Lab II – Prototype Product Specification

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March 31, 2014

Version # 2

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1. Introduction

The Virginia Academy of Science is an organization that was founded on April 26, 1923 by 123 members (Staggers). The purpose of this organization is to maintain and promote knowledge of science for educational purposes throughout Virginia. The Virginia Academy of Science publishes biannual journals and oversees the Virginia Junior Academy of Science. The organization has a website that can be accessed at www.vacadsci.org. The website's main goal is to reach out to different groups of people and organizations interested in science and scientific research. The website additionally provides grant and scholarship opportunities for interested users.

The Virginia Academy of Science does not effectively promote its cause through the use of publicly available information via the Internet. Current weaknesses of the Virginia Academy of Science website include improperly formatted web pages, no use of templates (shown in Figure 1), inaccessible content, and an incredible amount of broken links. The current website is not being maintained and does not target a direct audience which leads to problems that need to be addressed.

The purpose of this organization shall be to establish and maintain in Virginia for scientific and educational purposes an association of persons and organizations interested in science and scientific research in all of its branches; to solicit financial and other support; to cooperate with educational institutions, industries, and state agencies in fostering an interest in scientific matters, in promoting scientific investigations and in spreading knowledge of the sciences; to provide a forum for the presentation and discussion of papers on scientific subjects and facilities for their publication; to provide opportunities for the cooperation and fellowship among its members; and generally, in doing these things, to benefit not only its own members, but to promote the civic, agricultural, academic, industrial, and commercial welfare of the people of Virginia.

Figure 1. Current Virginia Academy of Science Website

The Virginia Academy of Science Team (VAST) is composed of six members from Old Dominion University. The members are Benjamin Pochekailo, Jack Bagby, Jasmine Smallwood, Mark Vanderclay, Peter Langlands, and Raven Sims. Dr. Christopher Osgood, an associate professor in the Department of Biology at Old Dominion University, proposed this problem and serves as the mentor for VAST. The goal is to replace the current Virginia Academy of Science website with a more functional, user-friendly website that can better promote the benefits of the whole academy. VAST will be using Joomla, a content management system, to properly build this website with the most up-to-date features. The website will target users who are interested in science for educational purposes and will reach to registered, paying members.

VAST will effectively promote grants and meetings offered by the Virginia Academy of Science. The team will have an automated registration system setup, for visitors who wish to become members of the Virginia Academy of Science. Their information will be stored into a secure database. VAST will assign administration roles to groups of people, in order to manage the website. For instance, a Web Administrator will be able to approve and update content on the website; whereas, a Super Administrator will be in charge of maintaining every operation of the website. The prototype will demonstrate all major requirements and effectively promote the goals of the Virginia Academy of Science.

1.1   Purpose

The website currently does not target a clear audience. VAST is going to redesign the Virginia Academy of Science website using Joomla to make the site more informative. Joomla, a content management system, will make the website easier to maintain and update by the administrators. VAST has the appropriate knowledge to work with Joomla and make a user-friendly design.

1.2   Scope

VAST will construct a newly designed frontend and backend prototype to serve as the new Virginia Academy of Science website. The frontend will be more navigable. All information will be accessible via the home page and from the navigation bar. VAST will implement a feature that will allow registered users to login with their account id and password to access "member only" content. This feature will keep people on the website rather than having to mail in an application to become a member that is explained on the current website. Nonetheless, dues must be paid to become a registered member. Another feature VAST will include is a PayPal system, so users can pay their dues online and complete their registration. The PayPal process will be simulated because of the limitation of using real money. The process of using actual funding can be added at a later date.

Joomla, an open source content management system, will be used to customize the backend of the website. The backend is where different levels of administrators will perform their operations. This includes the Super Administrator, Web Administrator, Newsletter Administrator, and the Journal Administrator. The Super Administrator, the highest level of the administrators, will maintain and oversee all administrator operations. The Web Administrator is responsible for maintaining the website. The Web Administrator also approves submitted content. The Newsletter Administrator is responsible for maintaining the monthly newsletter about the Virginia Academy of Science and can approve submitted content for the newsletter. The Journal Administrator is responsible for keeping up with the Virginia Journal of Science and can approve submitted content for the journal.

This prototype will meet the 508 compliance standards. The 508 compliance states that all electronic and information technology developed, procured maintained, or used by the federal government is made to be accessible to everyone (Rouse). Without the 508 compliance applied, the organization might not be able to receive any government funding.

Members have the opportunity to submit content for approval. This includes journal submissions, newsletters submissions, and website content submissions. The content should be submitted in proper format. The prototype will accept PDF and DOC file submissions. These submissions along with the member's account ID will be stored in a MySQL database. The appropriate administrator must approve the content before it is uploaded to the website.

1.3 Definitions, Acronyms, and Abbreviations

508 Compliance: an amendment to the United States Workforce Rehabilitation Act of 1973, is
> federal law mandating that all electronic and information technology developed,
> procured, maintained, or used by the federal government be accessible to people with
> disabilities. (From searchcio.techtarget.com)

Administrator GUI: the web page interface for all approved administrators.

Administrator/Admin: a person who manages and supports a computer system or network, as in
> a business or other organization. (From dictionary.com)

Algorithms: a set of rules for solving a problem in a finite number of steps, as for finding the
> greatest common divisor. (From dictionary.com)

Database Server: a stand-alone computer in a local area network that holds and manages the
> database. (From dictionary.com)

Document Submission Algorithm: the algorithm is used to submit documents for grants,
> journals, and scholarships.

End User GUI: the web page interface that is available to all users.

Graphical User Interface/GUI: a software interface designed to standardize and simplify the use

of computer programs, as by using a mouse to manipulate text and images on a display

screen featuring icons, windows, and menus. (From dictionary.com)

Joomla: is a content management system (CMS), which enables people to build Web sites and

powerful online applications. (From joomla.com)

Journal Administrator: the person responsible for maintaining Journals.

MySQL (My Structured Query Language): is the world's second most widely used open-source

relational database management system. (From mysql.com)

Newsletter Administrator: the person responsible for maintaining newsletters.

Notification Algorithm: the algorithm that sends notifications to registered users about

membership renewal.

ODU: Old Dominion University.

PHP: Hypertext Preprocessor: a popular general-purpose scripting language that is especially

suited to web development. (From php.net)

Prototype: the original or model on which something is based or formed. (From dictionary.com)

Registered User GUI: the web page interface that is available to all registered paid members.

Super Administrator: the person responsible for maintaining the whole website.

User Creation Algorithm: the algorithm used to create registered users to the website.

VAST: Virginia Academy of Science Team composed of six members.

Web Administrator: the person responsible for designing, developing, marketing, or

maintaining a website. (From websiteadministrationcenter.com)

Web Server: a remote computer or a computer program that delivers Web pages to a user's

computer, or a client, upon request from a web browser. (From dictionary.com)

Website Content Submission Algorithm: the algorithm used to submit content for approval from

an administrator.

1.4 References

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1.5 Overview

This product specification provides the hardware and software configuration and

capabilities and features to fully implement the VAST prototype. This prototype will not need

the use of any external interfaces. The information that is provided in the remaining sections of

this document includes a detailed description of the hardware and software configuration and

capabilities and features. The product specification requirements provided in Lab II Section 3.1

can be found in a separate document.

2. General Description

The Virginia Academy of Science website is being redesigned to target users who are interested in science. This includes students, faculty, and business interests. Students, including, sixth to twelfth grade, undergraduate, and graduate, will have the ability to search for events, and view/apply for scholarships and grants. Faculty members, including teachers and professional educators, will also have the ability to search for events and view the scholarships and grants available but will not be allowed to apply for them. Businesses, including non-profit, franchise, and independent, have the opportunity to post events and funding opportunities on the website. However, some of these opportunities will be limited if the users are not registered. If businesses are not registered with the organization, the only option is to email content to the Virginia Academy of Science. If businesses are registered, they will be able to upload and submit content through the website.

2.1 Prototype Architecture Description

The VAST prototype will have a newly designed frontend interface. The interface will contain additional features that the current Virginia Academy of Science website does not offer. Figure 2 shows an example of a graphical user interface that VAST will implement using Joomla. Everything that the Virginia Academy of Science has to offer will be available on the home page. A template will be used so that every page created is consistent. On the home page, visitors will be able to access certain information depending on if they are a student or faculty member. Additionally, visitors interested in the Virginia Academy of Science will have the option to register and become a member on the home page. Once a user has registered and paid their dues, they will be given an account ID and a temporary password that will allow them to

login from the home page to access "member only" content. After a member logins for the first

time with a temporary password, it will prompt them to change their password.
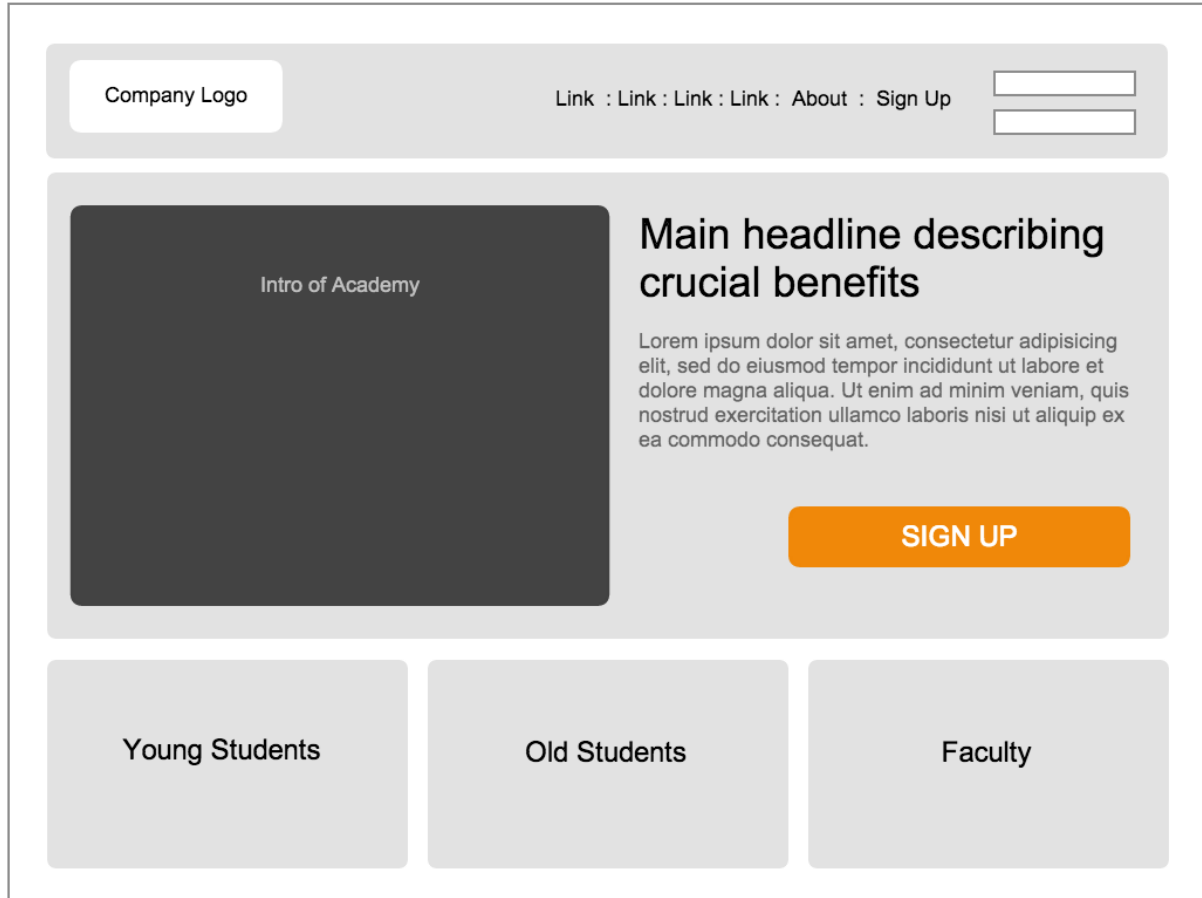

Figure 2. Prototype Graphical User Interface

It is crucial to have a navigational bar that is consistent on every page. The navigational

bar should contain all information that can be found on the website so that visitors will not have

to click on several pages to find hidden information. VAST took the current Virginia Academy

of Science sitemap and constructed a new sitemap shown in Figure 3 for the prototype. The new

sitemap will contain three levels: a first level, second level, and restricted level. The first level

will contain all information that is directly visible on the website. This information will be

available to all users.

The second level contains more information on each first level subject. However, first level topics may or may not contain any second level information. To access second level information, a user must first hover over a topic that interests them. If subtopics exists, a dropdown menu will appear listing them. For instance, a user interested in learning more information on the Virginia Academy of Science clicks on the "About" tab. The user wants to learn more about the academy, so they hover their mouse over the "About" tab and a dropdown menu appears containing the "History" tab. The user then proceeds to click on the "History" tab to learn more information about how the Virginia Academy of Science started.

The restricted level follows the same format as the second level. However, this information is "member only" content and will require a user to login with their account ID and password to access the content. For instance, a non-registered user hovers over the "Membership" tab. The user then clicks on the "Newsletter" subtopic, which is a restricted level. The non-registered will be prompted for an account ID and password. Users who are not registered will not be able to view restricted level content.

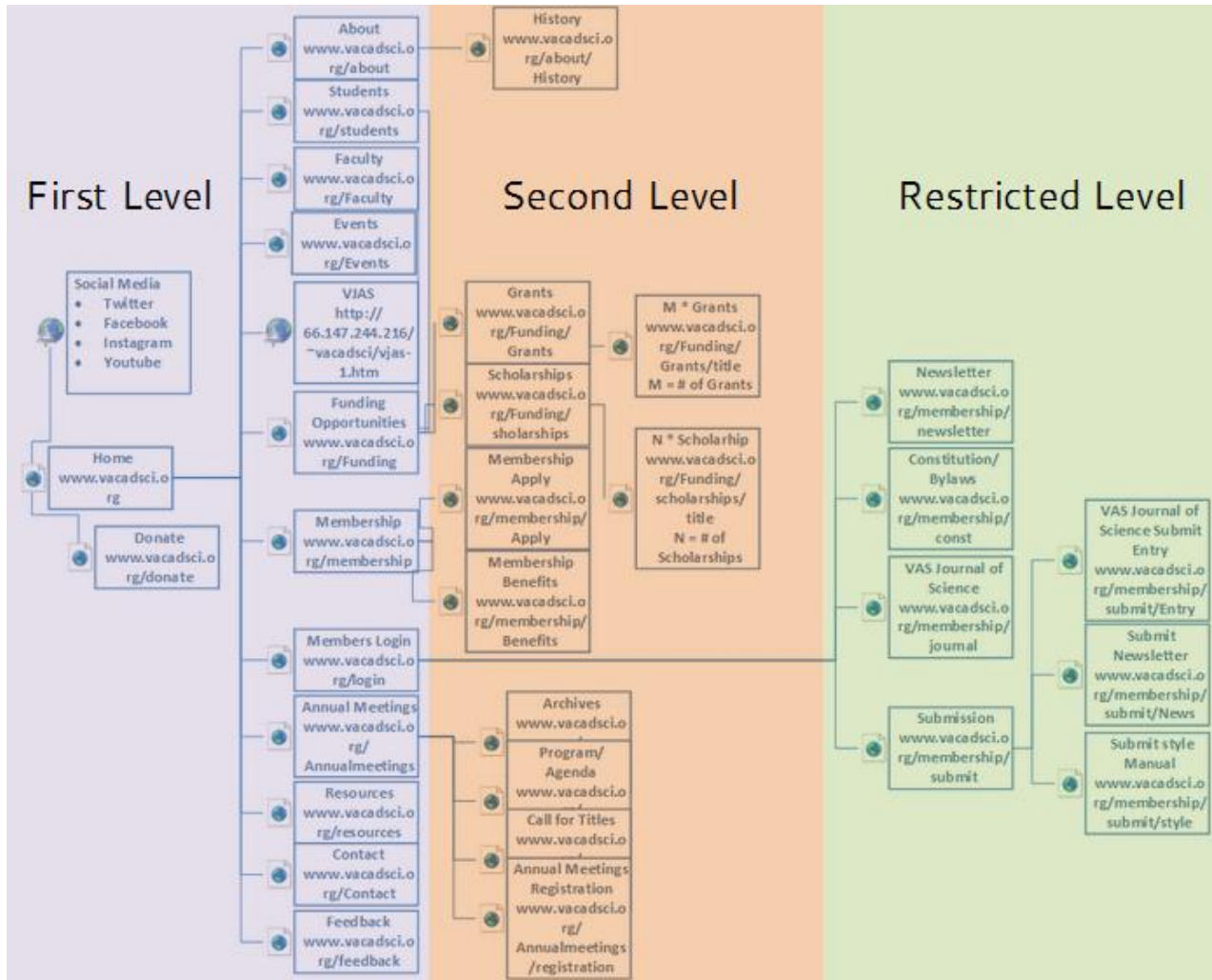(This space is intentionally left blank.)

Figure 3. Prototype Site Map

The prototype architecture involves hardware and software that is almost identical to the

real world product. The hardware will consist of a Web Server and a Database Server. The web

server will run Joomla and allow for it to be public and visible when a user accesses the website.

The Database Server will be running MySQL. It will consist of user information and documents

that can be accessed via phpMyAdmin. Figure 4 shows how the PayPal simulator will handle

payment situations.

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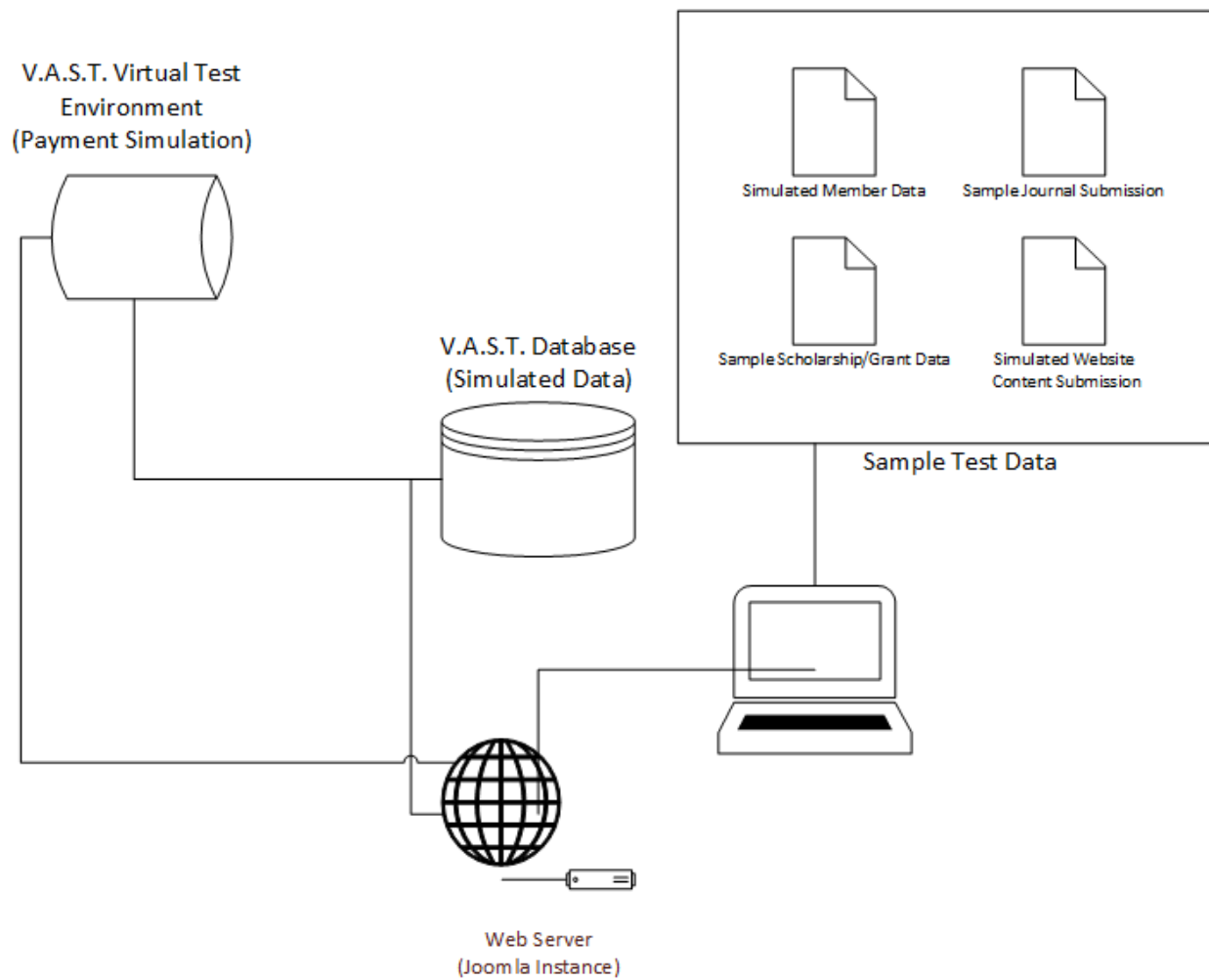
Figure 4. Prototype Major Functional Component Diagram

The major software components will consist of PHP, Joomla, and MySQL which are open source. PHP is a server-side scripting language that will be used to process the submissions. Joomla will allow for user-friendly backend customization for administrators who are not experienced in programming. MySQL will allow an administrator to create and edit necessary tables.

VAST will provide customized software. This includes the document submission algorithm, notification algorithm, user creation algorithm, and website content submission algorithm. These

algorithms will be handled by a set of administrators. Each of these administrators will have a different role. When an administrator logs into the website, they will have access to certain areas of the website depending on their administrator level. For instance, a level 2, Web Administrator will not have all of the access of a level 1, Super Administrator.

2.2 Prototype Functional Description

The prototype will provide the user with the ability to register and pay online via an automated system. Figure 5 shows an electronic membership submission. When a user interested in becoming a member visits the website, they will click on the "membership" link to bring themselves to an online registration form. The form will ask the user for their basic information including to their full name, date of birth, email address, home address and phone number. After the basic information is filled out, the user will be brought to an integrated PayPal system that will have different options of payment depending on the types of membership categories. The prototype will have a test environment for the PayPal system, due to the limitation of a live account and real money. After the registration is complete, the information will be stored in the database and an email confirmation containing the new member's ID and temporary password will be sent to the user. The user will be prompted to change their password after logging in to the website for the first time.

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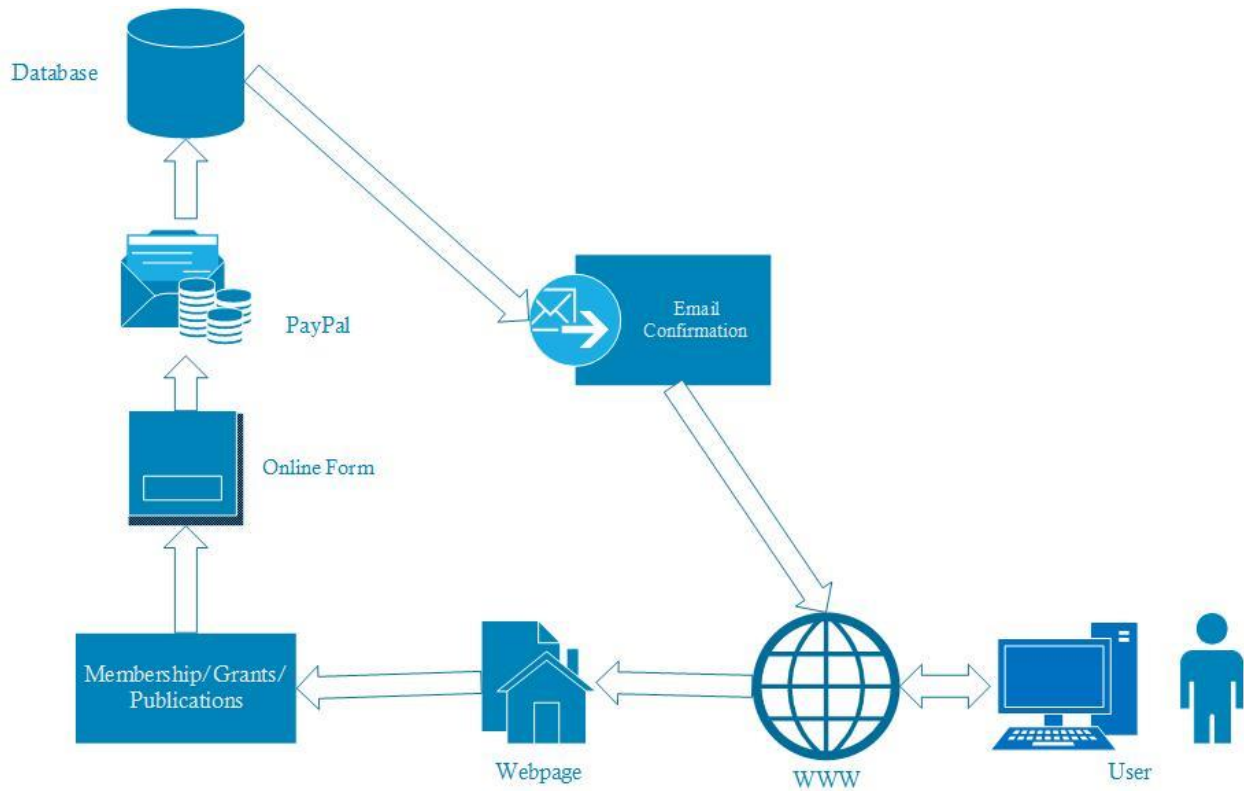
Figure 5. Becoming a Member Process

Members will be able to submit content for approval. If approved, the content will be processed accordingly and updated on the website. Figure 6 shows an electronic journal submission flowchart. When a member submits an unformatted document, it is checked to see if it has a proper PDF or DOC extension and is sent to the Journal Administrator for approval. After the document has been approved and correctly formatted, it will be stored in the database which will display the document on the website on appropriate action. The Journal Administrator will be able to directly store documents in the database and on the website.

(This space is intentionally left blank.)
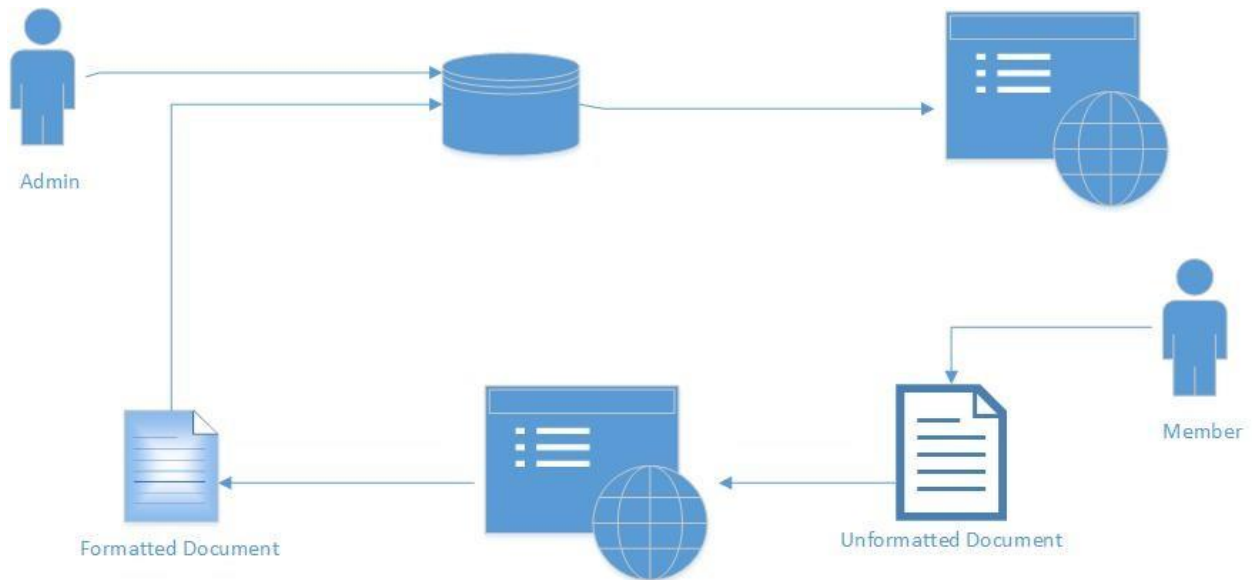
Figure 6. Journal Submission Process

In the prototype, all information will be stored in a database. Figure 7 shows a document

storage process. All the data will be kept private and protected. Members will be able to access

documents, journals, and newsletters stored in the database. Only administrators will be able to

access the member's accounts stored in the database. The process of storing information in the

database will make it more accessible and organizable.

Figure 7. Document Storage Process

Non-registered users will be able to view all public information on the website. This

includes scholarship and grant opportunities, membership categories, and the ability to search for

upcoming events. Table 1 shows a broad overview of Non-Admin roles between the end user and

member. A visitor will not have all of the benefits as a member, but the website will encourage

the end user to register.

	STORIES	USER	
		End User	Member
Available to all users	View scholarship opportunities	x	x
	View grant opportunities	x	x
	View memebership categories	x	x
	Submit payment concurrently with application	x	x
	Apply to become a member electronically	x	x
	View public information	x	x
	Search calendar events	x	x
Paid dues required	Password protected login		x
	Able to submit required material for scholarship opportunities		x
	Able to submit required material for grant opportunities		x
	Able to submit journal article		x
	Ability to renew membership		x
	Ability to view "member only" content		x
	Ability to opt-in or out of member only newsletter		x
Admin specific functionality	Ability to submit website content for approval		
	Ability to submit event information for approval		
	Ability to submit newsletter information for approval		
	Ability to resubmit material that has not yet been approved		
	Ability to submit AND approve website content		
	Ability to submit AND approve newsletter information		
	Ability to submit AND approve event information		
	Ability to approve journal content		
	Ability to edit approved website content		
	Ability to edit approved newsletter content		
	Ability to edit approved events content		
	Ability to assign admin roles		
	Ability to manage VAS membership list		
	Ability to manually opt-in or out VAS members to the newsletter		
	Ability to add website sections --- should be deleted		
	Ability to alter design aspects --- should be deleted		
	Ability to add credentials for the contributor***		
	Ability to update membership log in**		
	Ability to reset members password**		
MUST HAVE			
WOULD LIKE			
SOME DAY			

Table 1. Non-Admin Roles

Most websites now have some form of administrator roles. Administrators are given

specific roles for the website that they are monitoring. Table 2 shows a broad overview of Admin

roles that will be put in place on the Virginia Academy of Science website.

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	STORIES	Website Admin**	Journal Admin	Newsletter Admin	Website Admin***	Web Admin	Super Admin
		ADMIN					
Available to all users	View scholarship opportunities	x		x	x	x	x
	View grant opportunities	x		x	x	x	x
	View memebership categories	x		x	x	x	x
	Submit payment concurrently with application	x		x	x	x	x
	Apply to become a member electronically	x		x	x	x	x
	View public information	x		x	x	x	x
	Search calendar events	x		x	x	x	x
	Password protected login	x		x	x	x	x
Paid dues required	Able to submit required material for scholarship opportunities						x
	Able to submit required material for grant opportunities						x
	Able to submit journal article						x
	Ability to renew membership						x
	Ability to view "member only" content						x
	Ability to opt-in or out of member only newsletter						x
Admin specific functionality	Ability to submit website content for approval	x				x	x
	Ability to submit event information for approval	x				x	x
	Ability to submit newsletter information for approval	x				x	x
	Ability to resubmit material that has not yet been approved	x				x	x
	Ability to submit AND approve website content					x	x
	Ability to submit AND approve newsletter information			x			x
	Ability to submit AND approve event information				x		x
	Ability to approve journal content		x				x
	Ability to edit approved website content					x	x
	Ability to edit approved newsletter content			x			x
	Ability to edit approved events content				x		x
	Ability to assign admin roles						x
	Ability to manage VAS membership list						x
	Ability to manually opt-in or out VAS members to the newsletter						x
	Ability to add website sections --- should be deleted						x
	Ability to alter design aspects --- should be deleted						x
	Ability to add credentials for the contributor***						x
	Ability to update membership log in**						
	Ability to reset members password**						
MUST HAVE							
WOULD LIKE							
SOME DAY							

Table 2. Admin Roles

2.3 External Interfaces

No external Interfaces will be needed to construct the VAST prototype. VAST has all of the resources required to implement this prototype. Therefore, no additional resources are required to be purchased for the development and demonstration of the VAST prototype.

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3. Specific Requirements

The functional requirements of the VAST prototype, found in section 3.1, are located in a separate document. Lab II Section 3.1 contains all requirements that are necessary to complete the prototype. Each requirement will contain specifications to ensure that nothing is to be missed during implementation.

Appendix

VAST currently has all of the skills and knowledge that it takes to redesign and create this website using Joomla. If any issues arise, they will take all necessary action to make sure that this prototype is built on time and properly. Each member of the team has been assigned a role and will work together in tandem to ensure that the frontend corresponds with the backend. When developing this prototype, all of the important requirements will be taken care of first. Any extra features or plugins will be implemented after the completion of the main requirements to make sure the website is fully functional upon its launch.