Theses Website

CS4624 (Multimedia, Hypertext, and Information Access)
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05/13/2021
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Client: Bill Ingram
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Executive Summary

The non-profit educational organization Networked Digital Library of Theses and Dissertations, or NDLTD, currently has a website built with Google Sites. They wish to redo this site to ensure that it can be accessed by as many countries as possible, is built with a system that is not frequently changing, and has a more visually appealing design.

Our team has been tasked with researching and deciding on a new content management system to create the website with, migrating all of the content to the new website, implementing news and events widgets, coming up with new website designs, and writing documentation for future developers of the site.

We first had to research different content management systems, and decided that WordPress best suited the needs of our client. We then downloaded WordPress to a server that could be accessed by all developers of the site. We sketched potential website designs and presented them to the NDLTD Board of Directors. After receiving feedback on our designs, we migrated the content of the old NDLTD website to the new one, and implemented the agreed upon design. We met frequently with members of the NDLTD Board and received constructive feedback on our site implementation. We made a few final changes to the design, tested the website from the user’s point of view, and wrote up documentation for future developers of the website to use.

We ran into a few obstacles in the early stages of our project, including picking the hosting platform and setting up the Ubuntu Virtual server. We went back and forth between using WordPress and Wix, however, after feedback from our client, we settled on using WordPress. Additionally, with help from our client, we were able to overcome the difficulties with setting up the server and to proceed with our project.

We anticipate that this new website will become the primary NDLTD website. We expect that future developers of this site will make slight modifications to the content of the site and so have provided them with resources that should ease this process.
Introduction

The Networked Digital Library of Theses and Dissertations (NDLTD) is a non-profit educational organization that has a website built with Google Sites (ndltd.org = theses.org = dissertations.org). They wish to remake their website for a variety of reasons. First, Google Sites does not allow access from users in certain countries, such as PRC. Because NDLTD is an international organization, they need to make sure that their site is accessible worldwide in order to adhere to their organizations’ mission and goals. In addition to this, Google Sites is changing and will not meet their current requirements. They need a content management system that will stay consistent for a long time and continue to meet the needs of the organization. Finally, their current site has a very outdated design and they believe that it is time to give it a more clean and modern look.

Objective

Our primary objective is to redo the Networked Digital Library of Theses and Dissertations (NDLTD) website. We will do this using WordPress, so we will first download WordPress to a server that our team and other members of the NDLTD Board have access to. We will also sketch a number of potential new website designs that we will present to the Board. After receiving feedback, we will begin to migrate the content of the current website to WordPress, using mainly copy and paste. We will implement the agreed upon design, and meet frequently with NDLTD Board members to make any necessary tweaks to the design and content of the site. We will write documentation to ensure that future maintainers of the site will have all of the necessary resources to keep it up and running and make any modifications.

A main component of this project is to redesign the website in a way that is more modern, visually appealing, and easier to navigate. Thus, we will frequently experiment with the design and ask for feedback in order to create the most effective site possible.

WordPress was the chosen content management system due to its availability in most countries, its ease of use, and overall consistency. After conducting our own research and speaking with members of the NDLTD Board, we found that the use of WordPress would best meet the needs of our client.
Deliverables

The deliverables for this project include:

1. A new version of the website theses.org that includes all existing content and better serves stakeholders, accomplished by migrating the site to WordPress.
2. Comprehensive documentation that includes how to maintain and use the new theses.org site.

Client

The client for our project is Bill Ingram, the Assistant Dean and Director of IT of University Libraries at Virginia Tech. There, he oversees Special Collections and University Archives, Digital Imaging and Preservation, Digital Libraries, and IT Services. He has an M.S. in Library and Information Science from the University of Illinois at Urbana-Champaign and is currently pursuing his Ph.D. in Computer Science. He currently serves on the NDLTD Board of Directors.

Team

Our team consists of Keefer Ellis, Erin Hall, and Hunter Capestany. We are all majoring in Computer Science and will be graduating in the Spring of 2021. We all took this course as a way to expand our knowledge in multimedia and hypertext and gain valuable experiences that will help us in our future careers. Below is a brief overview of our respective roles and responsibilities in this project.

Keefer Ellis’s main role in this project was quality control. He ensured the quality of the migrated content as well as the integration of news and events widgets to the new website. He worked on the overall website design, presentation design, and format of written reports. He also ensured orderly website transition and cohesion between team contributions. In addition to this, he helped get WordPress up and running on the server.

Erin Hall was the team contact leader and in charge of merging the content from the old site to the new one. She was the primary source of contact for both the client and professor and kept them updated on the progress of the project as appropriate. She created the necessary
pages on the new website and transferred the content of the old website over to the new website.

Hunter Capestany was in charge of technical development of the project. He researched and selected appropriate widgets to be used within the updated website. Along with Keefer, he helped to get WordPress running on the server. He also made sure that the structure and image of the updated website flowed efficiently for users and was visually pleasing. He worked to add necessary plugins and code to maximize the efficiency and simplicity of the updated website.

Descriptions of each of the team member’s roles can be seen in Table 1.

**Team Member Role/Responsibilities (Table 1):**

<table>
<thead>
<tr>
<th>Team Member Name</th>
<th>Description of Role/Responsibilities</th>
</tr>
</thead>
</table>
| Keefer Ellis     | • Quality control  
|                  | • Ensured the quality of the migrated content  
|                  | • Ensured the integration of news and events widgets to the new website  
|                  | • Worked on website design, presentation design, and format of reports  
|                  | • Ensured cohesion between team contributions  
|                  | • Set up WordPress on server |
| Erin Hall        | • Team contact leader  
|                  | • In charge of migrating content from the old website to the new one  
|                  | • Primary source of contact for our client and professor  
|                  | • Created necessary pages on the new website and effectively transferred the content to them from the old website |
| Hunter Capestany | • Technical development  
|                 | • Researched various widgets and plugins to be used in new website  
|                 | • Assisted in getting WordPress running on the server  
|                 | • Ensured that the structure of the new website flowed efficiently for the users  
|                 | • Ensured that the new website was visually pleasing and informative  
|                 | • Added necessary widgets and plugins to maximize efficiency of the new website |
Requirements

Content Management System

Our client recommended that we use WordPress as our content management system, but ultimately left it up to us to research and decide on a system to use. They asked for the system to be similar to WordPress if we chose to deviate from their recommendation. The main restrictions they put on the system we chose was that it must be available in most countries, it must be a consistent (not changing) system, it must not require an ongoing maintenance cost, and it must be compatible with existing modern web application designs.

Website

The main requirement for the website was that it must contain all of the existing content. All content, even if it is not inherently visible, must be migrated over to the new site. In addition to this, the new website must have an updated, modern look. This includes both a new design and the reorganization of content. A lot of the content on the current site was organized in a confusing and ineffective way. For example, the site had both a topbar and sidebar with different sections and pages to navigate to. Some of these sections were repeated in both the topbar and sidebar, and were not organized in a clear way. They recommended that we condense some of these sections and subsections and place them in either the header or footer.

News and Events Widgets

Another aspect of the website that our client stressed the importance of were the news and events widgets. The current site has a widget for news, where different headlines and important information can be shown and frequently updated. It also has an events widget with information about upcoming NDLTD related events, including their respective name, location, date, and any supplemental information. Similar to the news widget, the events widget was frequently updated. We were required to reimplement these widgets in a way that maintained their functionality, while looking slightly more modern and updated.
Documentation

We were required to write thorough documentation, so that future maintainers of the website are able to use it with ease. The documentation will help future developers of the site find content easily and make any necessary changes. It will provide a resource to those who are taking over our project after us.
Design

A portion of our project beyond migration of content also included the draft and creation of new designs for the website itself. This process was done in multiple stages during the project and iterated until we decided on core characteristics and a more finalized theme from the provided WordPress themes. A large requirement for selection from the WordPress themes though was that the theme selected be actively supported and updated so that the NDLTD could rely on the theme itself. Ways we determined active support was to be able to see active development, check the team that was working on it, and to look at update history. As those themes recently were edited and updated, they had clear support.

The first step in deciding on designs for the website was during our presentation to the NDLTD Board on the submission of possible designs for feedback. These designs are illustrated in Figures 1-4. Figure 1, being an initial design proposed, had a darker theme, more sectioned off boxes, and was to assess how blocky designs were received. Figure 2 attempted to emulate more closely the current website, changing the spacing and keeping closer to what we knew we could emulate in WordPress systems. Figure 3 was a display of Figure 1 in a mobile design format. This was done to show how we would see the design from a mobile perspective as well as assess different aspects of mobile website scalability. Elements specifically of this mobile scalability of the website were mobile top toolbar/navigation bar, bottom bar elements, and text box setup. Figure 4 attempted to develop a more colorful theme and emulate a theme similar to the twenty twenty WordPress theme we were experimenting with prior to the board meeting.

Further elements considered in the design process are outlined in Table 2.
## Feature Comparison for Design (Table 2):

<table>
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<th>Positive Features to include</th>
<th>Negative Features to avoid</th>
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<tr>
<td>● Dark Themes</td>
<td>● Complex titles</td>
</tr>
<tr>
<td>● Easy on Eyes</td>
<td>● Small elements</td>
</tr>
<tr>
<td>● Simple Color Pallet</td>
<td>● Blocky Design</td>
</tr>
<tr>
<td>● Compatible with Mobile Devices</td>
<td>● Small space for text</td>
</tr>
<tr>
<td>● Maximize content to draw eyes</td>
<td>● Empty spaces between elements</td>
</tr>
<tr>
<td>● Consistent font and styled text</td>
<td>● Confusing icons and elements</td>
</tr>
<tr>
<td>● Frequently updated or supported</td>
<td>● Old or unsupported themes</td>
</tr>
<tr>
<td>● Supports visible and simple menus</td>
<td>● Themes that don’t fit website type</td>
</tr>
<tr>
<td>● Easily edited in WordPress and CSS</td>
<td>○ Informative and Commercial</td>
</tr>
</tbody>
</table>

*Figure 1: Image of Initial Wix Website Design I*

https://keefer9.wixsite.com/example-site
Figure 2: Image of Initial Wix Website Design II

Figure 3: Image of Initial Mobile Wix Website Design
These designs were created using Wix as purely designs, though at the time Wix was a hosting platform that the team had been considering for its ease to develop designs and themes. Through discussion with our client we narrowed down the expectations and migrated content to a LAMP stack with WordPress as the hosting platform. This discussion included the primary focus on WordPress accessibility internationally, the longevity of the system, and how flexible and scalable the system was. Overall WordPress offered further reach, had a far greater user base with some references stating as many as 75 million sites using it, and we could guarantee continued support of the system and its plugins.

We initially settled on the design shown in Figure 5. However, after receiving feedback from the NDLTD Board of Directors, we switched themes in order to accommodate a larger footer. We were advised to put the majority of our content in the footer in order to simplify the site, as our original theme did not support this well. Finalizing our design with these considerations we made the site displayed in Figure 6.
Figure 5: Image of Former WordPress Website Design

The design eventually settled on is shown in Figure 6.
Implementation

The Implementation of this project was done by migrating content over to an intermediate server. This server, ndltd.cs.vt.edu, is a Virtual Machine hosted on the Virginia Tech Computer Science Research VM cluster. This Virtual Machine is an Ubuntu 20.04.2 LTS. This is loaded with Apache 2, a free and open-source web server software. Apache 2 and an instance of MySQL (which is an open-source relational database management system) allows us to host WordPress. WordPress is a free and open-source content management system which hosts pages and posts. This system also provided a nice platform with downloadable widgets and
themes that can provide for the site’s requirements. Coding languages used for WordPress are PHP which hosts information, HTML for the site's pages, and CSS and PHP for themes.

Using our access to the Theses.org site and the provided files of the site shared on Google Drive, we migrated the pure elements of the pages to WordPress pages on the Ubuntu Server. From this we also added in widgets to replicate the widgets that existed on the original page. Beyond this we also implemented news/events to be used as posts which better fit in the WordPress system and allowed for easier reproduction of the Theses.org widget functionality.
Testing/Evaluation/Assessment

Since our project consists primarily of the migration of content from an existing website to a more modern, revamped site, there does not seem to be any concrete data that would be gathered from the testing of our new website. This is ultimately because the only true testing that we have conducted is to make sure that the content is visible to the users of the site and also to make sure that all of the webpages on our site are linked appropriately to one another and that the links do not redirect to a page that they are not supposed to. In order to test this aspect of our website, we used the preview functionality of WordPress to view the website as how a user would and then we manually went through and tested all of the links and pages present on our site to make sure that all of the correct content was there and that the links redirected the user to the correct destination page.

Another aspect of evaluating the website was the testing of the various designs of the site that we choose. This consisted of picking and evaluating different designs that WordPress offers in order to make the site as efficient as possible so that all of the content can be found in the least amount of time and so that the site would be visually appealing to the user. Also, we evaluated each design based upon the criteria of: the amount of space on each page for adding information such as text or images as well as the number of widgets and menu items that can be added to a page. We ultimately did this in order to check and see that the site can be as functional as possible with the specific design.

Lastly, as all of the content has been fully migrated to the new website that we have created, we have tested the website ourselves by going through the entire website and making sure there were no errors when transferring the content over. We have tested to see how efficient it is and looked for any usability issues. We have presented the website to the NDLTD Board of Directors and asked for their feedback on it in weekly meetings in April. The feedback gained from this assessment and the quality assurance checks conducted by our team has allowed us to find and correct any aspects of our website to make it more beneficial to our users and clients.
Users Manual

Website Overview

The website, as discussed above, essentially holds various content and information regarding NDLTD. There are close to 100 different pages of content that can be accessed through the dropdown menus or by searching for them in the search bar. To get back to the home page, the user can click the “NDLTD” page in the top left corner of the header. The website supports search features and commenting on certain pages. It also contains news and events widgets that are updated frequently to stay current as new news and events come up. The right hand side of any page contains links to various social media accounts that NDLTD has, as well as the news and events widgets.

Pages

With access to the website’s Google Analytics page, we were able to find the most visited pages on the site over the past year. We put these pages in the header, along with some pages that the NDLTD Board of Directors recommended we have in order to facilitate ease of access for the users. These pages can be seen on the website’s header, shown in Figure 7 as well as details on their unique pageviews in Table 3.

<table>
<thead>
<tr>
<th>Page</th>
<th>Unique Pageviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>86,872</td>
</tr>
</tbody>
</table>

Figure 7: Website Header

Theses.org Google Analytics of Site Prior to Project (Table 3):
The website currently has just under 100 different pages. These include pages that fall under the above sections, as well as pages for various people associated with NDLTD. Most of the pages can be accessed by clicking on that page in the footer. Other pages can be found by clicking hyperlinks on various pages. If there is a specific page the user is looking for, they can use the search bar to type in the name of the page, and it should show up under search results.

**Widgets**

Our site currently has widgets for news and events. Figure 8 shows these widgets.
As shown in Figure 8, the news widget is on the right hand side, above the events widget. By clicking on the hyperlink “Post on 4/15”, the user will be brought to a page that describes that specific news post. Here, if the user has permission, they are able to leave comments.

On the right hand side, below the news widget, the events widget is in calendar form. If there are any events for a certain date, the user will be able to click on that date and view the events.

**Other Features**

The website contains a few other additional features that are important to note. First, a search bar can be found on the right hand side of any page. Here, the user can search for a certain page within the site or any specific content they are trying to find. After clicking the “Search” button, they will be brought to a page with search results.

In addition to this, there is a useful feature in the middle of the footer called “Back to top”. If the users clicks this, they will be brought to the top of the page they are currently viewing.
is particularly useful for pages with a lot of content and will prevent the users from having to scroll a lot to reach the header again.

The website currently has nine groups of pages: News, Community, Thesis Resources, Global ETD Search, About, Contact Us, Membership, Support NDLTD, and NDLTD awards. These groupings, as well as the “Back to top” button, can be seen on the website’s footer in Figure 9.
Developer Manual

Setting up the Ubuntu Virtual Server

We were given a working Ubuntu Virtual Machine from the Computer Science Virtual Machine Project and asked to make this system into a working Linux, Apache, MySQL, PHP or LAMP stack. In order to do this the steps we took were to run updates for security and utility purposes. From there we installed Apache2 via the *apt install* command. From there we edited the ufw application list allowing Apache Full connection which opens both port 80 and port 443. This allowed us to create a TSL/SSL encrypted instance of the WordPress server, supporting HTTPS traffic. Allowing this was important for our client as well as getting WordPress on the system.

From here we installed MySQL setting up the strength of expected passwords, systems, and as well as a root user. With that installed we then installed PHP, the library Apache 2 mod PHP system, and finally the PHP MySQL software. Then we created a directory for the website to be located, in this case naming the directory WordPress and placing it under `/var/www/` path on the machine. We ran some tests to ensure the correct step at this stage and then moved to create TLS/SSL system requirements.

This system of creating an SSL certificate required the creation of a self signed key using OpenSSH. This is due to our team not having the DNS record and at the statement of our client that he would handle all certification necessary. As we were providing merely a migrated platform the final DNS systems implementation wasn’t a part of our implementation. The process to create this system is described in [1]. After the self signed RSA certificate was created then the Apache system needed to be configured to use the TLS/SSL certificate and system. Doing this required the creation of ssl-params.conf to define Apache behaviors and WordPress-ssl to define the individual site behaviors. The WordPress-ssl then required the inclusion of the Apache-self signed certificate and key that was generated. Finally a request to redirect to an https: of the original site destination is edited into the WordPress.conf file and Apache is now formatted to handle the HTTPS systems.
Regarding the process of using a WordPress database in MySQL, this database was then formatted to have a WordPress user and allow WordPress to create and delete data. Then we downloaded WordPress in a compressed tar zipped file onto the server and placed the uncompressed and zipped files into the `/var/www/wordpress` file path. This was then followed by having Apache use the config and server files. Using the Virtual Machine’s provided IPv4 we can access the website in a browser. From this browser access the WordPress system was properly installed and configured and users for editing the software were created. This completed the installation and setup of the LAMP stack, and WordPress was established on the Ubuntu Virtual Machine.

**Altering Site Information**

Theses.org site administrators have access to the WordPress administrator UI. This allows them to see every page, post, theme, and widget used on the site. From this an administrator can edit pages by selecting on the page portion of the UI, then searching and selecting the page they wish to edit. New pages are added with the same UI but selecting the create page option. The addition of content available to add will be present on the left hand side of the UI as of release 5.7.1 for WordPress. WordPress news and events posts can be updated and created in a similar fashion by selecting the post element from the left hand side of the main administrator window UI. Then the post once found and selected can be edited just like that of a page. Content can be added in a plethora of ways using the post and page left hand menu. These ways include video, youtube link, images, text with a variety of formatting, and hyperlinks both externally and internally to the site.

**Implementing the Site on the Web**

With the operating LAMP stack, using HTTPS, and content migrated to the WordPress platform. The site itself will need to be hosted on a server or hosting platform. This process can be done by using an export of the site itself detailed in [8] or utilizing the current Virtual Machine. Once a site is established on a server or hosting platform and the IP address of this site is accessible. The Domain Registrar or DNS should be informed of the new IP address and update the location the Domain points to for the DNS. Finally in order to have proper HTTPS certifications done by a certification authority. This process is included in the provided reference [1].
Methodology

Solutions devised from our working Methodology document are as follows. First is the section which breaks down our users of the site, their actions/tasks they perform, and what this correlates to on WordPress systems. Next would be the section on tasks. These detail the actions that can be performed by creating a workflow. The workflow being a set of subtasks or actions done in order to achieve the task. Each of these tasks have an accompanying text detailing the action and purpose.

Users:

- Theses Site Administrators:
  - Create events
    - Utilizing WordPress creation of blog posts
  - Update Site
    - Utilizing WordPress to change or alter pages and posts.
  - Moderate Content
    - Utilizing WordPress to survey and alter content.

- Theses Site Content Addition (Theses Creators):
  - Create and add Theses to website
    - Utilizing a submission process.

- Theses Site Visitors (Unique nonparticipants visiting the site):
  - Can access and navigate to see pages
    - By utilizing the navigation bar provided in the WordPress site
  - Can access and navigate to see theses
    - By utilizing the navigation bar provided in the WordPress site
    - By utilizing the search elements created.
  - Can comment on pages and elements
    - By utilizing the framework WordPress provides for creating comments.

Tasks:

**Create Events**: Workflow 1 = draft design of page for adding an event + change page to add event + review newly changed page
- This would be done by Theses site creators those that upload content. This is visible globally on the site and is mostly accessible on the news and events slides and widgets of the website.

**Update Site:** Workflow 2 = create list of elements to update + sketch draft of updated site design + update site

- This would be done by Theses site administrators. Updating site features would involve going to the WordPress update location on the admin page and allowing the update to process.

**Moderate Content:** Workflow 1 = identify content to be moderated + propose plan to effectively moderate the targeted content + carry out moderation plan

- This would be done by going through a page on the editor panel as a Theses site admin and altering the content to moderate its quality or elements.

**Create and add Theses to Website:** Workflow 4 = propose thesis + format thesis + submit to website

- This would be done by Theses site creators and be done either by adding a page or adding a post. Pages would be website elements a user navigates to and hosts content. While a post would be news or event information that would be displayed to a user.

**Can access and navigate to see pages:** Workflow 5 = navigate to specific pages + access information on such pages

- This is managed by the Theses site administrators who decide on the navigation menu. Users will select elements from the menu which is at the top and bottom of every page to navigate as well as hyperlinks presented on the current page.

**Can comment on pages and elements:** Workflow 7 = navigate to comment page + create comment + submit comment

- Users have access to comments on news and posts that are created by Theses creators and admins using WordPress’ current systems. This comment can be posted using the UI provided by Wordpress at the bottom of these news and event posts.
Lessons Learned

This section contains the following subsections of Timeline/Schedule, Problems and Solutions, and Future Work. The Timeline/Schedule subsection ultimately shows our plan of action to complete this project in a chronological fashion and exactly what work had to be completed for each day shown in the schedule. The Problems and Solutions subsection describes the problems that our group encountered throughout the completion of our project and also explains how we were able to overcome such obstacles with a description of each of our respective solutions. Lastly, the Future Work subsection explains the possible extensions that can be added to our project from a number of different perspectives for the future.

Timeline/Schedule:

- January 29th
  - Meet with Client
  - Finalize Team Roles
  - Research Hosting Platforms:
    - WordPress
    - Weebly
    - Wix
    - SquareSpace

- February 12th
  - Meet with Client
  - Present findings from Platform research to Client
  - Begin working on chosen Platform (WordPress)
  - Begin process of content migration

- February 14th
  - Create/sketch potential Future Designs
  - Prepare Presentation for NDLTD Board Meeting

- February 26th
  - Meet with Client
○ Continue process of content migration
○ Include error checking for previous migrated content
○ Begin process to recreate important News and Events sections
○ Begin creation of formal documentation of development

● March 1st
  ○ Present potential designs and decisions to NDLTD Board of Directors
  ○ Note feedback given from presentation
  ○ Adjust designs and content migration to meet client needs/wants
  ○ Recreate features of old Website with widgets/plugins

● March 12th
  ○ Meet with Client
  ○ Show updated Website based on given feedback
  ○ Finalize News and Events Sections
  ○ Draft possible widget for Administrators to add content
  ○ Update Development Document

● March 26th
  ○ Meet with Client
  ○ Finalize content migration
  ○ Begin quality check on content migration

● March 28th
  ○ Implementing approved designs and structure
    ■ Ensuring content quality stays stable
  ○ Begin creation of widget for Administrators to add content
  ○ Update Development Document

● April 9th
  ○ Meet with Client
  ○ Provide extra website testing and edge testing
  ○ Finalize widget for Administrator content addition
  ○ Ensure formatting is consistent
- Open up Website content
- Update Development Document

- April 23rd
  - Meet with Client
  - Provide the Website is functional and is operating to expectations
  - Provide assistance to support future features and additions
  - Assess all aspects of the Website
  - Update Development Document

- May 3rd
  - Transfer control of new Website to Client
  - Provide Development Document in full

Problems and Solutions:

**Problem A: Choosing Hosting Platform**

When we first began the project, the Client wanted the hosting platform for the new Website to ultimately be WordPress. However, from our research, we found that Wix was more flexible in terms of overall design and content migration and was very easy to make new edits to the website when compared to WordPress. This led to a discussion with the Client about which hosting platform to go with and at the NDLTD Board of Directors meeting it was decided that we were to use WordPress and we believed that the final product would not be as revamped as the Client wants and also thought that the content migration would be much more of a challenge.

**Solution A:**

We decided to do more research after the Client's decision to use WordPress and ultimately found that the WordPress platform we were looking at was actually the web version. Accordingly we changed our perspective on the platform. The problem subsided through the setting up of WordPress on the Ubuntu Virtual Server which allowed us access to more tools and capabilities than the web version and it turned out to be more detailed and
efficient than Wix as well, which gave us the ability to truly revamp the old website and meet the Client’s needs.

Problem B: Initial Setup of Ubuntu Virtual Server

When we began setting up the Ubuntu Virtual Server, many problems arose as we did not have access to the server and could not establish a SSH connection to it which halted our progress on the content migration and website redesign. Also, when following the guide to set up the LAMP Stack, we changed an important setting that caused the server to only allow Apache connections and again we could not connect to the server. Lastly, we were unable to access the server version of WordPress after following the guide given to us by our Client.

Solution B:

In order to combat the problem of establishing an SSH connection to the server using our public keys, we had to connect to the server through a VPN and this allowed us to be able to continue and ultimately be able to download and configure WordPress on the server. Also, to solve the problem of the server only allowing Apache connections, we had to contact our Client and reset the specific setting in order to restore the server to its previous version and allow connections other than Apache to be established. Lastly, the inability to access the server version of WordPress on the server was solved through the use of a Virtual Machine on one of our local computers, where we were able to configure and get WordPress running on the local server and used the same process to replicate the steps necessary to do the same on the Ubuntu Virtual Server which in turn allowed us to begin content migration using this more detailed and flexible version of WordPress.

Future Work:

The future work of this project and future improvements can best be described as updating the website with new content and information as well as adding new widgets and plugins to make the information more easily accessible and have a better design overall. The website that we hope to create is one that presents information in a well-formatted and modern design so that any user of the site can efficiently navigate and find what they are looking for.
This process may include adding future sections that make use of the tools that WordPress offers to present the information in a more detailed manner and also changing the design of the whole site so that it fits the audience’s wants and needs based on feedback that may be given. Also, the future of the site will be one that is easily editable so that whoever is in charge of the site in the future can add and change content seamlessly and without any obstacles to overcome which is why we have been recording our development process and resources within our Development Documentation in hopes to hand this document off to the future webmaster so that they are informed about the current state of the site when they take over control of it.

There are a few different areas of work that Developers can undertake to further the website. First, they can develop and continue breadcrumb support for the NDLTD, which can be pursued by following further tutorial information [5]. They can also work to implement proper DNSSEC information for the website to further security on the site. Additionally, they can further functionality for users like adding the ability to comment, creating surveys, or developing ways to drive interaction on the site. Further projects that could be developed would include helping with any of the previously mentioned supporting features that could be implemented, as well as developing custom widgets for specific functionality.

In terms of NDLTD-connected users of the site, they can add to the site by making small additions to different sections. Specifically, with administrator access to the site, they can add any relevant news articles to the news widget or events to the calendar on the homepage. They will also be able to make any minor fixes to the site, as needed.

For non-NDLTD users of the site, they can give feedback on the usability of the website to help the site developers make any appropriate and helpful changes. They also have the ability to leave comments on news posts.
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References


