The Effectiveness of Drupal's User Interface in Aiding Users During Website Development

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Abstract

The purpose of this study was to determine, based on the code knowledge of users, the effectiveness of Drupal's graphical user interface in aiding developers during website creation. It includes research on current website developer trends, with a heavy emphasis on Drupal's content management system, its usage, and the pros and cons of its graphical user interface. An online survey querying website developer knowledge of content management systems and preferences was distributed. Additionally, an in person case study that allowed users from two controlled groups, individuals with code knowledge and individuals with limited code knowledge, to physically interact with Drupal's graphical user interface in order to complete the same series of instructions. The participants were timed in order to gauge the intuitiveness of Drupal's interface in aiding various levels of experience in developers. The results of this study can be used to map the past and future trends in web development.

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Chapter I – Introduction

Content management systems, or CMS, are becoming the new trend in web development circles. Deemed the next generation in website advancement, content management systems provide a simplified way to manage workflow in a collaborative web environment. These database management systems call to procedures that can be manual

or computer-based. The end result is to facilitate users in the publication and editing of content and thereby ease the communication of site maintenance.

Having a website is a high investment for companies. In order to achieve the branding and recognition needed to remain web dominant, companies are forced to hire web design firms and/or web development experts at a high initial cost in order to create functional, dynamic and aesthetically pleasing websites. In addition to this high initial expense, these sites require complex coding and the only solution is to staff a full-time developer to maintain and update the site on a regular basis. This is where content management systems, specifically Drupal, find a niche. These powerful systems have the potential to become a resolution to reduce costs. Drupal allows companies to initially invest in a developer to build a clean website, but once built, all are able to update and maintain the website in-house using current employees, with or without a code knowledge base.

Web presence for companies is essential for success in the work environment. As websites have transitioned from small content to multipage, rapidly updating sites, many web developers are turning to open source content management systems to provide the tools necessary for strong organization. Open source grew with the advent of the Internet and began as a way for developers to create and share source code free of charge as a collaborative effort to improve and modify programs. This led to the development of Drupal in 2001 as open source software that became vastly popular with over 630,000 active users and developers within its community today. Drupal is distributed under the terms of the GNU General Public License (or "GPL"), which means any person is free to download it and share their additions and modifications to code with others. Due to the limitless

number of content management systems available, this study asks: What sets Drupal apart as a leading content management system?

Websites developed using content management systems gain the valuable structure and procedure for collecting, managing, and publishing content. All content management systems come with basic tools either embedded or developer added to the system via a modular extension. This "What you see is what you get" (WYSIWYG) toolkit gives developers the customizability to alter any default template and theme to create unique web pages and not stifle artistic freedom for the sake of usability.

This research paper will discuss and provide insight to how developers and companies alike can harness Drupal to strengthen content organization by highlighting the positives and negatives of its graphical user interface and modular-based content management system.

Chapter II – Literature Review

Over the past two decades the Internet has revolutionized the way companies sell and brand their products. The range of web presence can be seen in all different sizes – from small-scale stores to large, multi-national corporations. This study focuses on presenting how content management systems, specifically Drupal, are changing the landscape of web design.

Drupal allows developers to quickly install template tools for a wide gamut of applications such as navigation, calendaring, cataloging, blogging, and image management. These templates allow for less experienced users/developers to quickly create web content with a professional, polished look within a simplified graphical user interface. By easing the process, Drupal templates elevate the quality of web presence for even the greenest of web developers. Additionally, Drupal empowers developers to set up granular permissions – this allows the web administrator to restrict user accounts' access to change the settings that the developer had spent a great deal of time installing and formatting. This prevents deletion accidents and provides a more guided

experience for users who have less knowledge of web design, but still want or need the freedom to contribute to the site.

In the beginning, Drupal found its niche being implemented for use in large library web restructuring projects. The open-source content core of Drupal allowed for an entirely new database-driven management. According to an article by Hubble, Murphy, and Perry, focusing on the University of California Santa Cruz Library project, the Drupal Content Management System became the school's solution to modernizing the website from traditionally static HTML (hyper text markup language) Dreamweaver coded pages. These static web pages involve the tedious hand coding of hundreds, sometimes thousands of lines of web browser compatible language code that is converted into the readable webpages users are able to view in a clean user interface format that differs slightly within each browser and subsequent version of Firefox, Internet Explorer, and Safari, or others. The Drupal update allowed for a revitalization of the college library website and transformed it into a modern, dynamic, and collaborative site by allowing librarians to jump into the driver's seat of content control on the web for the first time.[1]

Expanding on this, CMS aid companies by "providing back-end structure for a website so that the authors can focus on the content" (Becker). CMS databases redefine how content is stored and formatted within the system so the information can be referenced based on the variable data. This variable data is referenced by sorting it into different content types designed and designated by the developer. For instance, content types are given a name such as "basic page" by the developer and can be styled differently than any other content type.

Each time "basic page" is then called on to be the designated formatting choice for that page, a different section of the CSS (cascading style sheet) is then called on. This method is superior to the traditional static website protocol in that now instead of defining both the content and formatting in a single document, when editing the CMS (Drupal), changes can be made more easily without having to recode the entire page and administrators can assign different user types varying levels of permissions for editing content. [2]

Simplified, Drupal can be seen as a data-management system that controls which users can see what content in your site.[6] The administrator(s) of the site act as the referee to control the submission and editing of content by contributors. The flexibility within Drupal's core administration module allows it to adapt and configure to any organization's workflow. Similarly, users can be assigned roles by the administrator, with each role assigned a specific permission. What makes Drupal unique is that users may be assigned multiple roles, with each role's permissions stacking depending on what they have been assigned. This makes managing security within a website trick if the administrator has a wide array of roles assigned to a large number of users.[6]

Despite Drupal's dynamic core easing the users experience in updating the site, it can require a steep learning curve for the developer(s) of the site. According to Danielle Becker, in her article, "Adventures in Drupal," "Without previous experience with Drupal, you can get lost down the rabbit hole of terms, coding languages, and puzzling sets of options." Similar to traditional web design, there is a certain level of HTML and CSS knowledge developers need to know in order to achieve the full potential of the system and maximize results. As an open-source content management system, Drupal relies on dedicated community of developers who code and donate their applications, themes, and modules for the benefit of everyone.[3] This community can be tapped by

developers of all skill levels to create, moderate, and aid others by providing feedback and tips via forums on the www.drupal.org website. The CSS knowledge comes into play when customizing the "out-of-the-box" themes that can be stacked and added to the main Drupal core default theme. As defined, Drupal is an open-source content management system, In order to be classified "Open Source" source code needs to comply with the Open Source Initiative criteria. Some of these requirements include free redistribution, the license must allow modifications and derived works, and it must maintain the integrity of the author's code.[7]

Moreover, Drupal's rise as a leading CMS, or as developers call it, the Drupalization of the web, can be attributed to its user-friendly interface and flexibility in designing the infrastructure of the site.[4] Other key advantages are Drupal's strong community of support, flexibility in configuration, plethora of modules, ability for granular permissions, effective editing, search engine optimization-friendliness, and dynamic PHP that is compatible with several operating systems. In essence, Drupal's range of add-ons is what sets it apart from other top content management systems such as Wordpress and Joomla! And drives its success.

Chapter III – Research Methods and Procedure

The purpose of this study was to determine, based on the code knowledge of users, the effectiveness of Drupal's graphical user interface. This was achieved using descriptive research, through a combination of case study and surveying.

In order to gather a general insight into the average individual's experience with web design and creation, a survey was created and sent out to the Graphic Communication department alias, along with an online sample of Facebook users between the ages of 16 and 50. Users were asked a series of general demographic questions to determine if they qualified as the correct sample audience the survey was targeting. Individuals with zero web design and/or content management system knowledge were asked to exit the survey. Those individuals who qualified, were first asked to identify which content management systems they had experience with – Wordpress, Drupal, Joomla!, SilverStripe, or Other, in which they wrote in an option not listed. Next, individuals were asked to provide a detailed description of the pros and cons they experienced with each system. From the responses, a sample was used to infer a general consensus conclusion taken from the ideas and opinions of a group of individuals call a sample survey of tangibles (Levenson).

For the case study, users were divided into two groups. Group one was users that were familiar with, and/or had a knowledge base with one or more of the following: HTML, CSS, JavaScript, PHP, or MySQL. Group two were users that were unfamiliar with, and/or had limited experience working with the aforementioned coding languages. Both groups were then given the same set of instructions to complete (e.g. adding a new content type) and timed to demonstrate how intuitive Drupal's graphical user interface was for participants. Once each user completed, or had given up on the task,

Chapter IV – Results

The need for a cost-efficient and easily accessible way for companies to communicate products and services to consumers is becoming a growing concern for companies. This study is here to address this issue by providing insight into the effectiveness of content management systems', specifically Drupal's, graphical user interface in aiding the average user in maintaining and updating corporate websites. The methods employed include surveying subjects that are familiar with website coding languages such as HTML, CSS, JavaScript, PHP, and MySQL, as well as those subjects not versed in coding languages in order to determine the strengths and weaknesses of this system. A small sample case study is also implemented in order to quantify the results and have a measurable target to support the results of the survey.

Surveys

For this study, a survey was administered online. The survey was meant to gather the subjects' technological knowledge of website creation, specifically targeting their knowledge of content managed websites.

The questions gathered information based on the subjects' age, awareness of website creation, and in particular, attitude towards content management systems. Sixty-five college students or recent college graduates completed the survey presenting their views on content management systems. The online survey first asked a few questions regarding general demographics such as age and gender in order to understand the audience sample.

The following questions addressed the subjects' familiarity with the creation of websites. When asked if subjects' were aware of the basics of web design, the majority of respondents replied in the positive, totaling 90%, while 10% were

unaware of how the information displayed online was uploaded and available to the masses. Three quarters of the respondents, or 75% of the sample, had either created their own website before or were planning on creating their own website within the next year. Of the remaining 25%, 5% had no interest in web design and 20% would be interested in learning more, but felt their lack of coding knowledge and ability to be of hindrance. Seeing that the average respondent is a college student pursuing a technology degree, this is a reasonable and expected outcome. The few outliers who did not have knowledge of web creation were asked to skip the remaining questions, as they were not the targeted audience this survey was meant to address.

When asking what content management systems specifically subjects' have used, the number one in terms of popularity was Wordpress, totaling 63.6%. Respondents cited ample support and documentation for the system as well as it being a good starting system to learn with as being their top reasons for using this particular system over other open source options. Conversely, subjects' who had experience with Wordpress believed drawbacks to this system to include generic, overused layout templates and the inability to insert and allow custom HTML. Exactly one half, 50%, of respondents have practice working with Drupal – not a surprising statistic for this sample as the Graphic Communication department at California Polytechnic State University, San Luis Obispo, where most of the subjects' have been, or are currently enrolled in, recently offered a course specifically on the creation and upkeep of Drupal-based websites. When asked what features they, as users liked about Drupal, the number one chosen category was the ease of use. The ability for scalability and customization utilizing Drupal's core modular set-up were close runner-ups. Surprisingly, one of the highest rated disadvantages of Drupal as well was its ease of use. A few respondents stated it took a lot of time and effort in order to get everything working properly and there weren't any solid handbooks or tutorials to follow so the learning curve was rather steep. This tells us that the graphical user interface isn't as intuitive for the beginning web designer as one might hope. For content management systems to embrace the average user, in-depth guides and tutorials might be a logical step to

embrace to encourage new developers. Of the remaining systems on the survey, 0% of respondents had experience working with Joomla!, 4.5% with SilverStripe, and 13.6% comprising a mixture of Dreamweaver and Google Sites.

Overall, online surveying assisted to study with insight and feedback regarding developer attitudes and perceptions about content management systems. The survey revealed which content management systems were most popular as well as the pros and cons of their graphical user interface and ease of use.

Case Study

The case study was used to analyze the intuitiveness of Drupal's user interface in guiding users in adding content to a webpage. In order to test the effectiveness of this system, a small case study with two distinct groups was formed. A small sample of 4 users was used for the purposes of this study: Group 1 were those who hadn't used a content management system before, and Group 2 were those who had experience designing and creating dynamic content using Drupal or another content management system. From there, users followed the process below and results were measured based on the amount of time it took users to figure out how to complete the process. If users got stuck, they were allowed to use Google or any other search engine to seek out the answer. My hypothesis was that users with experience in content management systems, regardless if they had knowledge of Drupal specifically, would complete this task significantly quicker (more than twice as fast) than those with no experience. Figure 1 displays the opening page both groups were shown before beginning the task. Figures 2 through 6 displays Drupal's graphical user interface that the subjects viewed while completing the assigned tasks.

Figure 1

User Interface Testing

Abstract: In order to test the effectiveness of Drupal's user interface, users have been sorted into two different groups: Group 1 are those who haven't used a content managed system before, and Group 2 are those who have experience designing/creating dynamic content using Drupal or other content managed system. From there, users will follow the process below and results measured based on the amount of time it took users to figure out how to complete. If users get stuck, they are allowed to use Google or any other search engine to seek out the answer. My hypothesis is that users with experience in content management systems, regardless if have knowledge of Drupal specifically, will complete this task significantly quicker (more than twice as fast) than those with no experience.

Process:

Step 1: Add a new page to the website that includes text. Title it with your sample number. (*For example, if you are test user number 1, title the page:* Test User 1)

Step 2: Add an image to that page from either one of the sample images in the provided folder on the desktop or one of your own choosing.

Step 3: Make the page become a new tab link in the main menu bar to display following the Case Study tab.

Figure 2

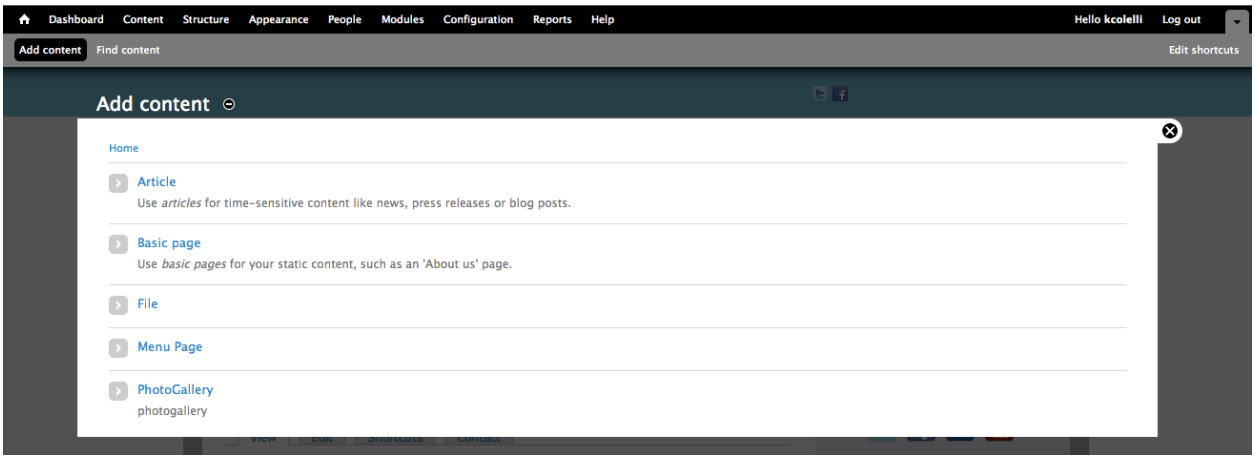

Figure 3

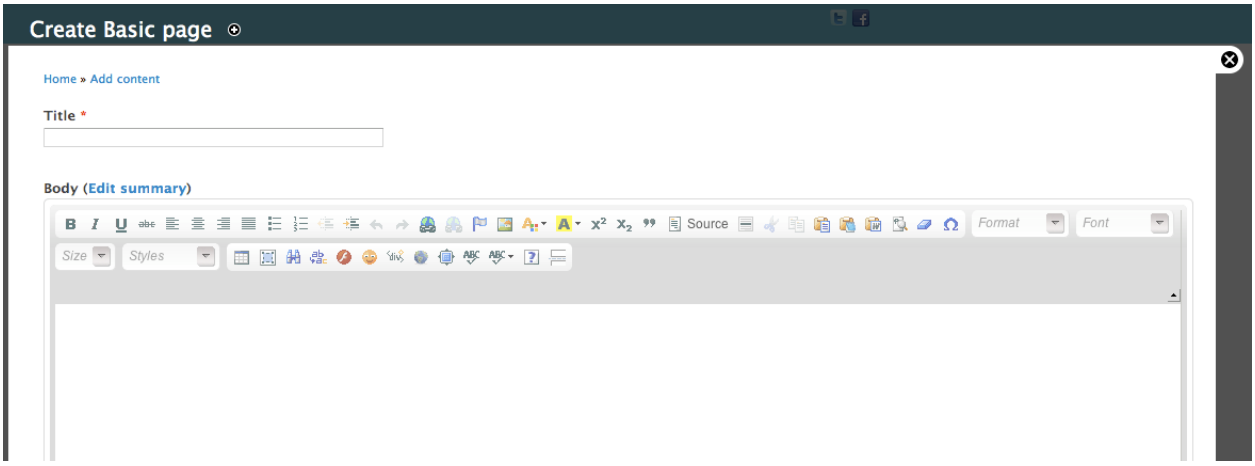

Figure 4

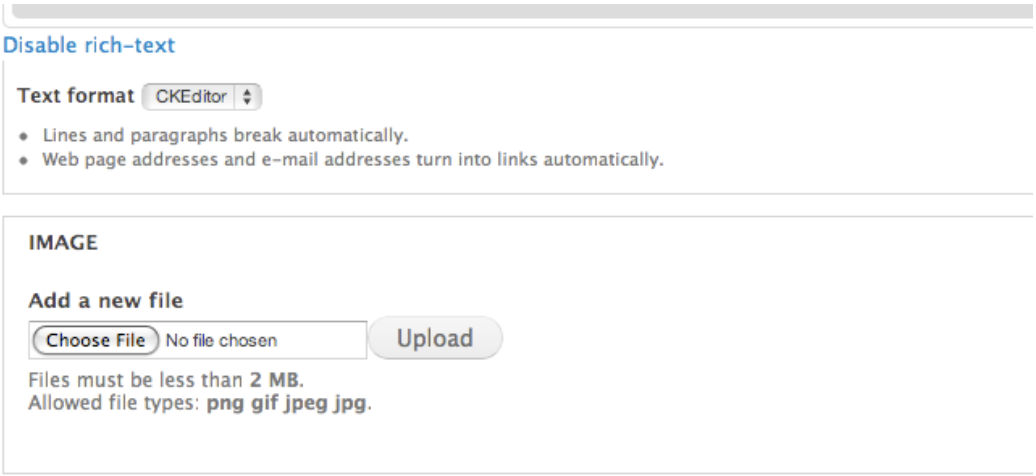

Figure 5

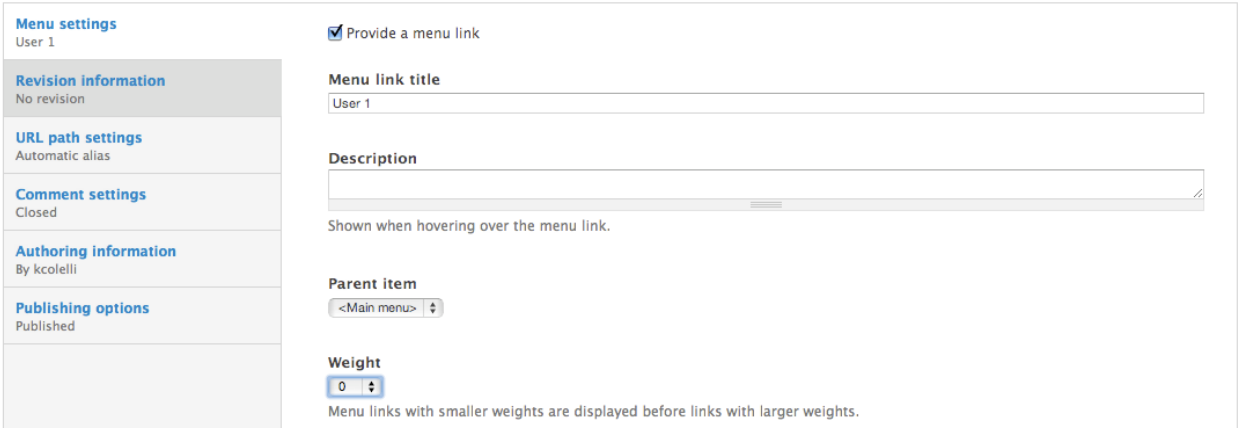

Figure 6

Results

For users in Group 1, those with little to no coding knowledge and hadn't used a content management system before, the average time to completion was 25 minutes and 13 seconds. The two main issues participants from this group experienced was knowing where to initially click to insert a basic page to begin, and upon completion of the page, how to then add it to the main navigation bar as shown in figures 5 and 6 above. Although the navigation to add content such as a page to the website was clearly displayed at the top on the developer bar, finding the correct button to choose proved difficult to novice users and therefore resulted in a longer time. Similarly, users were given the option to display their page in the menu bar at the bottom of their page; however, most users skimmed over this feature, resulting in a longer finish time.

For users in Group 2, those who had experience designing and creating dynamic content using Drupal or other content management systems before, the average time to completion was a mere 4 minutes and 42 seconds. Users from this category were familiar with Drupal's navigational panel or similar format and easily completed the three tasks.

Predictably, this case study proves to support my hypothesis that prior experience with Drupal, or content management systems in general, yields quicker results. Overall, it can be seen that the issues plaguing group 1 participants can be easily remedied by increased exposure to the user interface and corresponding navigational bars.

Chapter V – Conclusions

As the Internet continues to evolve, the gap between the code savvy and the average user-developer widens. The need to bridge this gap with a professional website will become increasingly important. Being able to facilitate the average user in website creation can promote a competitive advantage for companies previously unaccustomed to a larger audience for their products or services. Once a company determines the scope of the projected website project, an in-depth analysis of the pros and cons of various content management systems along with proposals from creative design firms can be considered.

This study set out to determine the effectiveness of Drupal's user interface in aiding various types of users during website development. What it discovered is that there is a multitude of variables to be considered when choosing the correct content management system for the type of website to be created, as well as the skill level of the website developer and administrator(s). Drawing from the research methods this study explored, it can be concluded that, although content management systems, specifically Drupal, lessen the amount of code knowledge users need to create and maintain company or personal websites, a steep learning curve unique to each system is required to maximize results.

A developer skilled in the specific content management system of choice is a worthwhile initial investment. Their knowledge of system quirks and layout can expedite the development process and give companies the freedom to allocate internal resources to other needed projects. Extra expenses are associated with this approach; however, the time saved internally allows employees to allocate their time to more profitable projects and can offset the cost of hiring outside the company.

A dedicated in-house employee is the preferred choice when the budget is limited. The skill-set of this individual can range from novice to professional. The benefit of this approach is the company is using existing resources to achieve similar results. The disadvantage is the company loses the expertise and capabilities of that employee on other projects within the organization. When pursuing this option, consider the size of the project, the long-term scope of development, the frequency of dynamic updates, and the coding knowledge of the employee. Compared to outside developers, in-house developers rely more heavily on the user interface of content management systems to create, maintain, and update websites.

The case study showed that even users with little to no coding knowledge were able to complete the same task as experienced developers. The key was Drupal's user interface in aiding new users to complete the steps. By minimizing the amount of actual HTML code users need to know and providing users with basic tools to customize templates, users of all skill levels are empowered to view, edit, and publish their own content to the website.

Therefore it can be seen that clean, simple, graphical interfaces are a powerful and successful way to develop websites. Although the skill level of the developer may vary, the strength of the content management system and its ability to expand in accordance to a company's needs, should be acknowledged.

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