

Web Design: Software Engineers Publishing Children's Books?

A Technical Report submitted to the Department of Computer Science

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Rishabh Jain

Fall, 2022

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Briana Morrison, Department of Computer Science

Web Design: Software Engineers Publishing Children's Books?

CS4991 Capstone Report, 2022

Rishabh Jain
Computer Science
The University of Virginia
School of Engineering and Applied Science
Charlottesville, Virginia USA
rj9crg@virginia.edu

ABSTRACT

The New Worlds Reading Initiative, started by the University of Florida to mail free books to elementary school students every month, needed an enrollment page for its website. This would allow parents to fill out information such as mailing address, primary language, and topics of interest so that books received would be individualized to each student. I worked on the front end portion of this partnership during my time at Scholastic, primarily handling the creation of such a form. I utilized React native to build the component on Adobe's AEM framework. I was provided a figma design detailing the layout I would be replicating. I worked with different platforms like Jira, Jenkins and Git. I learned the lifecycle of a ticket and also how to work in an agile work environment. Prior to my departure the entirety of the updates were not completed and hence my code changes were still awaiting to be deployed to the automation server. My work in its entirety is forecasted to reach at least 100K new users in the coming year. It will primarily be used by new clients who are looking to sign their families up; however, it does include sections existing customers may utilize to make edits to enrollment information. Future additions needed include the unfinished profile page and new year rollouts the business analysts wanted to implement before final release.

1. INTRODUCTION

Not only is Florida one of the states with the lowest literacy rates in America, but it also has the lowest number of public libraries per capita (Literacy rates, 2022). To combat this the University of Florida has worked hard to get free books into the hands of young readers. The University delivers free books every month to help improve students' reading skills and support a love for reading. The books aim to build reading confidence and help reinforce strategies that can be applied to their academic careers.

An endeavor of this capacity requires a website to streamline operations, and more importantly help people reach the program and then sign them up. A lot of different technologies go into setting up and deploying a web site. I worked as a front end engineer so I primarily dealt with the programming in React JS. React is a well-documented Javascript library used by companies like Meta and Netflix that allows developers to build websites using reusable components. Another tool I used was the Adobe Experience Manager, a content management system that helps coordinate assets and is especially helpful in creating a seamless experience across several devices.

2. RELATED WORKS

When beginning this project, the team had to make the decision of what tools and platforms they would prefer to utilize before moving forward. While a variety of factors

played into the decision of proceeding with React JS, including overall team familiarity, there are many reasons a new developer may want to choose React JS for their next project. In an article written on a blog site for software engineers, Pisuwala (2022) details the many factors one should take into consideration when picking a programming language, comparing React to its current biggest competitor, Angular. Pisuwala begins his case by presenting the popularity of the two amongst developers: “We will consider the number of stars that they receive on their GitHub repositories as the benchmark of popularity. React had 175k stars and Angular had 76.6k stars on GitHub.” React has more than twice the popularity on Github which is a good indicator of being backed by a strong developer community. With this comes the benefit of being able to find help with future issues with greater ease but also the peace of mind that this platform continues to be entrusted by many developers on a day to day basis.

The React community has recently published a comprehensive tutorial (React Docs, n.d.) on the implementation of the language going as far as to include interactive examples within the online textbook. This reading served as my primary form of training material and was my go to when I did not have the knowledge for anything React related. With ongoing updates and nearly 200 contributors, the resource was an extremely helpful guide not only to get React up and running but also to provide details about specifics regarding the making and styling of different components.

A major portion of the internship involved learning the fundamentals of web design. A lot goes into making a website look appealing and not something straight from the early era of the internet. Besides styling I had to handle user interactions. This included responsiveness and making

pages work across a variety of different devices without taking away from the overall experience like losing any of its functionality or simplicity of use.

In the past I have used McFedries (2019) to develop my web design skills. The book covers everything from spacing to color design and while there were a lot of areas I did not have to worry about since I was provided a Figma sketch, it was a helpful resource for some of the specific decisions I made. I struggled a lot with CSS styling, reading up the differences between margin and paddings and what to use where helped my page look cleaner and more uniform. Similarly, the book contained a section about web page genealogy that described the hierarchical structure of nested elements. This impacted how I chose to extend certain properties and to make some component specific changes using ID selectors. Overall the book covers a lot regarding coding conventions and how code should be formatted to allow for reusability and scalability.

3. PROJECT DESIGN

One of the pages I worked on was the enrollment form. Here I made a modification to one of the input fields. I was tasked with designing the HTML tag, styling the specific component using CSS, and also modifying the API call to submit the new information into the existing database of users.

3.1 REQUIREMENTS

The New Worlds Reading Initiative project had begun shortly before my start at Scholastic. As a result, much of the foundational work had been laid out. This kept the team on track to complete the basic requirements and begin delivering books as soon as possible. The enrollment page is an essential feature to the project and was therefore one of the first items to be

completed. While mostly finished, there were a couple updates required to be made to keep the page up to client expectations.

Figure 1: Part of the first section on NWRI enrollment page

On the enrollment page, the initiative requested that a couple more fields be added to get a better idea of their primary demographic. This would be used for internal use just to ensure they were getting the right books in the hands of people that needed them the most. One of the fields added was the Race field that displays 7 options when clicked (Figure 2).

Figure 2: Race dropdown options

3.2 KEY COMPONENTS

Since React is so heavily component based, much of the work I published was built partially off of existing code from previous

developers working at Scholastic. Having access to all the git repositories for the various front end applications, I found myself oftentimes searching through these repositories to find instances of code that I could refactor and use myself. This was especially handy in cases where I might have needed a text box or such for a specific case and was able to build off of what was already there but slightly tweak it for its new intended purpose. This made getting current coding conventions a lot easier to make my code reusable and scalable. For this specific case I was able to refactor an existing text box component to fit my needs and was able to specifically style it to fit the size of the intended boundaries and fall on the left side of the stacked columns.

```

1 | {
2 |   "LastName": "Doe",
3 |   "FirstName": "Jane",
4 |   "AccountID": "1469278",
5 |   "Mobile": "+49 999999 9999",
6 |   "Email": "jane.doe99@example.com",
7 |   "ExtensionField1_KUT": "value1",
8 |   "ExtensionField2_KUT": "value2"
9 | }

```

Figure 3: JSON API call example

Once I had the front end set up I had to connect the interface to the backend so that the newly added info would reach the database. I did this using an API call similar to the one shown in Figure 3. I added an id and value to the existing JSON call. The id was “Race” and its value was being pulled directly from the corresponding input id box.

3.3 CHALLENGES

CSS Styling had to be done in a manner that would be easy to understand and alter if need be in the future. In addition, a lot of my related works pertain to guides and code documentation which I found online to assist me in the problem solving process. These might be official guides put out by the React

community or Stackoverflow question and answers to resolve issues either in my code or working environment. In terms of personal communications, I reached out to various members on my team on numerous occasions when running into issues or when code swarming on specific problems. To resolve issues with connecting to the backend and specifically sending out the API POST request I utilized the Postman Platform which allowed me to test API calls while also allowing me to generate tokens to perform testing on the demo online experience manager.

4. RESULTS

The new year rollout to the enrollment page allows for greater personalization. Some of the improvements requested was the addition of Race and Ethnicity fields to the form. Furthermore, other changes involve the addition of numerous more themes for books and also a new supported language. All these changes allow for the program to customize the delivered books, hence the books can be better catered to the students. The more specialized a book is to a student, the more effective the program will be in the long run. With the goal of increasing literacy rates by inciting a passion to learn, it is crucial that the kids enjoy what they are reading. With more options like adventure and creativity, kids are able to select the types of titles they would hope to receive every month. Similarly with the support of a new language the program will be able to reach even more individuals.

Being able to change one's prior enrollment also ensures student info is kept up to date so they are still receiving books. The form can also be used by customers that have already signed up but need to make adjustments to their previous answers. This may be regarding the themes a child has chosen or could even be a person's address. If a child does not like a certain genre,

previously they would not have been able to change it and therefore may have become discouraged from reading or trying new books. With the ability to change a theme, parents can select the ones that may interest their kids more.

This initiative relies on people spreading awareness through word of mouth and boasting about the effectiveness of the program. If it helps someone's child it has the ability of working for others. In the end, my contributions to this project will help clients be more satisfied with the books they receive and in turn help the initiative obtain more clients, promoting child literacy.

5. CONCLUSION

My greatest realization during this internship was around the important role of tech in the growth of younger generations. I would never have imagined working as a software developer at Scholastic but a lot more software goes into building today's applications than meets the eye. This website will be targeted towards parents and used by hundreds of thousands of users over the next several years. My contributions towards completing this initiative will have a positive impact on numerous lives. It is important for any program or business have a website these days and I helped create a modern website that will help propel the success of this initiative. With sign up almost complete, the website will be launched and available for use starting this upcoming year.

6. FUTURE WORK

While this may be the end of the enrollment form for the foreseeable future there is still much work to be done on remaining parts of the website and other maintenance to be performed regularly. There is always the possibility of bugs coming up like one I worked on where a page was not being displayed in the proper language selected by

the user. Other information needs to be updated and maintained consistently to ensure correct information is portrayed to the user and aligned to customer requirements which can also change as time progresses.

REFERENCES

World Population Review. U.S. Literacy Rates by State 2022. Retrieved Sep 23, 2022, from <https://worldpopulationreview.com/state-rankings/us-literacy-rates-by-state>

Pisuwala, U. (2022). React vs angular, which one is more popular among JavaScript developers? Peerbits. Retrieved November 2022, from <https://www.peerbits.com/blog/react-vs-angular-which-one-popular-javascript-developers.html>

Quick start. React Docs Beta. (n.d.). Retrieved November 2022, from <https://beta.reactjs.org/learn>

McFedries, P. (2019). *Web design playground: Html & Css The interactive way*. s.n.