	Instruction provides students an opportunity to set goals and evaluate progress (Schunk, Meece, Pintrich, 2014, p. 249)	N/A	No	Yes	Area for improvement.
	13	Materials relate to student personal interest	N/A	No	Yes	Area for improvement.
	14	Students are given the opportunity to ask questions throughout the learning experience	N/A	No	Yes	"Pause points" are inserted into the instruction documents to remind the instructor when student questions are likely to arise.
Implementation	15	Previously learned material is reviewed with students	N/A	No	Yes	Area for improvement.

	16	Humor, incongruity or other attention gaining element is utilized to initially gain the leaners attention	N/A	No	Yes	Area for improvement.
	17	Instruction progressively increases independence in students	N/A	No	Yes	Students are walked through the first step of the web page programming and then increasingly less levels of detail are provided. "Do and check" methods are implemented for self- evaluating opportunities. Levels of independence are promoted in the following support procedures: 1 st instructor support, 2 nd peer feedback, and 3 rd self- check methods.
Evaluation	18	Formative feedback that is private and individualized is provided for in the instruction time	N/A	No	Yes	Formative feedback is presented in a private way. Instructor walk- around time is specifically planned for in the instruction planning documents.
	19	Student is provided tools that allow for self- evaluation	N/A	No	Yes	By viewing HTML/CSS in browser view, students can quickly and easily check for mistakes and re-check after modifications have been made.

Areas of Strength in Motivation

Overall, the instruction performed very well on motivation. Motivational elements were found in each phase of the ADDIE process. The major highlights of the areas of strength in motivation are as follows.

• The learning objectives are clearly described

- The second slide in the Welcome PPT clearly lays out the learning objectives.
 This instructional material is presented at the beginning of instruction so students are made aware of the learning objectives from the very beginning of instruction.
- Support is provided
 - Question asking is encouraged throughout instruction. Differing levels of support are provided as the instruction progresses. Instructor walk-around's are included in the design of instruction. Peer-to-peer feedback is a secondary source of support. Frequent self-checking opportunities are also provided which is inherent in the web-based programming process and yet provides an additional opportunity for student support from the available technology.
- Activities are appropriately challenging for the students
 - Entry level skills are have been ascertained by a pre-test ensuring that students are appropriately prepared for instruction. Instruction is scalable, allowing students who gain understanding to move on to more challenging topics.
- Materials include information that is relevant to the students in a clear and uncluttered manner
 - Materials are descriptive and organized. Only essential information is included on the materials. Categories are distinguished to enable students to organize information.
- Instruction progressively increases independence in students
 - Levels of independence are gradually increased. First, students are walked through the basic steps of web programming. Levels of independence include are promoted as follows: 1st instructor support, 2nd peer feedback, and 3rd self-check

methods. "Do and check" methods are implemented for self-evaluating opportunities.

- Student is provided tools that allow for self-evaluation
 - Self-evaluation tools are inherent in web programming, but automation helps improve the feedback process of learning. The W3C validator tool is enables students to enter their file into the software tool, run the tool to check for errors, student and receive a report which error, if any, are present.

Areas of Improvement in Motivation

The following areas of improvement were identified as a result of the completed checklist. The checklist items are listed below for reference.

- <u>Checklist item #1</u>: Student's level of interest in the topic is ascertained
 - The HTML/CSS content is essential to the success of AAS-VC majors' coursework as well as future workplace settings. References are made to the necessity of these skills in the multimedia profession; however it is necessary to ascertain the students' understanding of this concept as well as their specific interest in this topic. Interest level will have a direct impact on the types of motivational enhancements that are required.
- <u>Checklist item #4</u>: Learners are given choice in activities type or some other aspect of the learning

- Although only one assignment is given, creative license is allowed for in the design choices of the CSS3 implementation. Further choice options could enhance instruction.
- <u>Checklist item #8</u>: Learning goals are clearly stated and appealing
 - Learning goals are clearly stated. The appealing nature of the learning goals could be improved upon with visual enhancements.
- <u>Checklist item #12</u>: Instruction provides students an opportunity to set goals, evaluate progress
 - Goal setting and progress evaluating are not provided in the original set of instruction and instructional materials. Individualized goals setting and progress monitoring could easily be added as the nature of web-based programming encourages individualized style and creativity. Additionally, information regarding the topic is largely unknown to this population due to the introductory nature of the topic. Allowing for individual pathways to knowledge could be quickly accounted for in instruction with minimal time constraints.
- Checklist item #13: Materials relate to student personal interest
 - Personal interests are not addressed in the current form of instruction. As webbased programming encourages individualized style and creativity, personal interest aspects of motivation should be incorporated into instruction.
- <u>Checklist item #15</u>: Previously learned material is reviewed with students
 - Previously learned material is not currently accounted for in the implementation of instruction. Students' likely previous knowledge of HTML could be activated by referencing HTML tags. Here students can connect information they have

previously learned in the context of HTML programming in that seeing HTML tags in this context will allow students to organize the tags in their mind as being a necessary part of web-based programming.

- <u>Checklist item #16</u>: *Humor, incongruity or other attention gaining element is utilized to initially gain the leaners attention*
 - Humor can gain the students attention and if utilized correctly, help in maintaining it throughout. Humor can provide a break from the serious topic of programming which promotes attention in students.

Motivational Recommendations

<u>Checklist item #1</u>: *Student's level of interest in the topic is ascertained*

A focus group in which in formal questions is used to ascertain the student's level of interest in the topic is recommended. Level of interest should be included in the analysis phase in order to adapt the instruction elements by adjusting motivation with the appropriate kinds of amounts of motivational components.

Checklist item #4: Students are given choice in activities type or some aspect of the learning

In order to improve the elements of choice identified by checklist item #4, an additional instructional document containing sample web pages with corresponding CSS3 tags could be developed. This additional document, "HTML, CSS & YOU", would serve as a reference for students to use when adding personal enhancements to their web page.

<u>Checklist item #8</u>: *Learning goals are clearly stated and appealing*

While the learning goals are clearly stated at the beginning of instruction in slide #2 of the "Welcome PPT", the stated goals could be more appealing with the use of graphics and visually enhanced sample HTML tags. The slide would then be more appealing for the student to look at and hold their attention, as well as promote confidence by displaying HTML tags in a fun and non-threatening way.

<u>Checklist item #12</u>: *Instruction provides students an opportunity to set goal, evaluate progress* The students are not given an opportunity to select their own learning goals. The stated objectives are stringent and universal. Individual goals that allow students to self-monitor progress could be added to enhance motivation. An additional slide in the "Welcome PPT" should be added as the new 4th slide entitled "ACTION: Goals & Progress" that prompts leaners to think about an area of web programming that they have always wanted to know. They are then instructed to type the question into a blank notepad document and save for later. Twice during the workshop, the instructor should remind students about this question and think about whether their question has been answered which provides a self-monitoring evaluation process. If not, time should be allotted at the conclusion of the training for leaners to ask their question. By having a question that is personal in nature, students are given the opportunity to choose an aspect of the instruction that is meaningful to them. The question serves as a manageable goal that can be accomplished in the workshop and evaluated by the student.

<u>Checklist item #13</u>: Materials relate to student personal interest

In addressing checklist item #13 and in conjunction with checklist item #4, the additional instructional material recommended in checklist item #4 entitled "HTML, CSS, & YOU" could also be used to address the issue of lack of student personal interest. Using samples from a variety of different disciplines on the instructional material can be used to pique interest. If the student does not connect with one of the specific examples utilized, the variety displayed will provide enough exposure to see how they can relate web-programming to their own area of

interest. For example, if a user views the Tesla Motors web site, but is interested in motorcycles, they can make mental connections between the two and potentially see new ideas for a future motorcycle web site.

Additional elements within the instruction should be added to encourage the implementation of personalization within the code. Color choice, font choice, and content customization could be used to show students' how to personalize the web page based on their interests.

Checklist item #15: Previously learned material is reviewed with students

Adding a slide to the CSS Basics PPT between slide 1 and slide 2 that makes the connection between HTML tags and web programming, as well as the interplay between HTML5 and CSS3 will help students organize web-based programming that they have likely encountered previously into the web-based programming of HTML5 and CCS. By naming specific tags of the different programming types, students will begin to develop an understanding of how these tags can work to create a web page.

<u>Checklist item #16</u>: *Humor, incongruity or other attention gaining element is utilized to initially* gain the leaners attention

Add humorous graphic in "Welcome PPT" in order to gain the users attention. The "It works but I don't know why" graphic can be the slide after the daunting objectives slides in order to gain the users and attention and lighten the mood a bit after what may be seen by some as a challenging objectives list. Additionally, in order sustain the users' attention, as well as provide them a friendly reminder of a desired trait (e.g., question asking), the instructor should refer back to the graphic anytime there is a sense that students might be holding back with questions or misunderstandings of the material.

Connection to Theory

Checklist item #1: Student's level of interest in the topic is ascertained

"Hidi and Anderson (1992) suggested that when interest is high, there does not have to be as much effortful selective attention; that , in fact, interest could result in more spontaneous attention and less cognitive effort, but still have a positive influence on learning" (as cited in Schunk, Meece, & Pintrich, 2014, p. 129). By ascertaining the student's level of interest in the topic through questions and discussions within the focus group, the necessity to capture and maintain leaners' attention can be adjusted to account for the specific audience (e.g., if the students have a high interest in the topic, repeated trying to capture attention is most likely unnecessary).

Checklist item #4: Students are given choice in activities type or other aspect of the learning The additional "HTML, CSS, & YOU" document provides students with a reference guide that gives context in how to add personal enhancements to their web page. Many aspects of Intrinsic Motivation theories support the concept of choice for students in order to increase intrinsic motivation. "Allowing students choices in activities...fosters perceptions of control" Schunk, Meece, & Pintrich, 2014, p. 268) which can increase self-efficacy (Schunk & Pajares, 2009, as cited in Schunk, Meece, & Pintrich, 2014). Cognitive Evaluation Theory declares that students "want to feel responsible for their actions and free to make choices" (pp. 251-252). "Interest in learning can be developed when teachers provide opportunities for students to exercise some choice and control over their learning" (p. 67). These ideas support the addition of instructional materials that enhances the students' frame of reference for customization for the task at hand.

<u>Checklist item #8</u>: Learning goals are clearly stated and appealing

This technique would "help the student form the impression that some level of success is possible if effort is exerted" (Keller, 1987, p. 5). Learning guidance that promotes confidence (Okay & Santiago, 1991) is provided in the form of playful graphics that coordinate with stated learning objectives. This enhancement would have the positive benefit of improved confidence and "students who are confident of their learning abilities ...display great interest and motivation in school, which enhance achievement" (Schunk, Meece, & Pintrich, 2014, p. 186).

<u>Checklist item #12</u>: Instruction provides students an opportunity to set goals, evaluate progress

De Charms (1968, 1984 as cited in Schunk, Meece & Pintrich, 2014) created the personal causation concept where "an individual's initiation of behavior intended to alter the environment" (Schunk, Meece, & Pintrich, 2014, p. 247). Two categories were set to distinguish the different ends of a personal causation spectrum; pawns and origins (p. 247). "Origins set realistic goals for themselves, know their strengths and weaknesses, and determine actions that they can take to accomplish their goals, and assess their goal progress" (p. 247). Pawns do not see their circumstances as being within their control (p. 247). "Personal responsibility" fosters origin-behavior which is akin to intrinsic motivation. By having students select their own personal goals in web based programming and asking students to check whether their question has been answered, personal responsibility is fostered.

"As students experience success they should develop higher self-efficacy and believe they have control over the attainment of their academic goals" (Schunk, Meece, & Pintrich, 2014, p. 248). As the students put forth a personal goal and reflect back on it, they begin to understand how if they can learn one thing, anything may be possible. This is an important point for the introductory level of instruction in HTML, as the highly technical nature and of the topic leads

may to quit the area due to the challenging topic. By showing students that questions they previously held can be answered in this one workshop, intrinsic motivation towards the possibilities of their capabilities in web-based programming increases.

Checklist item #13: Materials relate to student personal interest

"In Herbart's (1806) view, interest is closely related to learning" (Schiefele, 1991, p. 300). Schiefele (1991) elaborates that interest "leads to meaningful learning" and "provides motivation for further learning" (p. 300). By allowing students to select their own content for the web page, they will inherently be selecting context in line with their own personal interests. Additionally, by displaying a variety of topics that can be included in a web page, students' interest in one of the topics or a related topic will be piqued. Personal interest relates to an individual's personality (Schunk, Meece, & Pintrich, 2014). By relating material to student's personal interest in this manner, learning is promoted as "personal and situational interest relate positively to choice of future activities, memory, attention, deep cognitive processing, and achievement" (p. 236). Familiar and enjoyable material to the students support intrinsic motivation as "positive emotions, such as the experience of enjoyment in doing a task or the anticipatory or outcomerelated joy of a task, may raise intrinsic motivation for the task" (p. 229).

Checklist item #15: Previously learned material is reviewed with students

"Favorable pattern of student characteristics" included higher level of prior knowledge. (Learning and Instruction Guest Editorial, 2009). As "students with a more favorable characteristics...reported less cognitive load, and solved more problems correctly than leaners with less favorable characteristics (p. 373), it stands to reason that adding the prior knowledge of linking general HTML knowledge to the specific tags of HTML5 used to build web pages will decrease students' cognitive load resulting in an improved learning experience. "Learning outcomes turn out to be dependent on personal characteristics such as prior knowledge, motivation, and perspective-taking" (p. 374); further supporting the performance improved by the inclusion of prior knowledge.

Song (2010) notes the importance of prior knowledge in learning; "many researchers agree that students' prior knowledge, self-regulation, and motivation are important to explain learning processes" (Song, 2010, abstract). In a research study of medical clerkships, Song (2010) reported posttest results that "students' prior knowledge directly positively affected their learning outcomes, self-efficacy and performance approach goal orientation" (abstract). By tying in students' cursory knowledge of "code" or "tags" to the programming (scripting) languages HTML5 and CSS3, students' are likely to experience increased engagement and perceived competence, as well as improved learning outcomes.

<u>Checklist item #16</u>: *Humor, incongruity or other attention gaining element is utilized to initially* gain the leaners attention

Keller (1987) emphasizes the importance of gaining student attention as it is both an element of motivation as well as prerequisite of learning (p. 3). Keller (1987) goes on to say that "the concern is for directing attention to the appropriate stimuli" (p. 3). One suggestion from Keller (1987) for directing attention of the student is through humor (p. 4). The element of humor is added to instruction through a humorous graphic. This picture no doubt draws the attention to the user and can be referred to at a later date as a reminder of what not be.

Revised Instructional Material (see Appendices)

Specific changes to instructional materials are details below.

<u>Checklist item #1</u>: Student's level of interest in the topic is ascertained

Adding a focus group with questions as detailed below in a verbal format. No new or modifications to instructional material are required. Questions to ask focus group regarding interest:

- 1. What is your interest level in this workshop?
- 2. Why are interested in pursuing an AAS-VC course of study?
- 3. How can this course be of value to you?
- 4. What is motivating to you about this workshop? Course of study?

<u>Checklist item #4</u>: *Students are given choice in activities type or some aspect of the learning* The additional document, "HTML, CSS & YOU", was created in order to give students context regarding the vast options of web page concepts available. The students are then able to tailor their own personal choices into the content of their web page. The document was created in Photoshop and exported into ".PDF" document. The document contains screen shots of four different web sites (HGTV, WordOnFire, Schwab, and Tesla) with select corresponding HTML5 tags. (*see Appendix A*)

<u>Checklist item #8</u>: *Learning goals are clearly stated and appealing*

Graphics have been added to the three main points on slide #2 in the "Welcome PPT." (*see Appendix B*)

<u>Checklist item #12</u>: Instruction provides students an opportunity to set goals and evaluate progress

The "ACTION: Goals & Progress" slide was added to the "Welcome PPT." Four main points

have been added to guide students in self-selecting a question regarding web programming. (*see Appendix C*)

Checklist item #13: Materials relate to student personal interest

The additional "HTML, CSS & YOU" document was created in order to give students context regarding the vast options of web page concepts available. The students are then able to tailor their own personal interests into the content of their web page. The document was created in Photoshop and exported into ".PDF" document. The document contains screen shots of four different web sites (HGTV, WordOnFire, Schwab, and Tesla) with select corresponding HTML5 tags. (*see Appendix A*)

Checklist item #15: Previously learned material is reviewed with students

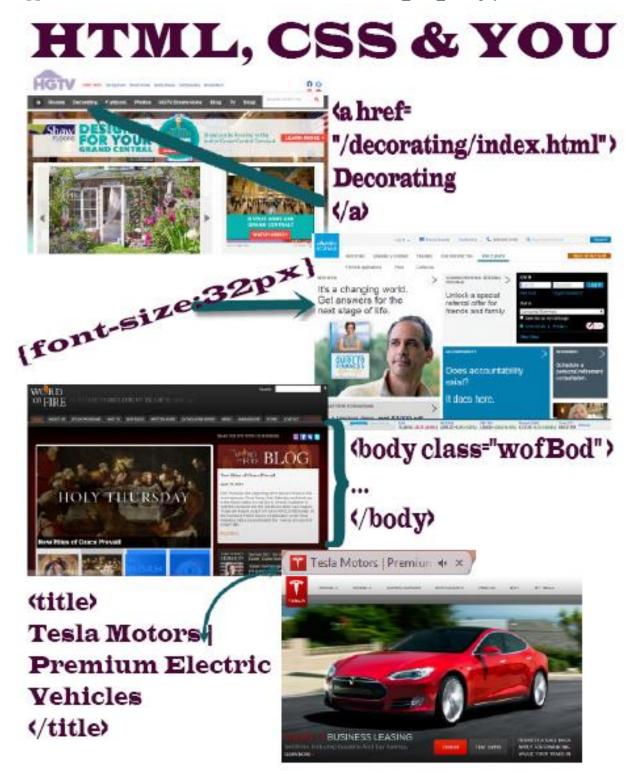
New slide #2 was added to the "CSS Basics PPT" that demonstrates one sample HTML5 tag and one sample CSS3 tag. Differences of each tag can be compared side by side or comparison and organizational purposes. Graphics are used to enhance the description of each tag. The connection between HTML and CSS is made. (*see Appendix D*)

<u>Checklist item #16</u>: *Humor, incongruity or other attention gaining element is utilized to initially* gain the leaners attention

The "It works but I don't know why" graphic was added as the new slide #3 to the "Welcome PPT" after the objectives slide. A reminder to the students was added to encourage question asking. (*see Appendix E*)

Appendices

Appendix A: See attached document with filename "HTML_CSS_YOU.pdf"



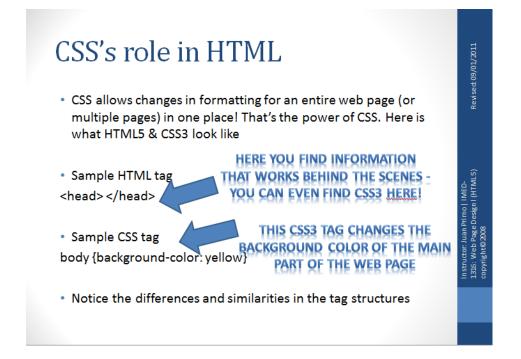
Appendix B: See attached document with filename *"Welcome – revised.ppt"* See below new slide #2

Objectives	Juan Primo
At the end of the session we will be able to: • Create a single properly structured web page • Document declaration • Header • Body • Apply basic CSS to modify • Header tags • Paragraph tags • Submit and pass the W3C validator	Purdue University EDCI-572 Group 4 : Ellen Twomey - Juan Primc
Validate by URI Validate by CRI Validate by CR	
+ More Options	

Appendix C: See attached document with filename *"Welcome – revised.ppt"* See below new slide #4

ACTION: Goals & Progress	
 Think of something that you have always wanted to know about web programming. 	
 Now open a blank Notepad document and type your question. 	
 We will come back to this question periodically to see if it has been answered throughout the instruction. If not, you will have a chance to ask it at the end of the workshop. 	
• The goal of this technique to ensure that what you are	
learning is relevant to you as a future multimedia technologist.	

Appendix D: See attached document with filename "*CSS Basics – revised.ppt*" See below new slide #2:



Appendix E: See attached document with filename *"Welcome – revised.ppt"* See below new slide #3



References

- Dick, W., Carey, L., & Carey, J. O. (2009). *The Systematic Design of Instruction* (7th ed.). Upper Saddle River, NJ: Pearson.
- Keller, J.M. (1987). Development and Use of the ARCS Model of Instructional Design. *Journal* of Instructional Development, 10, 3, 1-10.
- Learning and Instruction Guest Editorial. (2009). Cognitive load in interactive knowledge construction. *Learning and Instruction (19)*, 369-375.
- Schiefele, U. (1991). Interest, learning, and motivation. *Educational Psychologist*, 26(3&4), 299-323.
- Schunk, D.H., Meece, J.L., & Pintrich, P.R. (2014). *Motivation in education: Theory, research and applications (4th ed.).* Boston, MA: Pearson.
- Song, H.S. (2010). *The Effects of leaners' prior knowledge, self-regulation, and motivation on learning performance in complex multimedia learning environments* (Doctoral Dissertation). Retrieved from ProQuest. (ED517284)