



Autism Support Portal

Final Report

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May 8, 2018

Course: Multimedia, Hypertext and Information Access
(CS 4624)

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1. Executive Summary

The Autism Support Portal project involves the creation of a portal site that helps users find information they need about autism. The primary goal of the project is to help users quickly find credible information for their specific need. With the amount of information available online, it can be hard for those interested in autism to find information that is not only credible but useful and updated to reflect current research. The site needs to be easy to use both for the users and for the future administrators of the site. The site also needs to help guide people towards reliable resources while potentially exposing users to new resources. To ensure that our project meets the needs of our potential users, the project was divided into different phases involving data collection, research, design, and implementation.

To gather data for our project, we used resources such as the Virginia Tech Center for Autism Research and their connections, to send out anonymous surveys to some of our potential users. We asked several questions pertaining to their interests in the site, what they needed from the site, and what resources were useful to them. This data allowed us to implement a site as specific to the user needs as possible while also giving us other resources to collect credible information from. In addition, Dr. Scarpa provided a lot of other resources that allowed us to solve some of the needs of users, with other resources allowing this project to focus entirely on the implementation of our search engine and the guiding of our users towards effective answers, solutions, and resources. Upon entering the site, users have direct access to the search and are provided with search tips and external resources to help them.

The site is set up entirely using WordPress.org. WordPress was chosen to be the CMS or content management system for the site because it is very easy to use and allows administrators to do a lot for the site without the need for extensive technical knowledge. The site needs to be very easy to modify and change after its initial set up so that those who work on it at the Virginia Tech Center for Autism Research can do so quickly. However, using solely WordPress and its plugins created a variety of new obstacles stemming from the different uses of different plugins. To save time and money, research needed to be done on several different plugins to find the ones that not only met the needs of the site but that were also affordable. Even with these obstacles, using WordPress not only allows for easier creation and maintenance, but also easy modification of the site if additional features are wanted or needed.

The design of the site allows users to find necessary information very quickly through alphabetically sorted lists that will expose the user to terms that may have been unknown previously. One of the problems with researching autism is asking the right questions. For example, a child with a special need such as autism needs an IEP or individualized education

program, which requires a specific search for an IEP. When a user explores education information, the user also needs to be shown some specifics such as IEPs. This example also serves as an example of the need to have our site easily modifiable, as a change in law or name would require someone to change the resource in the site.

Using the data and implementation techniques discussed, the end result portal is composed of help and resource pages as well as a refined search that links questions to reliable answers. In addition, the site is designed such that any user without prior technical experience can use the site and adjust the sites that are searched and any other information within the site that is changed.

2. Introduction

The purpose of this project is to create a website (<http://www.autismportal.psyc.vt.edu/>) that acts as a portal to well researched and scientifically accurate information related to Autism. We, a group of students in CS 4624 Multimedia, Hypertext and Information Access, in this document detail our efforts to complete this project, including the problems we faced and how we came to solve them. Furthermore, we list the functional and technical requirements given to us by our client, Dr. Angela Scarpa, director of the Virginia Tech Center for Autism Research (VTCAR), and how we came to design and implement our solutions into the website. In addition, this report will contain a user's manual, which will contain a detailed tutorial on how to use the web portal. Lastly, this report will contain a developer's manual which will detail how to maintain the portal.

2.1 - Objective

There are thousands of resources available online if one searches for Autism on a search engine. However, for a parent whose child was just recently diagnosed with the disorder, it would be hard to decipher what resource is accurate, or even to understand what to search for in the first place. The ultimate goal for this portal is to help alleviate this problem. For a user on the portal, it will list pre-approved resources that contain information on what the user is looking for. From this, the user will be able to search through the resources using a custom search engine.

2.2 - Project Scope

This is a semester long project for the capstone class CS 4624 Multimedia, Hypertext and Information Access taught by Dr. Edward Fox. In order to ensure that we have a finished product

by the end of the semester, we broke down the requirements of the portal into milestones, detailed in section 3 of this report, Requirements. These milestones are placed several weeks apart, giving us adequate time to complete, and to revise them should the need arise.

2.3 - Client

Dr. Angela Scarpa is an Associate Professor of Psychology at Virginia Tech. She is the founder and director of the Virginia Tech Autism Clinic and the director of the Virginia Tech Center for Autism Research (VTCAR). VTCAR “ builds upon basic research and clinical resources already available at Virginia Tech and works closely with the Virginia Tech Autism Clinic and other autism service providers to provide outreach on research findings, conduct research, and recruit participants.”

2.4 - Report Outline

This report describes how we completed this project. Following this introductory section, in section 3, we list the functional and technical requirements for the portal. This includes a list of milestones we have given to ourselves to ensure we have a deliverable by the end of the semester, the software we used to accomplish our goals, and a listing of the major constraints we have to abide by for this project.

In section 4, we go over the design of the portal including details on how we made sure to implement the functional requirements given to us by our client. In sections 5 and 6, we detail how we implemented technical requirements and go through our procedure to ensure the portal is properly evaluated and tested.

Section 7 contains a manual for the users who will use the portal. This manual will give a detailed tutorial on how to set up as a user and use the search functionality. It will also contain information on how to get a new resource added to the list of pre-approved resources. Section 8 is the developer’s manual. It will detail how to add pages and resources to the search function, and how to maintain the WordPress website.

Lastly, we end the report with a list of acknowledgements, references, and appendices.

3. Requirements

In this section, we outline the functional and technical requirements for this project. We start with our statement of scope which details the milestones and when we will have completed certain parts of the project. Next we talk about the software we used to implement the requirements and finally we give a listing of the major constraints given to us by our client.

3.1 - Statement of Scope

The Autism Support Portal is a semester long project. In order to make sure we deliver the portal on time, we broke down the requirements into milestones. We gave ample time within each milestone to make sure we can complete it. The milestones are listed in Table 1.

Date To Be Completed	Milestone Description
Feb 16th	Pick user interface, decide on search engine approach.
March 2nd	Collect data to start backend and begin site survey.
March 16th	Finish web scraper and some UI features.
March 23rd	Have some prototype ready for testing at Autism Conference.
March 30th	Tag articles and make progress on question parser for users.
April 13th	Finish question parser; search element is complete and UI is completed.
April 27th	Tie all pieces together.

Table 1 - Project Milestones

3.2 - Software Used

To complete the project, we had to use VT Hosting as our hosting and database service. Our content management system was WordPress to allow for easy modification of the site. Instead of building our own web scraper, we decided to use Google Custom Search for ease of use, modification, and data collection. A much more detailed explanation of the software we used and

reasoning behind their usage can be found in the implementation section of this report (section 5). Full tutorials on how to use the software can be found in the developer's manual in section 8 of this document.

3.3 - Major Constraints

In this section, we list the major constraints given to us for this project by our client, Dr. Scarpa.

1. Hosted by Virginia Tech
 - a. The site needs to be hosted through Virginia Tech, specifically the psychology department.
2. Help Each Individual User Find Reliable Information
 - a. The site needs to help each stakeholder community such as parents and teachers find information specific to them.
 - b. In addition to recommending by stakeholder, the site should also help users find related information by category, and help users who don't know where to start.
 - c. In addition to the search, the site should connect users with potential resources such as the Virginia Tech Autism Clinic.
3. Recommendation System
 - a. Site collects data so that the search can be modified in order to recommend information to the users.
4. Easily Modifiable
 - a. The site needs to be as easy to modify as possible, even at the cost of effectiveness. Previously created sites designed to meet the same purpose have been discarded in the past due to their difficulty of use.
5. Social Network for Users
 - a. Users of the site need some way to interact with each other to discuss concerns, get advice and share the most helpful content.

4. Design

For our project, we decided that a simple website using WordPress would be our best option. Our client prioritized being able to easily edit and update the website. Our client has had previous experience with WordPress and expressed interest in using it again. Based on our research we found it is very user friendly and allows users to update the site with little to no coding.

WordPress has a lot of free plugins that provided the functionality we wanted, and we found we could set it up through CMS and Virginia Tech's servers, so it was our optimal choice. We decided that using a Google Custom Search was the best decision. It allowed our client to easily update the resources that the search would pull from. It also let our client have full control over what resources the search uses to output to the user. The Google Custom Search has a plugin with WordPress that allows us to easily implement it into our website, making it the best option.

Next we had to design the functionality of the webpage. We decided a simple design with minimal pages would be the best, since most users would come to our site with a specific purpose, to find information. We decided to have four main pages. We have a home page, about us page, contact page, search help page, and resources page. The home page contains a brief description of the site. The about us page contains information about the Virginia Tech Center for Autism Research. The contact page lists information about our client, Dr. Angela Scarpa, so users can contact her to request resources to add to the site. The search help acts as a beginner's guide on autism, and helps people figure out where to begin to search. The search page contains a search bar for the user to search through the pre-approved resources. The last page, the resources pages, lists National and local autism resources for the user to start to reach out to professionals for further aid.

5. Implementation

In this section we describe the implementation of the website and why certain choices were made over others.

5.1 - Hosting

The website is being hosted through VT Hosting. VT Hosting provides the database that WordPress uses for the data management of the website, and VT Hosting allows for manipulation of that database through PHPMyAdmin. The database is a standard MySQL database, and we are intending to build the site in such a way that the clients never have to bother with it.

5.2 - Backend

The backend of the website is WordPress. This is a website development platform that the clients are familiar with and therefore will allow them as smooth as possible an experience in the

day-to-day management of the website. It also allows for the use of WordPress plugins to quickly add and change website features as will be elaborated on next.

5.3 - Features

At the start of the project the decision was made to opt for a recommendation system that scraped reputable sites for articles and then recommended them to users over the much easier to implement Google Custom Search that just searched the sites given to it by the website developers. Later on in the development we switched back to the Google Custom Search idea. Although the functionality is slightly reduced, this is far easier for the clients to update with new websites as they see fit. We implemented the Google Custom Search functionality by using a Google Custom Search WordPress plugin so that the clients can modify it using the standard WordPress administrative system that they know how to use.

We opted towards building our entire website based on WordPress plugins for the same reason that we chose to use the Google Custom Search rather than building our own tools. To that end we planned to use plugins to manage a discussion board and user access to the website. This did not end up happening, but the results of the research to this end is in the developer manual.

5.4 - Current Plugins:

Plugin Name	Description of Plugin
WP Google Search	Allows for easy custom Google search integration.

Table 2 - Current Plugins

6. Testing, Evaluation and Assessments

In this section of the report, we outline the evaluation and assessments that we have done.

6.1 - Preliminary Assessment

When we first started this project we didn't really have any idea as to what kind of information people wanted in the portal. To find out this information, we sent out a survey to our client's extensive email listserv. From this survey, we were able to collect this information:



Figure 1 - Top Site Needs

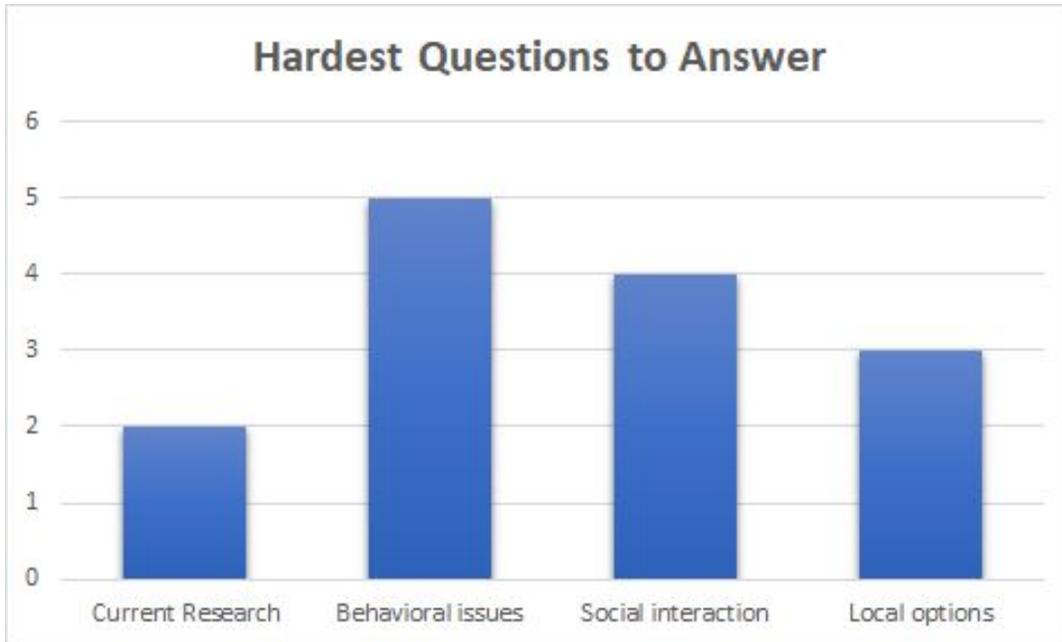


Figure 2 - Hardest Questions to Answer

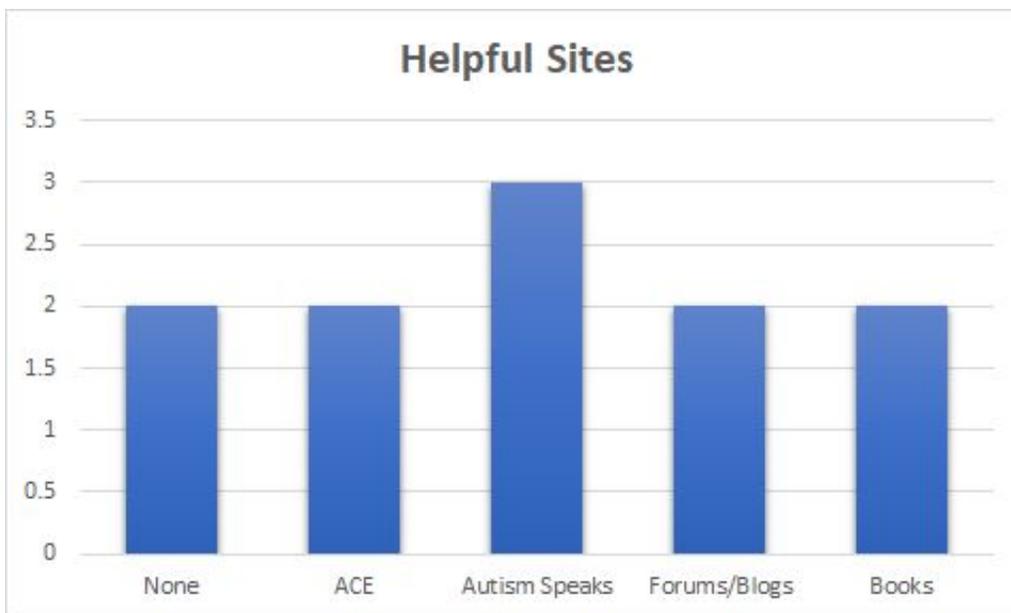


Figure 3 - Helpful Sites

If there is one feature you want to see in the portal, what would it be?

14 responses

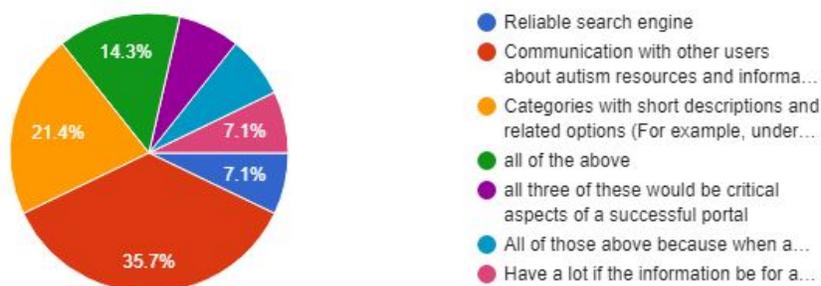


Figure 4 - Best Features

Based on these results from the survey (Figures 1, 2, 3, and 4), we were able to determine some of the functional requirements that were mentioned in the requirements section of this report. First and most importantly, the site needs to display reputable information. This means that the resources should be backed by scientifically proven data. One of the websites that the respondents to the survey singled out for reputable information was Autism Speaks, which was the first website we put into our search engine. Finally, we asked what information was the hardest to find information on, which was behavioral issues. To this end, we will be sure to make this information the most visible on the portal.

6.2 - Evaluation of Search Function

On Friday 23 March 2018, VTCAR hosted its annual Virginia Tech Autism Conference, where they share their research with the community. We took this opportunity to do preliminary testing on the search functionality of the portal. We asked conference attendants to search for something related to autism on the portal and then had them respond to a survey asking about their thoughts on the results of the search. Figure 5 shows the search bar that was implemented, while Figure 6 shows the survey that we asked the attendants to fill out. Figures 7, 8, 9 and 10 show their response.

Search



Figure 5 - Current Search Bar

QUESTIONS RESPONSES 11

How would you rate the quality of the resources you found

Good

Mediocre

Poor

What did you search?

Short answer text

Any suggestions for site features?

Short answer text

Please list any resources you find helpful that we could add to our website to help others

Short answer text

Figure 6 - Search Function Evaluation Survey

These were the responses we received:

How would you rate the quality of the resources you found

10 responses

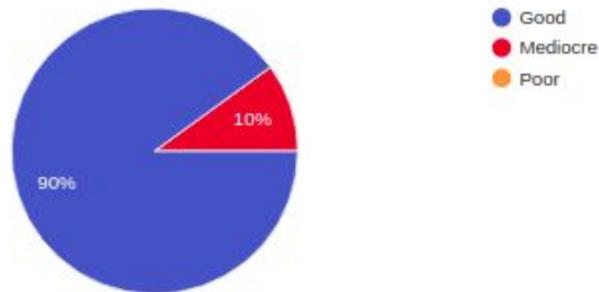


Figure 7 - Quality of Resources Found During Search

What did you search?

9 responses

Sensitivity
autism behaviors
newest autism research
language learning
Gene Therapy for Autism
Autism and Handwriting Skills
autism siblings
Adult autism siblings
educational advocacy

Figure 8 - Searches Performed

Any suggestions for site features?

6 responses

Ryan is testing this

quick links to the most updated research or mos ground breaking thus far

Wonderful that journal articles came up! Keep that going

I can't think of any right now

Would definitely use and recommend this. One thing to think about, how to get people to initially come to the website.

colorful icons

Figure 9 - Suggestions for Site

Please list any resources you find helpful that we could add to our website to help others

4 responses

anything!

n/a

facebook support groups for advocacy, therapies, community supports, events for ASD children, popups for events,

mount rogers community service boards, service boards

Figure 10 - Other Helpful Resources

We were able to gain valuable information on the usability of our search functionality. From the eleven responses, we received a 90% approval rating on the quality of the resources found. Although eleven is too small for a sound evaluation, we had a good understanding that we were on the right track for the search function.

6.3 - User Testing

After the portal was finished, we opened asked Dr. Scarpa to share the portal with her contacts so that we could get final remarks on anything that needs to be changed. One of the most important responses we received was from a graduate student, who wanted to remain anonymous. His input was very valuable and gave us ideas on how to improve the search functionality in the future. This will be discussed more in detail in the Future Work section.

The other responses were positive but unhelpful. To protect the anonymity of our testers, the emails themselves are not listed. Two of the responses requested for the search bar to be anchored to the top of the page. The most valuable response indicated that the search was very good for producing reliable answers to general questions but could be more localized to the area of the searcher and that clinic's in Miami are not helpful for someone in Roanoke. Although all the responses were positive, we only managed to get about four actual users to respond.

7. User's Manual

The user's manual for the operation of our site is fairly simple. The Autism Support Portal was built to be simple to use by anyone. Furthermore, we have listed several tips within the website itself that help direct the user. Because of this, we felt the only thing that the user manual should contain is how to use the search functionality.

7.1 - How To Use The Search Function

1. Go to www.autismportal.psyc.vt.edu/search
2. Search something in the search bar (Figure 11 shows the search bar)

Autism Support Portal

[Home](#) [Search](#) [Discu](#)

Search

sensitivity training



Figure 11- Search Bar

3. Look through the list of results (Figure 12 shows an example result page)

About 192 results (0.36 seconds) Sort by: **Relevance** ▾

powered by  Custom Search

autism sensitivity training for bus drivers | Autism Speaks
<https://www.autismspeaks.org/.../autism-sensitivity-training-bus-drivers>

 prompting of parents, the staff of this Autism Treatment Network center created a model autism-sensitivity and skills-building program for school bus drivers. More... ATN, ATN@Work, Autism Research Centre, autism **sensitivity training** for bus drivers, Autism Speaks, Autism Treatment Network, Holland Bloorview ...

Autism Speaks School Community Tool Kit.
https://www.autismspeaks.org/sites/.../school_community_tool_kit.pdf

File Format: PDF/Adobe Acrobat

Training with this tool kit should be as hands-on as possible: role-play, create examples, apply a technique to a current student's needs, discuss and compare! Autism education or **sensitivity training** can occur in a generalized manner, in which students learn about acceptance and sensitivity not related to a particular ...

Your ATN@Work: Autism training for school bus drivers | Blog ...
<https://www.autismspeaks.org/.../your-atnwork-autism-training-school-bus-drivers>

 ... And how well a child with autism is primed for success – or failure – often depends on the **training** these professionals receive. But **sensitivity** is a part of many special education courses for teachers and school counselors, what about the other central figures in our children's schools?

Figure 12 - List of Resources After Search

8. Developer's Manual

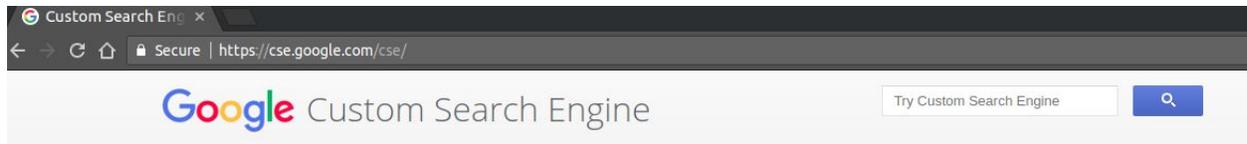
This manual is meant to serve as a reference for developers working on the site in the future. When making changes you should keep in mind that the site is intended to be as easy to maintain as possible, so any new features added should be intuitive to maintain.

8.1 - An explanation of the Google Custom Search

We decided to use Google Custom Search (<https://googles.com/cse>) in order to make adding and removing resources as simple as possible. Google Custom Search works as a regular Google search but only indexes a specified list of websites. The only maintenance needed on the part of the administrators of the Autism Support Portal is to make sure the list of sites that the custom search engine indexes is up to date. Adding and removing these resources is shown below in sections 8.1 and 8.2.

8.2 - Adding and Removing Resources to the Search

1. Log onto Google Custom Search <https://cse.google.com/cse/all> as shown in Figure 13



Make searching your site easy

With Google Custom Search, add a search box to your homepage to help people find what they need on your website.



Sign up for the basics - it's free

- Get fast and relevant search results
- Customize the look of the search results to match your site's design
- Make money off the ads we show using

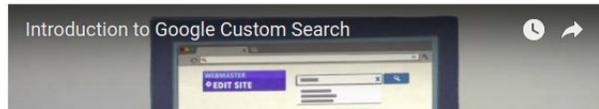


Figure 13 - Sign into Google Custom Search

2. Click on Autism Support Portal Link (as shown in Figure 14)

Custom Search

New search engine

▼ **Edit search engine**

All

► Help

Send Feedback

Edit search engines

Add Delete

<input type="checkbox"/> Search engines	Edition	Is owner?	Public URL
<input type="checkbox"/> Autism Support Portal	Free	Yes	🔗

Figure 14 - Autism Portal Link

3. From this screen you can edit the name and description of the search (as shown in Figure 15)

Custom Search

New search engine

▼ Edit search engine

Autism Support Po ⇅

Setup

- Look and feel
- Search features
- Statistics and Logs

► Help

Send Feedback

Basics Make money Admin Advanced

Provide basic details and preferences for your search engine. [Learn more](#)

Search engine name

Search engine description

Search engine keywords ?

Edition

Free, with ads.

Details

Search engine ID Public URL Get code

Image search ?

OFF

Language

English ⇅

[Advanced](#)

Sites to search

Search only included sites ⇅

Figure 15 - Edit name/description

Scrolling down, you can add and remove to the list sites to search (as shown in figure 16). This is where you will add or remove pre-approved resources.

Sites to search Search only included sites 


1- 5 of 5  

<input type="checkbox"/> Site	Label
<input type="checkbox"/> http://www.autism-society.org/	
<input type="checkbox"/> https://www.nimh.nih.gov/health/topic...	
<input type="checkbox"/> http://www.researchautism.net/	
<input type="checkbox"/> https://www.cdc.gov/ncbddd/autism/i...	
<input type="checkbox"/> autismspeaks.org	

[Advanced](#)

Submit indexing and removal requests via [Google Search Console](#). [Learn more](#)

Figure 16 - Add/Remove Resources

8.3 - Search Page

Making modifications to the search page is fairly simple, However there are several things about it that are not necessarily intuitive, so in this section we will explain how to modify and link to the search page.

8.3.1-Modifying The Search Page

The search page can be modified just like every other page except that there are two features that must always be included on the page for it to function properly. The search page must always contain `[wp_google_searchbox]` and `[wp_google_search]`.

The `[wp_google_searchbox]` element determines where the search box will appear on the page, and the `[wp_google_search]` determines where the search results will appear on the page. For ease of use by the user, we recommend always making the search box appear above the search so that the user doesn't have to scroll past the results in order to search again.

8.3.2-Linking To The Search Page

The WP Google Search Plugin requires that the search page have a very specific name and be located at a very specific address. The name must be “Search” and the address must be “{WEBSITE_URL}/search_gcse/” (where {WEBSITE_URL} is replaced with the base URL of the website). In order to link to the page, you must simply link to the address above.

8.4 - Adding Plugins

Adding plugins to this site is the same process as adding plugins to any other WordPress site, so if you have experience with this, you do not need to bother with the section. If you have no experience with WordPress, the following paragraph will describe the basic process as of the current build of WordPress in April of 2018. If you are trying to add plugins sometime significantly past that date, you should probably check WordPress’s official documentation as the process may have changed.

To add plugins to the current version of WordPress, simply log in as an administrator, click on plugins on the left bar, and then click on add plugin at the top left of the page. It will open a window in which you can search for the plugin you want. I recommend that you do research beforehand in order to make sure you completely understand the plugin you are going to install before you do so.

8.5 - Discussion Board

The discussion board was a feature that was talked about quite a bit in the creation of this site, but never was implemented due to issues with how it would be moderated and kept accurate. Since it was such a talked about feature, we thought it might be smart to write this section explaining a few of the conclusions we came to about the discussion board and a plugin that we determined was probably the best bet for this feature. Hopefully this section will give whoever actually implements it a leg up and save them some frustration.

8.5.1 - Things To Consider

The whole point of this website is to allow people who are trying to get accurate information about autism to have a resource of accurate data. With that in mind the main issues with a discussion board become apparent. We want users to be able to connect and talk to people in their same situation, but we also want to make sure that incorrect information is not making its way onto the site. This means that the discussion board would have to be heavily moderated or allow only a few trusted users to contribute information.

The moderation option incurs a maintenance cost (most likely measured in time donated by volunteer moderators). Should the site eventually gain a rather large and constant following, it may be possible to recruit users to be moderators and thus make this version possible.

The option that allows only trusted users to contribute information is very easy to implement, but it defeats the whole point of having a discussion board in the first place.

8.5.2 - Potential Plugin

After a decent amount of research, we determined that the plugin that would most likely allow for the easiest implementation of the discussion board is [Asgaros Forum](#)[4]. This plugin integrates user accounts and a fairly well designed and respected forum. It seems to also include all the features you would need to assign moderators to police the forum and create specific admin only forums for posting information for users to read that can only be modified by admins.

8.6 - VT Hosting and WebDrive

The portal is hosted by [Virginia Tech Hosting](#). Using VT Hosting allows the site to be included in the vt.edu domain and the cost of the site to be paid for by Virginia Tech. In order to access the site, the user must be made an admin by VT Hosting. In order to get a domain and a site linked to the Psychology department as requested by the client, we had to have our client email Ben Pfountz of the Psychology Department, who opened a ticket with Joy Huntley who oversaw the rest of the process. Once the site was set up and the content management system was chosen, Joy was given the names of the admins of the site, Ryan Galliher and the client Dr. Scarpa. Note that the admins for VT Hosting are entirely separate from the admins in WordPress, and are the only ones who have access to the files through WebDrive and the VT Hosting website.

In order to upload large files such as WordPress to the website, the team used a service called WebDrive. WebDrive allows large files to be uploaded to the site very quickly. VT Hosting has very detailed directions on [downloading](#) and [using WebDrive](#) (VT Web Hosting). We ran into several issues using WebDrive, and kept a steady correspondence with [VT 4Help](#). Note that the ticket page linked to is NOT a normal 4Help ticket and is accessed through the VT Hosting site as shown Figure 17. Note that the screenshot is the homepage for VT Hosting, and that the directions provided by VT Hosting for downloading and using WebDrive are included in the VTechWorks submission.

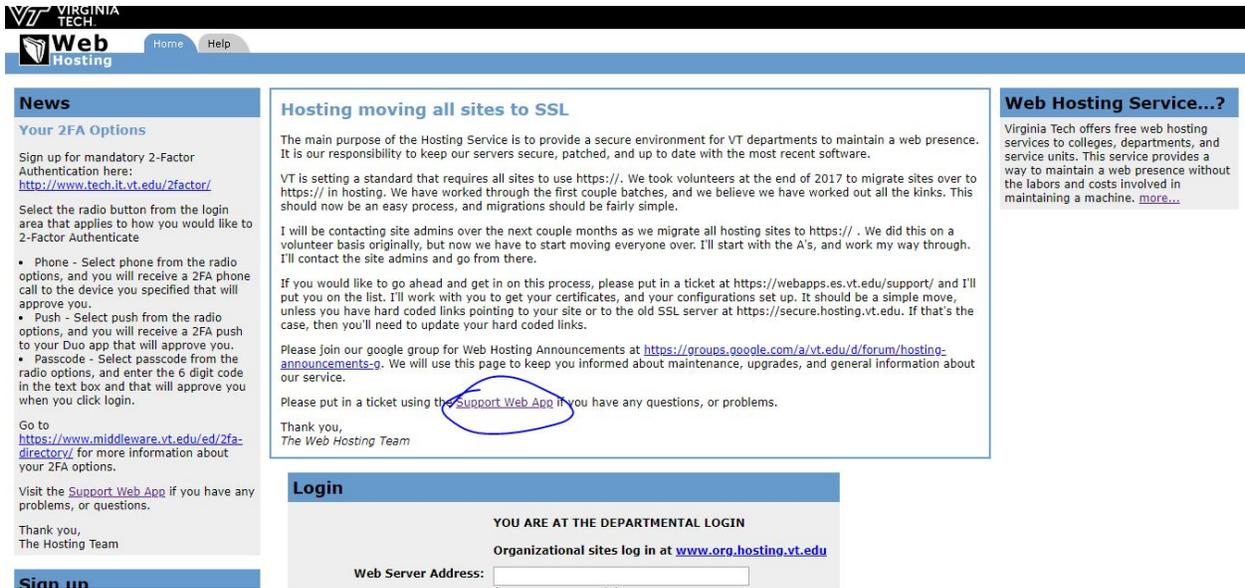


Figure 17 - VT Hosting Site

Once we uploaded the WordPress.org files to the site using WebDrive, all site creation was done through WordPress.

8.7 - Google Analytics

Google Custom Search gives the administrators of this site extensive data collection tools through Google Analytics. In this section, we show how to see use some of these tools.

1. First log onto the Google Custom Search at <https://google.com/cse>
2. On the home screen for the Autism Support Portal custom search, click on Statistics and Logs as shown in Figure 18.

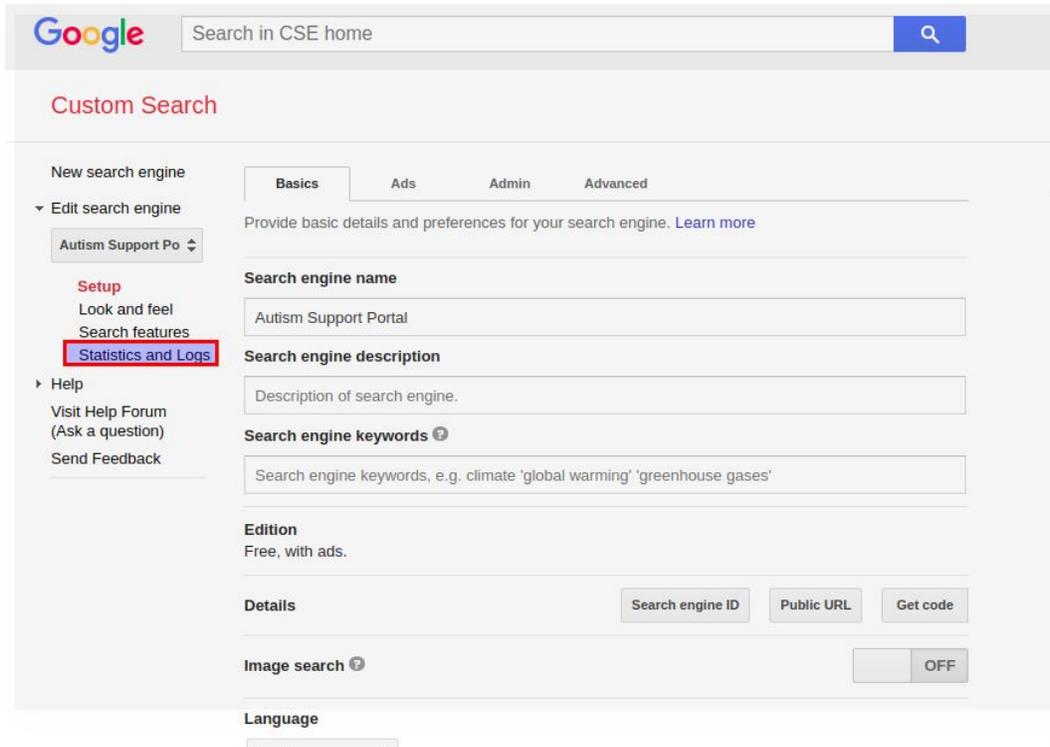


Figure 18 - Location of Statistics and Logs page

On the Statistics and Logs page (image shown below), we can see a clear graph of the number of queries per day. Furthermore there is a section “Popular web queries for all time”. This section will show the most popular search terms done on the Google Custom Search in the portal site. As of writing this report (May 2, 2018), there has not been a sufficient number of searches done on the portal for Google Analytics to report back on the most popular search terms.

9. Lessons Learned

9.1 - Completed Milestones

For our project, we had a detailed timeline with milestones that we followed very closely. Our first milestone, which we set to complete by February 16th, was to decide on basic UI functionality and decide how we were going to approach our search engine. The UI elements we decided to implement was the questionnaire that helped users narrow down their search. We also decided we wanted four main pages, which are the home page, search page, about us, and a

discussion board. For our search engine, we decided to do a simple UI connected to a backend that contained data from a web scraper. Our second milestone, which was March 2nd, was to send out a survey to the Autism Clinic listserv to help gather information on what people would find useful to the site, start the backend and web scraper, and have some basic UI elements designed. The results from the survey were extremely helpful in shaping the rest of the project. We received a lot of information on resources that different users found helpful that we could incorporate into our site. We chose to use Scrapy[5] as our web crawler and set that up. Our third milestone was for March 16th, was to have the web scraper completed and to have a portion of the UI completed. We were able to complete basic functionality for our home page and search page, and we set up our website with the Virginia Tech CMS through 4Help. At this stage, we moved away from the web scraper and decided to use a Google Custom Search[6] instead. The next milestone was March 30th. We worked on compiling a list of articles and resources that our Google Custom Search will pull data from. Our client gave us a list of resources to start from, and then we worked diligently to find new resources to have our client approve any additional resources that we found. We also went to the VTCAR Autism Conference to ask attendees for suggestions for our website. After that milestone, the next milestone was April 13th. For this milestone, we finished compiling most of our resources for the custom search engine and completed most of our of our UI completed. Then for our final milestone, which was April 27th, we tied up loose ends and ensuring that we have everything up to our client's standards. This includes final touches on the UI, adding any last resources to the search engine, and teaching our client how to update and manage the website.

9.2- Complications and Solutions

We had multiple complications through our project. The first complication we encountered was through trying to set up our website through VT Hosting. We assumed this would take no longer than a few days and did not allot much more time for this process. Unfortunately, this took a few weeks to resolve and put us behind on our project. We emailed VT 4Help to help us set up the server, and they sent us in an email loop. After approximately a week of emailing around to multiple people, we finally got in touch with people that could help us out. They set up our website using the Virginia Tech CMS. Then we had to figure out how to upload the WordPress files and edit them, and this took another few days. Fortunately, we were able to figure everything. To make up for the lost time, while this processing was taking place, we created mock ups of our website and worked on collecting resources and information from VTCAR and from the survey we sent out to the VTCAR listserv. This allowed us to stay mostly on track and not lose too much time.

Another complication we faced was with trying to make our website helpful for most of our users. One of our client's main goals was to make it easy for users to find information on autism.

However, since Autism is a spectrum disorder, it is really difficult to figure out which resources will be the most helpful for our user base. To help combat this, we decided to create a questionnaire that the user will fill out that helps narrow down the scope of things they are looking for.

We also had complications in choosing our backend. Initially we went with a webscraper connected to a database. We quickly realized how difficult this would be for a person with no coding background to manage, and had to make a change. Fortunately we found out about Google Custom Search which allowed our client to easily have full control over what resources the search pulls from. This was our best solution and we quickly moved over to the Google Custom Search.

The last major complication we have run into was a discrepancy in what our client wanted and what the user base for our website wanted. We sent out a survey to the VTCAR listserv asking what users would like to see in a website. Much to our and our client's surprise, most people wanted some sort of discussion board to connect with other servers. This conflicted with what our client wanted, which was a website that contained a lot of reliable resources for the user. We solved this issue by proposing new ideas to our client that incorporated both concepts. Then, we started work on these ideas so we would be ready to work on whatever our client decided. In the end, our client decided that she did not want to manage and moderate a forum. The overall goal of the portal is to ensure users get reliable information, and users on a portal could provide false information. As an alternative, on our portal we list resources from different organizations that provide ways for users to connect and support each other.

9.3 - Future Work

If the client changes their mind and decides they wish to host their own forum, this will need to be implemented. In order for the forum to work, we must also create a login system for the site. All of this will require the design and creation of various UI elements through WordPress, which also need to be done. Most of this work can be completed by adding plugins to the portal. The client can also choose to include more information on the webpage. This could include resources for the home page that our client would like to showcase. For the duration of the life of the website, it will be important to continually add and update the resources that the Google Custom Search is pulling from. This shouldn't be too complex, however, it will require that it is regularly updated.

From the feedback we received from our user testing, there are several useful features that can be added onto the Google Custom Search, but due to time constraints, we were not able to get to. In the future, it would be good to add a "local search" that would only search resources in the New

River Valley. Furthermore, if the user does not have an ad blocking extension in their web browser, then the custom search will display advertisements. This can be solved by purchasing a more robust version of the Google Custom Search. However, due to the exploratory nature of this project, being its first iteration, we did not purchase this feature.

10. Acknowledgements

This project would not have been possible without the incredible support from the following:

Angela Scarpa, Ph.D.

Director, VT Center for Autism Research (VTCAR)
Founder and Co-Director, VT Autism Clinic (VTAC)
Associate Professor, Virginia Tech
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Dr. Scarpa, as the director of VTCAR, is our main client. We would like to thank her for her prompt and detailed guidance on any issues we faced during this project.

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Dr. Fox, as the professor of CS 4624, is our supervisor for this project. We would like to thank him and his teaching assistants for their very generous assistance with deadlines, reports, and overall guidance during this project.

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We would like to thank Dr. Gracanin for his ongoing help on the technical aspects of the portal.

Last but not least, we would like to acknowledge Dr. Erica Whiting, Anna Caldwell, Ben Pfountz, and Colleen Webb in helping us getting started, and their continued assistance with both functional and technical requirements.

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12. Appendices

12.1 - Table of Team Member Roles and Responsibilities

Team Member	Role	Responsibilities
Ryan Galliher	Team Lead	<ul style="list-style-type: none"> ● Client Contact ● Requirements ● Documentation ● Record Keeping
Kenneth Nagies	Implementation Lead	<ul style="list-style-type: none"> ● Backend ● Plugin Research
Sib Quayum	Testing Lead	<ul style="list-style-type: none"> ● Reports ● VTechWorks ● Assist with backend
Ayumi Ritchie	Design Lead	<ul style="list-style-type: none"> ● Front End Research ● Presentations

Table 3 - Team Member Roles and Responsibilities

12.2 - Meeting Notes

Autism Support Portal Meeting One Notes

Date: 1/22/2018

Meeting Attendees

- Angela Scarpa
- Denis Gracanin
- Erica Whiting
- Ryan Galliher
- Ayumi Ritchie
- Sib Quayum
- Kenneth Nagies

Search/Design Goals Discussed

- Provide *reliable* resources for those searching for information related to autism
 - Focus on his or her question by using an adaptive recommendation system
 - Should help everyone, from parents to siblings to teenagers and young adults
 - Provide functionality for users to rate and review resources
 - Which resources were helpful?
 - “Amazon for Autism” in terms of user accounts, reviews, and ratings of resources
- Frequently Asked Questions section/resource

Other Technical Goals Discussed

- A small complete project is preferred over a large incomplete project
 - Modular design so that additions can be done or continued once the class ends
- Site should be compatible with the VT system
- Site needs to address the large variety of use cases
 - User surveys (age, issue/key word) with questions that will help the search
 - Proactive recommender
 - Provide stepping stones for the user to help refine the search process
- Site needs to be designed so that it can be easily modified in the future
 - Discussed using WordPress frontend
 - Easy to use backend
- Development of a Cortana/Siri search
 - More personable
- Inclusion of podcasts and other expert resources
- Differentiating between professional and family member accounts

Goals for Team Members

- Find an easy to modify backend system for those who are not computer scientists
- Survey potential users to collect data on some of the potential use cases
- Research effective recommenders (Amazon, Facebook, IEEE, etc.)
- Create a schedule with Milestones for the semester by the end of next week
- Solidify our goals
 - What can we *guarantee* this semester?

Autism Support Portal Meeting One Notes

Date: 1/29/2018

Meeting Attendees

- Angela Scarpa
- Ryan Galliher
- Ayumi Ritchie
- Sib Quayum

Search/Design Goals Discussed

- What resources are helpful?
 - Research Autism
 - Autism Speaks
 - NIH
 - CDC
- Survey
 - Create a survey for potential users to clarify their wants and needs this week.
- Add categories for the user (diagnosis, medical, etc.)

Milestones/Timeline

- There will be another email tomorrow (January 30th) that is our “project contract” for our class that will include the timeline and project goals.
- Feb 16th: Pick the user interface method (alternatives to WordPress will be explored), create search engine action plan.
 - Between this milestone and the next one (March 2nd) we will hopefully be able to have another team meeting. A doodle poll will be sent out this week to see if there is a time everyone is available.
- March 2nd: Have data collected to start backend/webscraper. Begin site survey in order to help users find what they need.
- March 16th: Webscraper finished, some aspects of the user interface completed.
 - March 23rd: Have some preliminary features ready for prototyping at the Autism conference.
- March 30th: Tag articles, make progress on the question parser to help users formulate the proper questions.
- April 13th: Question parser done, searching element done, finish user interface.
- April 27th: Have everything tied together.

Student Team Member Roles

- Ayumi: Design, presentations, VTechWorks (VTechWorks is the site where our project report will be stored)
- Ryan: Client contact, project requirements
- Sib: Testing, reports
- Kenneth: Implementation

Student Team Goals

- Learn about Autism using the resources given to us by Dr. Scarpa.

Autism Support Portal Meeting Notes 3/19/18

Attendees: Ayumi, Ryan, Sib, Dr. Scarpa, Dr. Gracinin

Autism Conference

- We will share a table at the autism conference March 23rd with VTCAR
- Data collection
 - Have users test search and provide feedback

Refined Goals for Site

- Focus on generating scientifically accountable answers for specific user questions
- Move forum board to stretch goal
 - Has issues including
 - Moderation of use
 - Potential spread of false information
 - Needs a disclaimer
- Would be useful for site to have a suggestions to administrators option for users to provide feedback.
- Resources such as FAVE, AMP, and ACE lend program can be linked on the site to help users find alternative resources.

ICAT DAY

- With our group potentially participating in ICAT day on April 30th, our group hopes to use this time to spread information about our site as well as general autism awareness.

