

# PRACTICAL CONSIDERATIONS OF HTML5 IN LEARNING PLATFORMS

With web-based e-learning, at times it may be necessary for designers and curators of content to create custom web pages for instructional purposes, or to aggregate online learning sources. Such pages are frequently housed inside a content or learning management system, and thus subject to the markup element restrictions of that system. This research paper examines considerations for project managers and instructional developers undertaking projects to develop web pages inside enterprise learning platforms.

A Case Study on  
Web Development  
Within an Enterprise  
Learning  
Management System

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## **INTRODUCTION**

HTML5 allows for accessibility, ease of customization, multi-browser support, and multimedia integration which make it practical for customized web applications in enterprise learning management systems. However, system architecture and cyber security restrictions may still limit its adoption within enterprise intranet environments.

HTML5, along with CSS3 and JavaScript, has become the standard e-learning markup language for both learning management systems and online courses. The syntactic features of HTML5 allow for developing e-learning content which is supported in most modern web browsers such as Google Chrome, Microsoft Edge, Firefox, Safari, and Opera, although it may be rendered differently in each. E-learning course output rendered in HTML5 can be tracked using e-learning communication protocols that include current industry standards SCORM, xAPI, and AICC. HTML5 also allows for courses to be displayed on devices of different screen sizes, such as desktop PCs and smartphones, while being optimized for each of these devices using the same code. Combined, these markup languages can also be used to develop custom widgets, apps, games, or multimedia, or simply to create customized forms and elements, without the use of browser plugins like as Adobe Flash.

This research paper will examine how HTML5 can be used to create custom pages in learning management systems to meet specific the learning and development needs of an enterprise business organization, and what are its limitations.

## **LITERATURE REVIEW**

Current literature on web trends identifies HTML5 as a pivotal shift in web and learning technologies. The public release of HTML5 by the World Wide Web Consortium (W3C) in 2008

marked the beginning of the deprecation of Adobe Flash Player. On July 25, 2017, Adobe officially announced support for its Flash browser plugin would end after 2020, “Adobe today announced that Flash, the once-ubiquitous plugin that allowed you to play your first Justin Bieber video on YouTube and Dolphin Olympics 2 on Kongregate, will be phased out by the end of 2020. At that point, Adobe will stop updating and distributing Flash” (TechCrunch, 2017).

The retirement of Flash was made possible due to the customizability of HTML5. According to Shikhir Singh, writing in TechCrunch, “for developers, one key attraction to HTML5 is its open standards support, which helps them deliver on application requirements in the face of fragmented mobile devices, form factors, platforms, and operating systems. Developers can use HTML5 to create and present rich content without relying on the device or its operating system, making it a preferred alternative to native apps (2015). Christopher Pappas, writing for the eLearning Industry blog, lists the benefits of using HTML5 over Flash in e-learning to include its mobile optimization, ease of customization, multi-browser support, and unrestricted multimedia (Pappas, 2015).

Possibly the biggest drawback of Flash was its incompatibility with mobile devices. According to Reyna,

Flash was a brilliant solution for the desktop and mouse often years ago, but failed to perform on touch-screen devices. As a third-party browser plug-in, Flash demands a lot of energy and will drain the batteries of portable devices designed to be low in power consumption. Also, functions such as 'hover' or 'mouse-over' typically used in Flash will not work well on touch-screen devices. Early in July 2012 Adobe decided to discontinue its Flash player for mobile devices due to its limitations. Instead, they are promoting open standards such as HTML5 + CSS3, as are many other vendors (2012).

In terms of its impacts on e-learning, this meant that the combination of HTML5, CSS3, and JavaScript now made it possible to design website interactions that would be playable in any modern browser which supported HTML5. Furthermore, the responsiveness of the HTML5 and CSS3 standards ensured compatibility across multiple browsers and devices:

Compatibility does not mean that the experience of the user should be the same in every client, but it needs to maintain certain consistencies. For example, if we have a list of users in an application, it is good practice to have different inputs depending on the platform. We can use the scroll bar to navigate the list on any desktop client. For touch devices, gestures might be preferable. On the other hand, we need to be careful with platform restrictions because sometimes it is not technically possible to support the same functionality in every device or client (Shah & Balda, 2013).

Ethan Marcotte (2011) emphasized the need to craft sites that adapt to the media that renders them by practicing “responsive web design.” Rather than creating disconnected designs each tailored to a particular device or browser, responsive design treats them as facets of the same experience using flexible grid-based layouts, fluid images and media, and media queries (Marcotte, p. 8). With HTML5, plugins of the type provided by Flash technology are no longer required to view multimedia online courses. Synytsya, et al., (2014) conducted research into the use the HTML5 tags in e-learning assessments. HTML5 happens to be a convenient way to enable video for e-learning, for example.

The tag <video> has some attributes that coincide by semantics to the corresponding attributes of the tag <audio>, namely, controls, auto play, loop, src and preload. This technology can provide important advantages for e-learning developers, simplifying development of interactions, and, in particular, knowledge assessment tasks.

Considering the growing use of online resources through mobile devices, and the fact that mobile sales have recently overtaken desktop or notebook sales, HTML5 for mobile devices has become a driving force for e-learning (Synytsya, et al, 2014; see also Murtagh, 2011; Firtman, 2012; Adobe, Inc. 2011).

In 2019 a market report confirmed that HTML5 was emerging as the main programming language for content authoring (PR Newswire, 2019). The Association for Talent Development also conducted research which showed that in addition to text, most organizations included at least some other element in their e-learning. The most common was noninteractive video, currently in use at 91 percent of organizations (See Figure 1).

**TABLE 1**  
E-Learning Features  
*Do your organization's current e-learning assets incorporate any of the following?  
(Select all that apply.)*

	We Use This	We Don't Use This But Plan to Add It in the Next Year	We Don't Use This and Don't Plan to Add It in the Next Year
Noninteractive Video	91%	5%	4%
Microlearning	67%	24%	9%
Interactive Video	53%	30%	17%
Audio Without Video (e.g., voiceovers and podcasts)	51%	13%	36%
Games and Gamification	28%	37%	36%
Virtual Reality	6%	24%	70%
Augmented Reality	6%	21%	73%

Figure 1. Survey of e-learning assets. From "E-Learning: The Evolving Landscape," by Association for Talent Development. 2020, August.

The expanded use of multimedia enabled by HTML5 content authoring necessitates content management systems (CMS) to house, aggregate, and track e-learning. According to Bates, from an internal strategic context, the first question that needs to be asked and answered is as follows: "What do we have and where is it?" Once digital material is created, it needs to be

described, stored, and be easily found and accessed by a variety of users. This can be done manually (e.g., classified by course coordinators, and the registry of materials stored by the Library) after creation, or through the use of digital tools such as tagging at the point of creation, or through a combination of both man and digital procedures (Bates, 2011). Content management systems (CMS) are a highly effective tool for implementing knowledge integration. By providing a database management system that allows for the design of a database which stores the documents in which knowledge is represented, a CMS aids the dissemination or compartmentalization of knowledge through the use (search and retrieval) of all the knowledge-holding documents in the repository (Pérez-Montoro, 2010).

Le Dihn, Rickenberg, et al., propose a Knowledge-Based Content Management (KCBM) Framework for assessing, classifying, and managing enterprise content in order to promote e-collaboration process and knowledge development, as shown in Figure 2. Within this framework the system view deals with the container in which content objects reside, the content management system being a container, and a web page being one type of content object within it (2014). Figure 3 shows the role of the web page within the CMS.

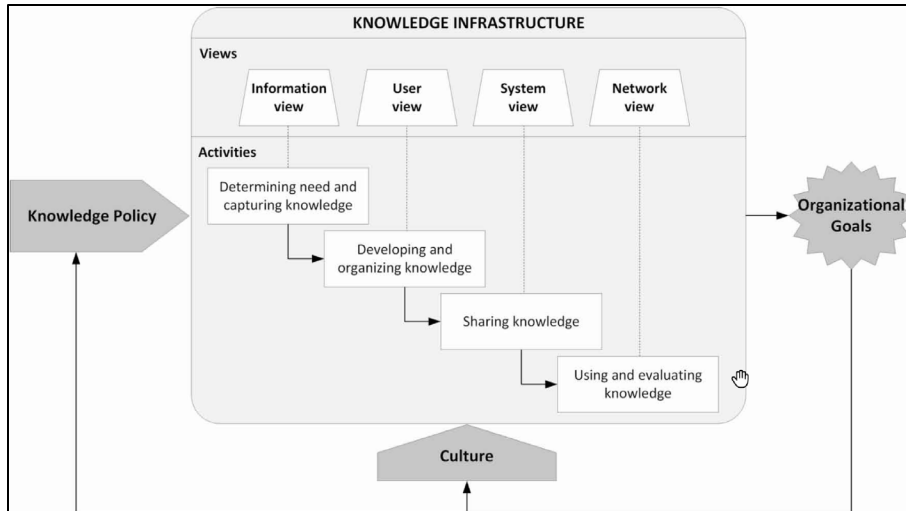


Figure 2. The knowledge infrastructure. From “Enterprise Content Management Systems as a Knowledge Infrastructure,” by Le Dihn, Rickenberg, et al., 2015.

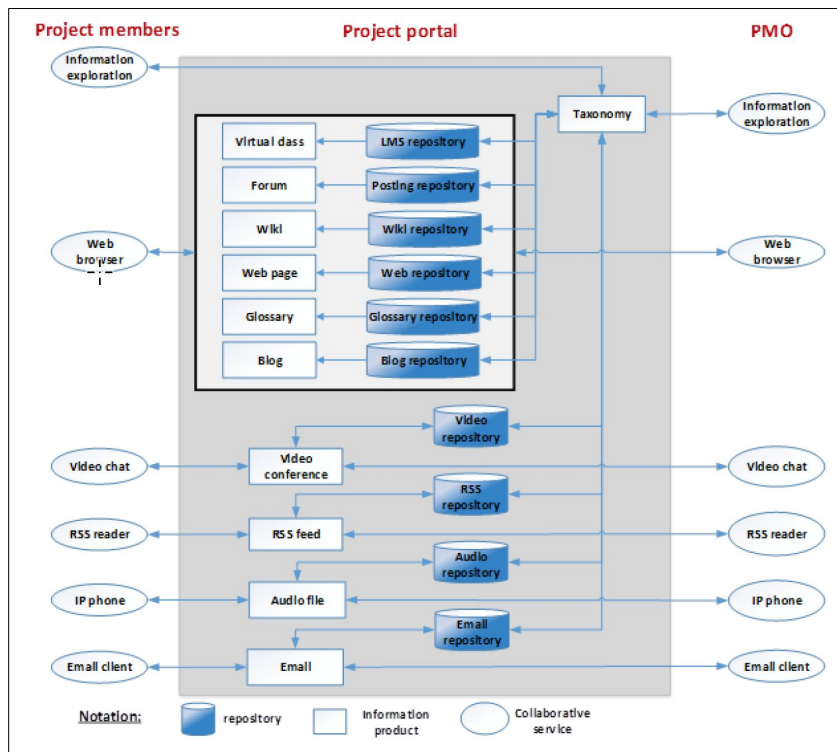


Figure 3. Enterprise Content Management for Information Technology. by Le Dihn, Rickenberg, et al., 2015.

A content management system is used to create, upload, and display training in a central location, and learning in a CMS is passive in nature. Eleni Zoe describes learning via a CMS as



“like reading a blog or watching a video on a website. There are no quizzes, levels, badges, or discussion forums. In other words, there’s little or no interaction with the content” (2020). A content management system designed for interactive e-learning is called a learning management system (LMS). The LMS contains interactive courses, multimedia, and other learning objects. These learning objects may be organized into learning object repositories (LORs). LORs have the capability to package files into meaningful and complete units of learning (Monterroso, 2009). Minguillón, et al. discuss the use of semantic markup in creating LORs as it pertains to learning object metadata properties (2011). The advent of HTML5 as an e-learning authoring language standard makes it easier to include multimedia and interactive learning objects within LORs, as HTML5 can communicate with server-side languages such as XML, something that was more difficult with plugins. HTML5 also allows for easier creation of passive learning objects within an LMS, through the creation of custom web pages.

## **CASE STUDY**

This case study examined the use HTML5 to create pages which guide employees in the steps, or paths for obtaining sales and technical certifications for professional development. The subject matter focused on technology industry certifications for Microsoft products. The company in this case study was a mid-sized privately owned provider of technology products and services, headquartered in the United States with fewer than 5000 employees across 15 locations worldwide. The company had customers in academic, corporate, enterprise, and public sector. It had been in operation for 31 years and experienced steady growth since its founding.

## **Business Considerations**

The organization was a service and technology product provider, not a manufacturer, so its sales force formed the core of its workforce. Its partnerships with major technology manufacturers included HP, Microsoft, and Adobe. Sales reps and support staff needed to be knowledgeable in the products and services the company sold through these partners. IT professionals within the company also had their own certification tracks. Professional development for these employees included becoming certified in these products where applicable vendors offered certification paths. Responsibility for completing these certification paths fell primarily on the individual employee, by means of vendor training resources. No centralized repository for accessing exam preparation and registration resources existed within the organization. The organization's content management system was Microsoft SharePoint 2016. Some certification resources were stored in SharePoint intranet document libraries by individual departments, but there was no company-wide standard for creating these content libraries, and in many cases, they were not maintained regularly. The project sponsors, Corporate Learning & Development, had access to content from internal pages, partner pages, external e-learning repositories, and other sources. The business purpose of the project would be to lay these paths in a repository that would be easily accessible to employees, and to begin to pull content from departmentally managed SharePoint sites under the L&D umbrella, to allow for standardization and tracking of certification programs, starting with Microsoft.

The Corporate Learning & Development department was a relatively new branch of the company, being approximately one year old. Its mission statement was to "enhance our employees' knowledge, skills, and capabilities with high-quality training and professional development opportunities that contribute to their continued growth and success." Prior to the

formation of the L&D department, training resources within the company were primarily allocated for sales new hire training, which sat in a separate business unit under Sales. There was also a small team of e-learning instructional designers tasked with designing and developing company-wide and departmental online training. L&D's primary goal was to centralize and standardize employee development across departments. As part of achieving this overall objective the Instructional Design Manager and the Senior L&D Director wanted to leverage existing systems. to clearly map out Learning Paths for various training subjects. First on the list were Microsoft certification/training paths and End User Tools. The plan was to build a model with the initial certification paths. The partner teams would then provide the details on course and training tracks.

There was a desire within the L&D department to produce more mobile accessible content, with the company's entire workforce now being remote and its sales force working from the road prior to the 2020 pandemic. Despite that, full-scale mobile adoption had yet to occur. Therefore, while mobile accessibility was not a business goal of this initiative, designing with future mobile accessibility in mind was an important development consideration, given that the primary audience for these learning paths pages, Outside Sales, was also the primary user group of company-issued tablets and smartphones.

In terms of organizational support there was backing for the initiative from both management and stakeholders. The repository was viewed as a particularly valuable need by the marketing and product champion teams which managed partner programs.

## Technical Considerations

After initial discussion between the Director, Manager, and the Instructional Designer assigned to design and develop the Learning Paths pages, it was decided to use the organization's learning management system, Cornerstone OnDemand (CSOD), to house the pages. No investments in additional IT assets would be made for this project. The team would leverage CSOD's existing custom page functionality to build a series of "Learning Paths" pages, which combined would form a Learning Paths Portal. Page templates from the initial rollout would then allow for more rapid development of future learning paths.

An alternative content management system that was considered a content hosting platform was Microsoft SharePoint, which formed the backbone of the organization's intranet. Both platforms offered functionality in terms of page building. The reasons for selecting Cornerstone were first and foremost, the L&D team's desire to drive more traffic to its LMS. Second, the team had direct administrative control over the LMS; SharePoint pages which were created and administered by the IT department, and content on SharePoint sites was managed at the team level. From an operational standpoint, ownership of CSOD resided entirely within the L&D department, which would allow for creating and editing pages in a faster, more linear process. Third, the SharePoint pages and document libraries were already being used by internal teams in fragmented fashion and the with limited effectiveness. Another goal of the project was to improve upon this model that had not worked to date. Finally, there were change management concerns because the SharePoint 2016 infrastructure, which included all organizational intranet pages, was in the process of being migrated to SharePoint Online, and there was still some uncertainty how this would impact team sites and document libraries.

## **FINDINGS**

This section details the findings of this project. The focus is on the custom page design editor in CSOD, and the application of custom CSS within the editor to create pages that would be accessible on either desktop or mobile. For the purpose of fully customizing look and feel, most of the page contents would be hand-coded, rather than using CSOD's stock widgets.

### **Design Editor**

CSOD custom page parts were created using widgets in a WYSIWYG (What You See Is What You Get) editor. These widgets included an HTML widget (see Figure 4), however the HTML widget consisted of only a <body> element with no header, each being functionally equivalent to its own <div>. Cornerstone, in its Online Help describes the editing process as follows

When you add an HTML Widget to the Layout frame, the Widget Settings pop-up appears with an HTML editor. In the editor, there are two editing modes: Design and HTML. When in Design mode, you can use the standard editing tools to format your text, similar to your word processor application. When in HTML mode, the standard editing tools are disabled, and you are able to view and modify the HTML code that is used to design the certificate. To switch between modes, click the appropriate tab in the lower-left corner of the editor.

Only certain HTML tags will be rendered. All other tags will not be rendered, and the tags will display as text. See Safe Listed Customizable Elements (Cornerstone Online Help, Safe Listed Customizable Elements).

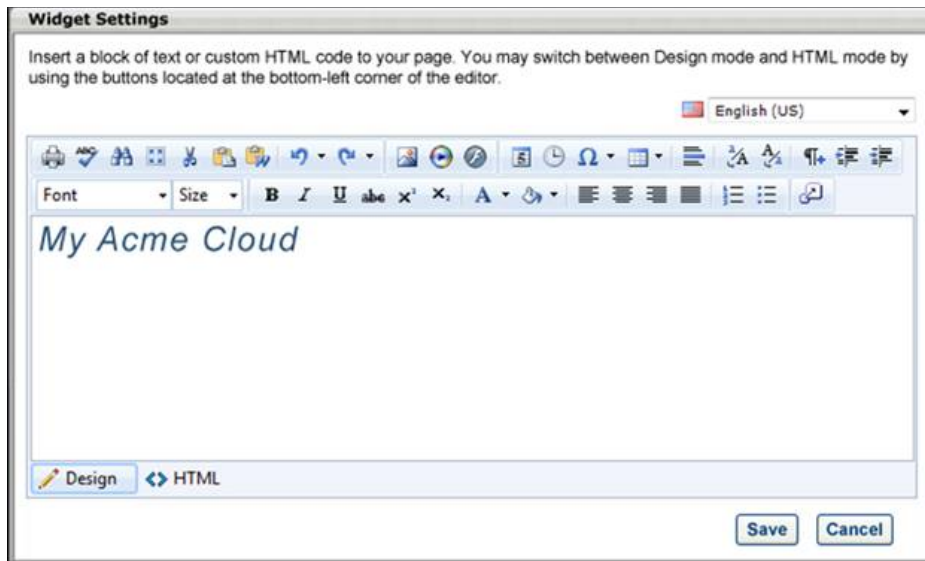


Figure 4. HTML Widget in Design mode, sample from Cornerstone OnDemand, 2020.

The safe listed HTML tags allowed for limited customization of page layouts, sufficient to accomplish the project goals, using simple visual attributes in combination with header, text, and list attributes. `<tbody>` tags were also safe listed, though that is not shown in the examples. A sample code snippet (Figure 5 and 6) and page render (Figure 7) shows a prototype design concept. Each widget could be housed inside its own frame, or in a frame with other widgets. Either way, the HTML widgets existed completely independent of each other, and for ease of development could be considered equivalent to its own `<div>`. The layout of these widgets on each page could be configured by means of “cells” that could be added, split, and resized using the Custom Page Builder’s graphical user interface (Cornerstone Online Help, Custom Page Builder).

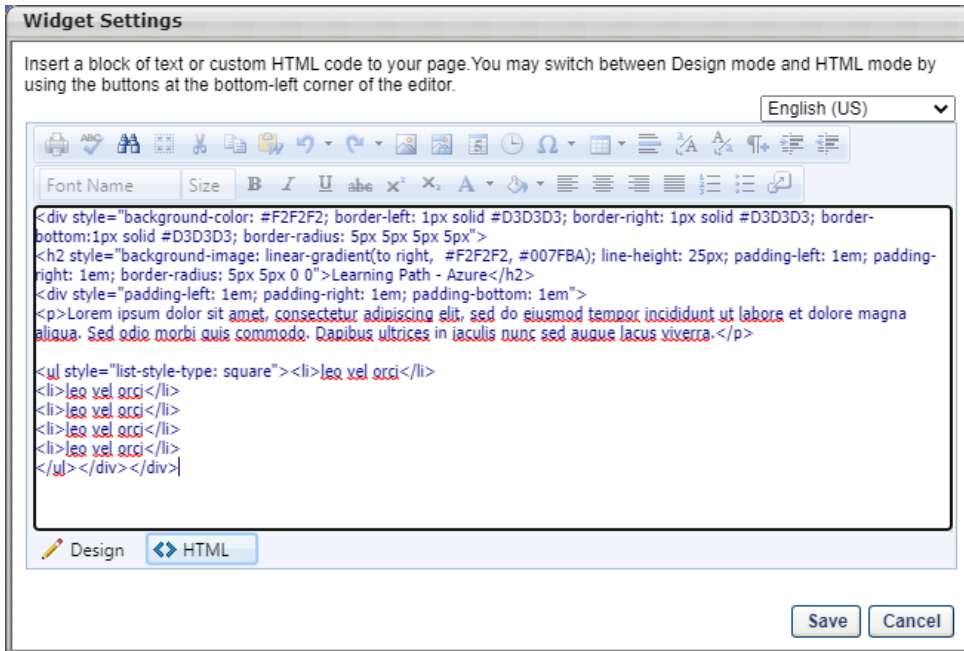


Figure 5. Raw code for a learning path portal widget from case study

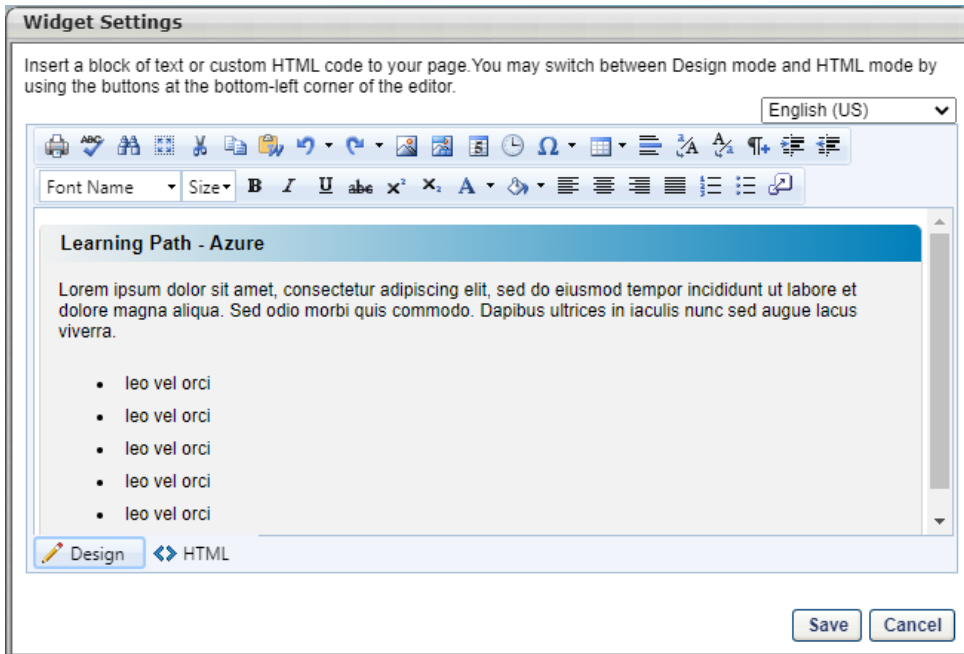
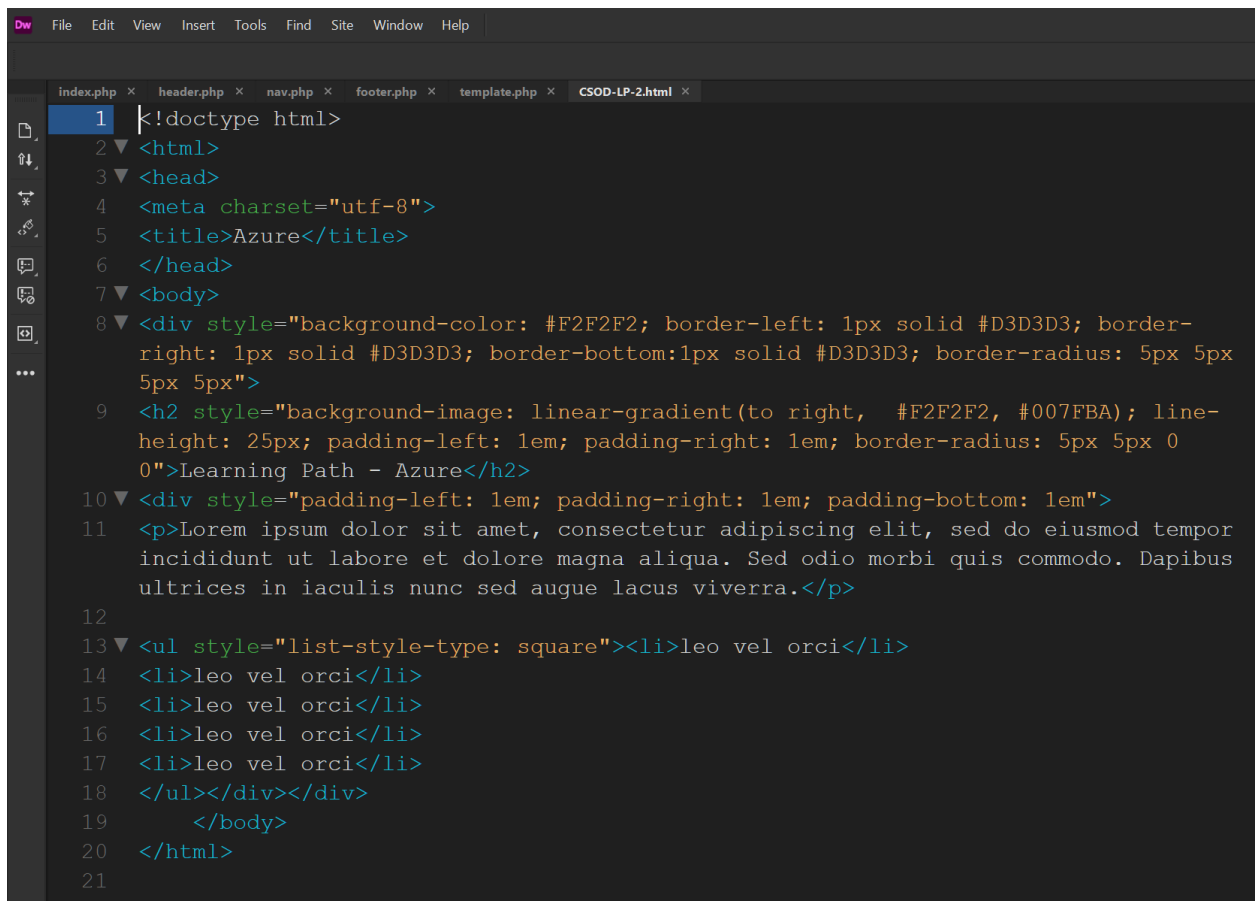


Figure 6. A learning path widget in design mod case study.

## CSS Support

Customizable CSS imposed limitations on the project. External CSS sheets were unsupported in the widget, which meant that only inline CSS properties could be coded within the HTML editor, and styles could not be globally applied, nor would style tags in one HTML widget carry over into another. Code templates would be maintained outside the LMS in an external editor such as Dreamweaver (see Figure 7), but CSS updates would need to be separately applied to each widget in a layout.

A screenshot of the Adobe Dreamweaver interface. The top menu bar includes 'Dw', 'File', 'Edit', 'View', 'Insert', 'Tools', 'Find', 'Site', 'Window', and 'Help'. Below the menu bar, several file tabs are open: 'index.php', 'header.php', 'nav.php', 'footer.php', 'template.php', and 'CSOD-LP-2.html'. The main workspace shows a code editor with the following HTML code:

```
1 <!doctype html>
2 <html>
3 <head>
4 <meta charset="utf-8">
5 <title>Azure</title>
6 </head>
7 <body>
8 <div style="background-color: #F2F2F2; border-left: 1px solid #D3D3D3; border-right: 1px solid #D3D3D3; border-bottom: 1px solid #D3D3D3; border-radius: 5px 5px 5px 5px">
9 <h2 style="background-image: linear-gradient(to right, #F2F2F2, #007FBA); line-height: 25px; padding-left: 1em; padding-right: 1em; border-radius: 5px 5px 0 0">Learning Path - Azure</h2>
10 <div style="padding-left: 1em; padding-right: 1em; padding-bottom: 1em">
11 <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Sed odio morbi quis commodo. Dapibus ultrices in iaculis nunc sed augue lacus viverra.</p>
12
13 <ul style="list-style-type: square"><li>leo vel orci</li>
14 <li>leo vel orci</li>
15 <li>leo vel orci</li>
16 <li>leo vel orci</li>
17 <li>leo vel orci</li>
18 </ul></div></div>
19 </body>
20 </html>
21
```

Figure 7. Custom code in Dreamweaver from case study.

This coding limitation became a primary design consideration, because with multiple page layouts, page maintenance would quickly become unwieldy. The LMS vendor confirmed



that linking external CSS was actually possible, however calling the CSS file from a <link href> tag would require enabling a portal setting that could expose the organization's CSOD portal to web application security risks which included attacks such as cross-site scripting or session hijacking. The vendor further recommended as a best practice disabling the security setting to make changes and reenabling it as soon as the changes required were complete in order to mitigate risk. As a consequence of the IT security risk, external CSS linking would require additional approval from within the organization.

### **JavaScript Support**

JavaScript was disabled by default in CSOD. Per Cornerstone Online Help, "Because of the security risks associated with JavaScript, it is disabled in this editor by default. To embed JavaScript within this widget, contact Global Product Support. Global Product Support does not troubleshoot Java or HTML issues" (Cornerstone Online Help, HTML Widget). Any interactions in the widget requiring JavaScript would fall outside of the scope of this project.

### **iframe Support**

The developer initially attempted to embed iframes within a page for interactivity, and found that, if nested between a <div> tag, it would be possible to natively embed iframe code for an external document, so that the learner could navigate through it without having to open it externally. Usability was tested using MS PowerPoint and MS Sway iframe code generated from the web version Office. The PowerPoint presentation was initially rendered and was viewable and clickable. However, the Sway presentation did not render and returned an error that the iframe code was unsupported in the LMS. The PowerPoint, which was stored on the developer's OneDrive, was later found to be inaccessible by users with whom the cloud drive was not shared with. The team then moved the PowerPoint document to a SharePoint library and attempted link

the iframe again, but was blocked by SharePoint's own security permissions, despite the SharePoint document library being public. At this point, the idea of using an iframe was dropped, and not tested any further.

## **Responsiveness**

Over the course of the development process, it was found that HTML pages created in the widget did not render responsively. While CSOD's main Learner Home page was itself responsive, and the system did optionally allow for enabling responsive navigation, the responsive user experience did not carry over to custom pages. This resulted in a redesign from the initial layout which had been proposed. Figure 8 shows the original home page prototype:



Figure 8. Original landing page layout

In order to future-proof the Learning Paths pages given their lack responsiveness, the four-column lay was reduced to three columns maximum, and all fonts were enlarged (for example, to 16px pixels for paragraphs). Figure 9 shows the final Home page design, to better accommodate future users viewing the pages on their mobile devices.

The screenshot shows the SHI Corporate Learning & Development website. At the top left is the SHI logo, which includes a lightbulb icon. To its right is the text 'Corporate Learning & Development' in green, with a blue banner below it containing the tagline 'Learn, grow and teach'. Below the logo is the section header 'Microsoft Learning Paths'. The text under this header explains that these paths help build skill levels on Microsoft products and services, and lists internal SHI resources. A second paragraph encourages users to pick a learning path to build knowledge in Microsoft solutions and licensing. To the right of this text is an image of a person in a blue suit holding a tablet, with a central 'skills' icon and several smaller icons (wrench and hammer, person, lightbulb, brain) connected by lines. Below this is a blue header for 'Professional Development Options'. Underneath, there is a section for 'Microsoft Azure' featuring a 'Microsoft Certified Azure Fundamentals' badge. To the right of the badge is a text box stating that the path teaches Azure services and licensing. Further right are two yellow buttons labeled 'Sales Foundations' and 'Technical Fundamentals'.

Figure 9. Final home page layout

### USABILITY SURVEY

The first set of completed learning paths pages consisted of five pages for Microsoft Azure. Upon completion, the site URL and a Microsoft Forms user experience survey were sent to a testing group of 15 employees in the Licensing and Sales Departments, evenly distributed between employees who had previously completed a Microsoft certification, and employees who

were new to the process. The survey did not evaluate useability on mobile screens, because at the time of the pilot test, CSOD mobile accessibility, while fully implemented, had not yet been rolled out to employees, meaning none of the respondents would have had training in how to log into CSOD on their company phones or personal devices.

The survey mixed Likert Scale and open-ended questions to poll respondents and elicit feedback on basic usability, along with quality of instruction. Seven responses were received: five from respondents in Licensing and two in Sales. Of those seven respondents, three reported that it was their first time registering for a Microsoft Certification exam. Figure 10 shows the responses to the question of usability. All respondents agreed that navigation was easy to understand, and that text and images were appropriately sized and readable.

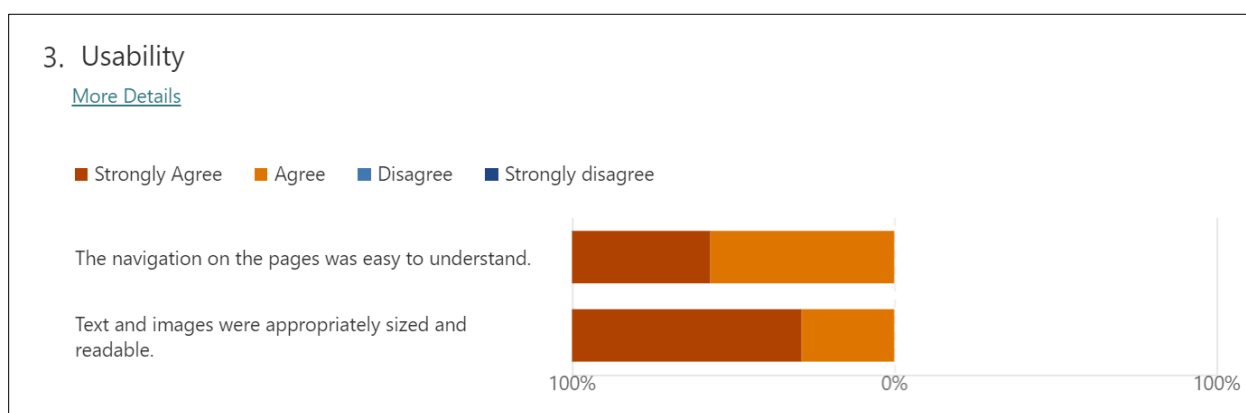


Figure 10. Usability responses

In open text comments, the team received a request for additional navigation functionality in the form of jump anchors. Additional testing would be required, but it did not appear the HTML widget allows for the use of anchor links without an external style sheet, and consequently id or class selectors. Another request the team received was to add accordion tabs to longer pages. Adding this element was desirable, but not possible because it would require

JavaScript, which was not enabled. A requested function that would be added to the final release would be “Download these instructions” buttons which link to printable PDF versions of the exam registration instructions, as shown in Figure 11.



**shi** Corporate Learning & Development  
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## Azure Technical Fundamentals

This technical certification path is a good fit if you are new to the cloud, new to Azure or if you want to demonstrate a fundamental knowledge of cloud concepts, as well as Azure services, workloads, security, privacy, pricing and support.

Microsoft Certified Azure Fundamentals (AZ-900) validates foundational knowledge of cloud services and how those services are provided with Microsoft Azure.

**Steps:**

1. Prepare for the AZ-900 with self-paced and/or instructor-led training.
2. [Create a Microsoft Online account](#) (if you don't already have one).
3. Register for **AZ-900 Azure Fundamentals Exam**.
4. Pass the exam.
5. Access your MCP Transcript.
6. Associate your Account to SHI's Microsoft Partner Center. **(Note: You MUST associate your certification with SHI after passing your exam).**

**Download these instructions**

Microsoft CERTIFIED  
AZURE FUNDAMENTALS

Figure 11. Instructions with "Download" button

Overall, the survey responses were helpful, despite the small sample size. The size of the survey group was primarily a business decision by the stakeholders, and the design team had to work with who was provided to them. For the relatively small scale of this iteration, it may have been enough, but in future learning paths projects it may be beneficial to push for more respondents, and in establishing credibility by showing the value of these pages, it may become easier to obtain such a request. For the full survey results, please see Appendix B.

## CONSIDERATIONS

The final set of pages consisted of a Microsoft Learning Paths landing page (which will be expanded as more programs are added), and four pages of instructional content. In light of the limitations of the HTML widget, and because the team would need to seek approval from Information Security to proceed further, a scaled back design approach using inline CSS was applied to create the Learning Paths pages template. In order to streamline the editing process, code for custom layouts was stored in external HTML files, with markup clearly labeled using comment tags.

The biggest hurdle in completing the project was the HTML widget itself, and the LMS architecture that limited the availability of HTML tags and search functionality to build a truly robust learning object repository. In terms of the project scope set forth by the organization, however, what was created may be sufficient, especially given that many of resources on the Learning Paths pages are external.

Another key challenge that future designers of similar projects should consider is responsiveness. Project stakeholders and end-users with company-issued mobile devices, or those who use their personal devices for work, may increasingly demand mobile accessibility. Therefore, page design should be future-proofed with mobile in mind. If responsive page design is an option in an LMS or CMS, it should be a standard practice, as it is now for most public websites. If the platform does not allow for responsive page design, then careful design consideration needs to be taken in meeting accessibility standards to the highest degree possible.

The challenges encountered here should be considered by this organization and others looking to undertake similar projects. Developers who want CSS and JavaScript interactions for

a fuller, more engaging user experience should expect that they will need to find a way to work with both their internal IT department and their LMS vendor. As cybersecurity concerns become more of an issue, approval for such initiatives may become more difficult to obtain. It is also worth keeping in mind that obtaining the necessary permissions to lift security blocks may extend the timeline of project, especially if for example, a portal needs to be manually opened every time an external CSS needs to be updated. If obtaining such IT security exceptions is unfeasible, then the project manager should look to limit scope so that both initial development and page maintenance are kept at manageable levels.

HTML5 is easy to work with and customize, is mobile friendly, and for newer web browsers is very browser agnostic. It can also be integrated with SQL using PHP, which is outside the scope of this project, but absolutely should be a consideration for learning professionals and developers looking to track page traffic and certificate completion. For the purposes of the Learning Paths project, completion tracking will be handled outside the LMS at least for the near future.

## **CONCLUSION**

All of the above make HTML ideal for small-scale customization projects within an LMS, but at some point, design will only go as far the system architecture and security protocols will allow. While HTML5 is the standard markup language for rendering courses and standalone websites, in terms of building a deeper learning object repository, it may be that coding from scratch using HTML5 is less than ideal. It may even be those newer technologies, such as learning experience platforms built on automation and machine learning, offer customization without the need to hand code pages. Given recent announcements that Cornerstone OnDemand



will integrate with Microsoft's upcoming LXP *Viva* (Cornerstone, 2021), and that LinkedIn (whose parent company is also Microsoft) will release its own *Learning Hub* LXP (LinkedIn, 2021), seamless integration between Microsoft's certification programs in its learning platforms seems likely to become a reality in the not-too-distant future. For non-Microsoft professional certifications and learning paths, development of custom pages may still fill a niche for the time being. However, given the pace of technology change, the integration of Cornerstone with Teams and LinkedIn Learning can be reasonably expected to render the need for such pages obsolete, at least for organizations with the resources to adopt LXP's and other advanced learning technologies. In a few years, the Learning Paths certification pages may be an entirely different experience.

## REFERENCES

Adobe Inc., (2011, November). The How & Why of iPads, HTML5 & Mobile Devices in eLearning, Training & Education [Online]. Available:

<http://blogs.adobe.com/captivate/2011/11/the-how-why-ofipads-html5-mobile-devices-in-elearning-training-education.html>

Bates, A. W. (Tony). (2011). Content Management and E-Learning: A Strategic Perspective. In N. F. Ferrer & J. M. Alfonso (Eds.), Content Management for E-Learning (pp. 197–211). Springer. [https://doi.org/10.1007/978-1-4419-6959-0\\_11](https://doi.org/10.1007/978-1-4419-6959-0_11)

Cornerstone OnDemand. (n.d.). Custom Page Builder. Online Help. [Online Help Article].

[https://help.csod.com/help/csod\\_0/Content/Custom\\_Page\\_Builder/Custom\\_Page\\_Builder.htm](https://help.csod.com/help/csod_0/Content/Custom_Page_Builder/Custom_Page_Builder.htm)

Cornerstone OnDemand. (n.d.). HTML Widget. Online Help. [Online Help Article].

[https://help.csod.com/help/csod\\_0/Content/Custom\\_Page\\_Builder/Widget\\_Settings/HTML\\_Widget.htm](https://help.csod.com/help/csod_0/Content/Custom_Page_Builder/Widget_Settings/HTML_Widget.htm)

Cornerstone OnDemand. (n.d.). Responsive Navigation Theme User Experience. Online Help. [Online Help Article].

[https://help.csod.com/help/csod\\_0/Content/Preferences/System\\_Preferences/Display\\_Preferences/Responsive\\_Navigation\\_Theme\\_User\\_Experience.htm](https://help.csod.com/help/csod_0/Content/Preferences/System_Preferences/Display_Preferences/Responsive_Navigation_Theme_User_Experience.htm)

*Cornerstone to Bring Learning into the Flow of Work, Powered by Microsoft Viva | Cornerstone.* (2021, February 4). Cornerstoneondemand.com.

<https://www.cornerstoneondemand.com/company/news/press-releases/cornerstone-to-bring-learning-into-the-flow-of-work-powered-by-microsoft-viva/>

Dinh, T. L., Rickenberg, T. A., Fill, H.-G., & Breitner, M. H. (2015). Enterprise Content Management Systems as a Knowledge Infrastructure: The Knowledge-Based Content Management Framework. *International Journal of E-Collaboration*, 11(3).

<https://doi.org/10.4018/ijec.2015070104>

E-Learning: The Evolving Landscape. (2020). [Research Report]. Association for Talent Development (ATD).

Firtman, M. (2012, October) Mobile HTML 5. [Online]. Available: <http://mobilehtml5.org>

Global Academic E-Learning Market 2019-2023: HTML5 Emerging as the Main Programming Language for Content Authoring. (2019, May 2). PR Newswire.

<https://link.gale.com/apps/doc/A584207596/AONE?u=stout&sid=AONE&xid=28e5bfda>

Lardinois, F. (2017, July 27). Get ready to finally say goodbye to Flash—In 2020 [Web log post]. TechCrunch. <https://social.techcrunch.com/2017/07/25/get-ready-to-say-goodbye-to-flash-in-2020/>

Marcotte, E (2011). *Responsive Web Design. A Book Apart*, ISBN 978-0-9844425-7-7.

Monterroso, Y. (2009). *Digital Content in Education: How does a Learning Repository Help?* [White Paper]. Desire2Learn.

<https://community.desire2learn.com/d2l/lor/viewer/viewFile.d2lfile/1796/5045/Digital%20Content%20in%20Education%20LOR%20Whitepaper.pdf>

Minguillón, J., Sicilia, M.-A., & Lamb, B. (2011). From Content Management to E-Learning Content Repositories. In N. F. Ferrer & J. M. Alfonso (Eds.), *Content Management for E-Learning* (pp. 27–41). Springer. [https://doi.org/10.1007/978-1-4419-6959-0\\_2](https://doi.org/10.1007/978-1-4419-6959-0_2)

- Mohanty, L. (2019, August 2). How A Learning Experience Platform Is Disrupting Corporate Learning. ELearning Industry. <https://elearningindustry.com/learning-experience-platform-disrupting-corporate-learning>
- Murtagh, R. (2011, August). Mobile Now Exceeds PC: The Biggest Shift Since the Internet Began. [Online]. Available: <http://searchenginewatch.com/article/2353616>
- Pappas, C. (2015, May 18). 6 Benefits of Using HTML5 in eLearning [Web log post]. ELearning Industry. <https://elearningindustry.com/6-benefits-of-using-html5-in-elearning>
- Pérez-Montoro, M. (2011). Theoretical Perspectives on Content Management. In N. F. Ferrer & J. M. Alfonso (Eds.), Content Management for E-Learning (pp. 3–26). Springer. [https://doi.org/10.1007/978-1-4419-6959-0\\_1](https://doi.org/10.1007/978-1-4419-6959-0_1)
- Raybould, J. (2021, April 20). *Introducing LinkedIn Learning Hub, an LXP and so much more* [Web Log]. <https://www.linkedin.com/business/learning/blog/learning-and-development/introducing-linkedin-learning-hub-an-lxp-and-so-much-more>
- Reyna, J. (2012). From flash to HTML5: The eLearning evolution.9(5), 28-29. <https://login.ezproxy.lib.uwstout.edu/login?url=https://www-proquest-com.ezproxy.lib.uwstout.edu/docview/1140333316?accountid=9255>
- Shah, N., Balda, G. (2013). HTML5 Enterprise Application Development. Packt Publishing, Limited. <http://ebookcentral.proquest.com/lib/uws-ebooks/detail.action?docID=1115457>
- Singh, S. (2015). HTML5 on the rise: No longer ahead of Its Time. <https://techcrunch.com/2015/10/28/html5-on-the-rise-no-longer-ahead-of-its-time/>

Synytsya, K., Prokofyeva, N., Grocevs, A., & Tomko, V. (2014). HTML5 in Development of Assessment Tasks for e-Learning. *Applied Computer Systems*, 16(1), 105–110.

<https://doi.org/10.1515/acss-2014-0020>

Zoe, E. (2020, February 13). LMS vs CMS: Which are the differences and which one is better?

TalentLMS Blog. <https://www.talentlms.com/blog/a-comparison-between-lms-and-cms/>

