

An Accessible Portal to Teach Computer Science Modules to Typical and Special Needs Children: A Prototype

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Speakers



Dr. Daniela Marghitu received her B.S. in Automation and Computing from Polytechnic University of Bucharest, and her Ph.D. degree in Automation and Computing from University of Craiova. She is a faculty member in the Computer Science and Software Engineering Department at Auburn University, where she has worked since 1996. She is the Co-PI of NSF CISE "EAGER: An Accessible Coding Curriculum for Engaging Underserved Students with Special Needs in Afterschool Programs". She was recently appointed to serve on NSF's committee, EPSCoR. For more info see her official site <http://www.eng.auburn.edu/~daniela/>.



Davis Ward is a senior undergraduate student studying software engineering at Auburn University. He is working under Dr. Marghitu with Quinterious Hall on creating Accessible Virtual Learning; a platform that delivers computer science modules to students with accessibility in mind. He enjoys learning new technologies and solving problems related to web development.



Quinterious Hall is a senior undergraduate student studying software engineering at Auburn University, where he is working on accessible computer science learning modules under Dr. Daniela Marghitu, alongside Davis Ward.

Introduction

Learning to code is challenging

Without the right tools, resources, and assistance, it can be tough to build the foundation needed to understand key computer science fundamentals.

There are a number of disabilities that can be a hurdle to effective use of computers and other technologies.

This highlights the importance of virtual learning modules that are accessible to any student.

What is Accessible Virtual Learning?

- ❑ A platform prototype that delivers computer science learning modules to students with disabilities in mind





Why create such a platform?

- ❑ There was a clear need in the computer science web application space that delivered to students with disabilities who wanted to learn fundamental concepts
- ❑ Limited resources exist for teachers looking to support accessible virtual educational platforms, leading to a significant number of struggling learners including students with disabilities.
- ❑ This platform provides a much-needed expansion of computer science resources to students that otherwise may not be warranted an equal opportunity to develop programming skills.



AVL's Objectives

- ❑ Provide a clean and easy to understand user interface for the user to get the wanted learning modules and resources
- ❑ Adhere to W3C Accessible standards that allows the use of Screen Readers and other accessibility tools
- ❑ Provide a clean color scheme and font sizes that are accessible to visual disabilities
- ❑ Implement a voice navigation feature that allows users to interact with the pages vocally



Architecture





The Design



- ❑ Technologies:
 - ❑ Front-End: HTML, CSS, EJS
 - ❑ Back-End: Node.js, Express.js, MySQL

- ❑ Model-View-Controller Architecture

- ❑ Components: Dashboard, Blog, Resources, Voice Navigation



Components

01	Dashboard	<ul style="list-style-type: none">• Delivers content and functionality to both student and educator accounts• Students can view articles, resources, and courses; Educators can create them
02	Blog	<ul style="list-style-type: none">• Allows educators to create post that surround the topics of accessibility and computer science education• Strictly informative and acts as an extension to the learning modules
03	Resources	<ul style="list-style-type: none">• Collection of resources that we selected to supplement the learning modules• Resources are known for usability and popularity in the education space
04	Voice Navigation	<ul style="list-style-type: none">• Allows users to navigate the portal vocally• Voice icon on bottom right corner of every page that displays instructions if clicked



Voice Commands

Voice Command 		Action
'Home'		Redirect to the index page
'Dashboard'		Redirect to the dashboard page
'Educators'		Redirect to the educators' page
'Blog'		Redirect to the AVL Blog
'Resources'		Redirect to the resources page
'Log out'		Log the user out of the portal



Conclusion & Future Work



Conclusion

This virtual learning platform is created to take the first step into providing a universal learning experience.

The success of this portal relies heavily on its ability to allow teachers and self-directed learners to facilitate curriculums effectively while maximizing student engagement, ease of learning, and digital assistance for students at various ages with different learning abilities, both physical and cognitive.



Future Work

- ❑ Testing the portal with a range of different students to get input
- ❑ Custom voice commands
- ❑ RSS feed to AVL Blog



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