

# Final Report: Engaging Science Education for Teens

| by Wandile Ndaba (31 May 21)

## 1. Introduction

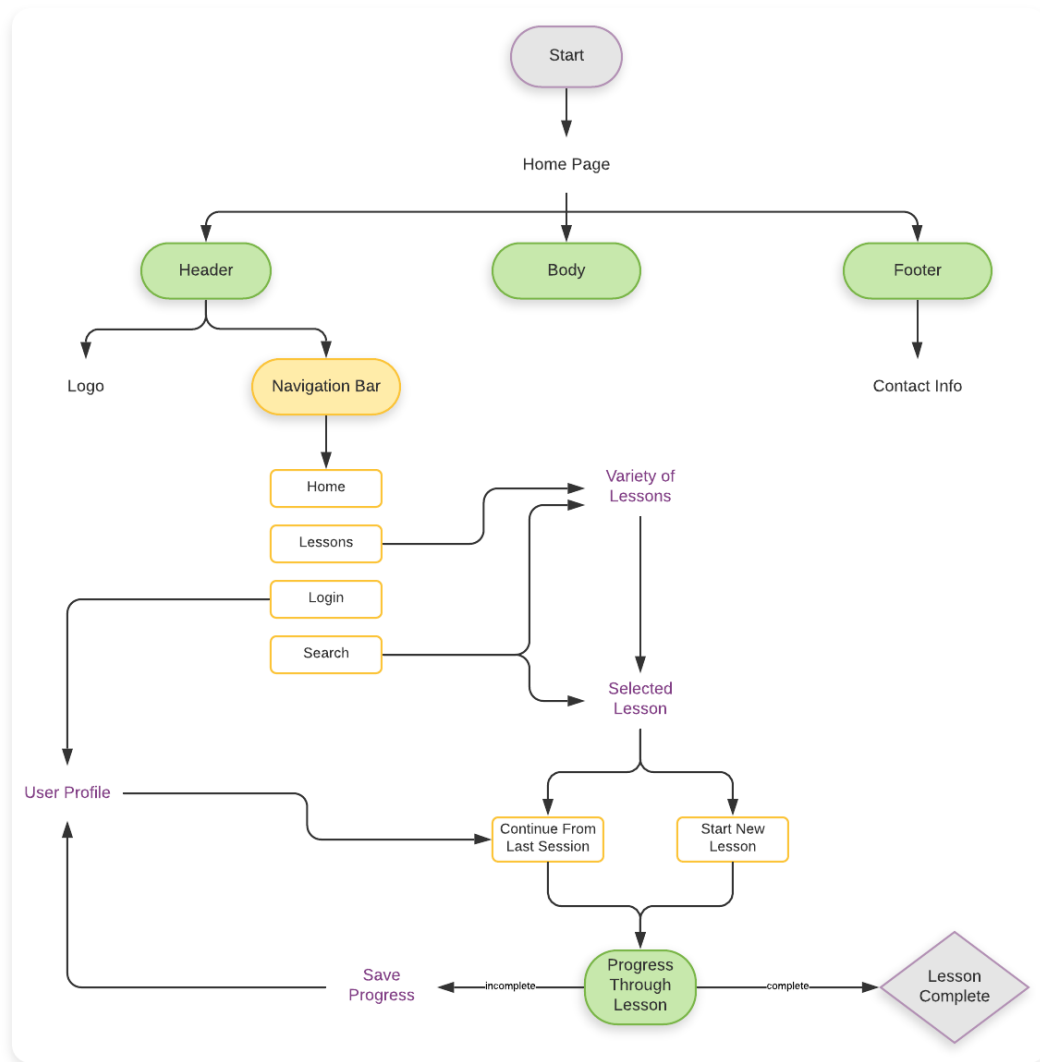
- Goal: The goal of this project was to create a **website** that teaches **STEM** (*Science, Technology, Engineering, Mathematics*) material to teenage students.
- It was intended to be narrative-driven it's writing tone, highly visual and applying best practices and science-informed teaching strategies. The plan was to implement an audio voice-over that students can activate whenever they get stuck on a topic.
- The results: The features intended for inclusion to aid student's learning, included: 1. an audio player on the page at all time; 2. a progress bar; 3. a responsive design;

## 2. Design and Implementation

- The design for the website, inspired by other existing learning applications (eg. Coursera), was done in Adobe illustrator and finally wireframed using proto.io.
- To help flesh out the visual idea and communicate it better to others, I drafted/prototyped two pages from the website - the homepage and a single lesson page.

### 2.1.0 Typical User Flow

User experience journey for completing a lesson



## 2.1.1. Homepage Mockup



search

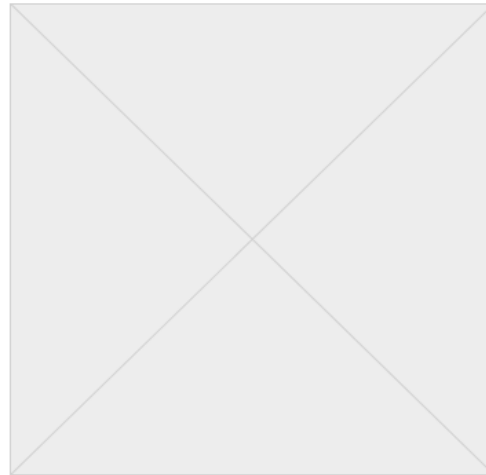


## Master STEM Subjects With Ease

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Get Started



## Go Further That You Thought Possible

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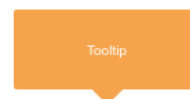
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## 2.1.2. Single Lesson Page Mockup



# Subject 1



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## Section Heading

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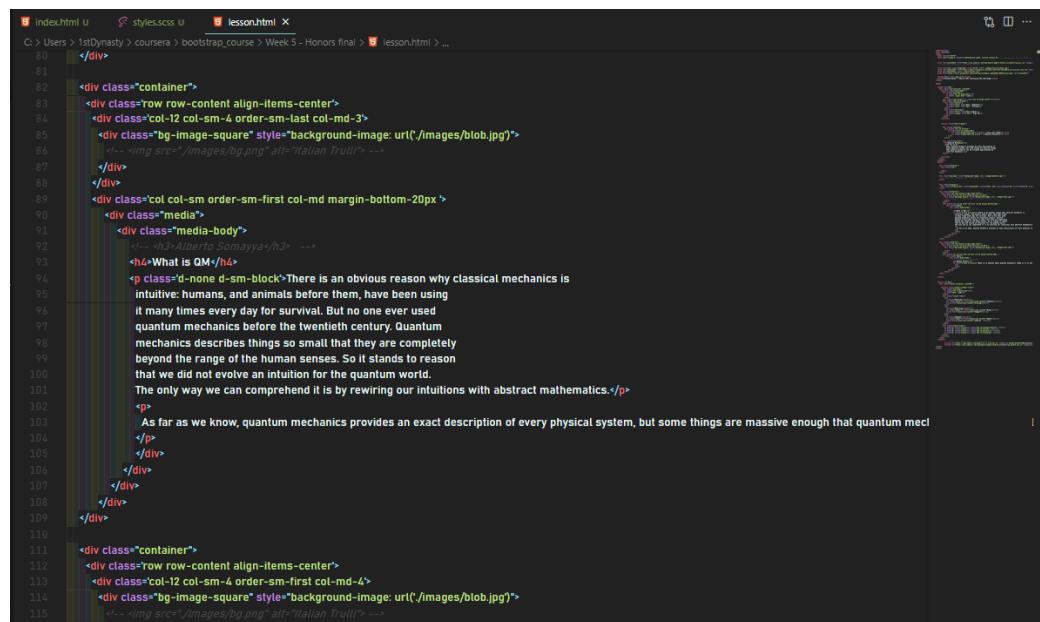
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- After research phase was complete, I was left with a compelling design. but it included many elements/moving pieces and features, most of which I had never implement in code before. This meant a potentially for confusion, which would lead predictably to difficulties with the project) So I broke down the final design, **listing** out all the necessary **components**.
- Over the week I gradually found **resources**, such as online tutorials, that would help realise the functionality of the website.
- Production: Week 1 -The content.
  - First, I picked a subject for the preview lesson page. This had to be an exemplar for the type of course material students should expect

and the difficulty level. study the subject enough to distill it. Create any illustrations needed for the

- I also created a bibliography using Mendeley, of for resources that I would use for the content of the lesson page.
- production: Week 2 - Coding
  - I coded the website using VS Code alongside a few of my favourite extensions.

A screenshot of the Visual Studio Code editor interface. The editor is open to a file named 'lesson.html'. The code is written in HTML and uses Bootstrap classes for layout. It features a container with a row of two columns. The first column contains a paragraph of text about quantum mechanics, and the second column contains an image placeholder. The code is syntax-highlighted, and the editor's interface includes a sidebar on the left showing the file explorer and a sidebar on the right showing the output console.

- There were no libraries or modules utilised in this project, everything was coded from the ground up. My reasoning was that, given this was a learning opportunity more than anything else, the goal was solve as many of the challenges myself.
- post-production:
  - The service I use for deployment was GitHub. The last step was a series of tweaks to the final website based on feedback I received.

## Screenshots from the final website

### Home page

# Science Education For Curious Young Minds

Tackle science topics on the frontier, informed by the most current research, years before it appears in mainstream textbooks.

[Get Learning](#)[Send Email](#)

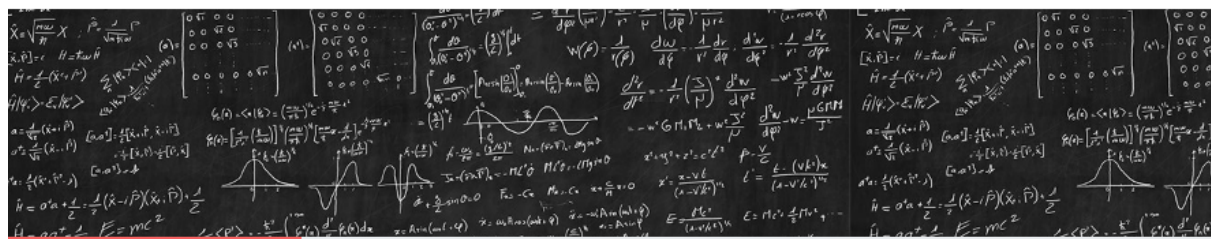
## Advance Your Horizons

Here are some of the features that LnR has to offer.

### Lesson Page

# Quantum Mechanics

As far as we know, quantum mechanics provides an exact description of every physical system, but some things are massive enough that quantum mechanics can be reliably approximated by classical mechanics.



**What is QM**

There is an obvious reason why classical mechanics is intuitive: humans, and animals before them, have been using it many times every day for survival. But no one ever used quantum mechanics before the twentieth century. Quantum mechanics describes things so small that they are completely beyond the range of the human senses. So it stands to reason that we did not evolve an intuition for the quantum world. The only way we can comprehend it is by rewriting our intuitions with abstract mathematics.

As far as we know, quantum mechanics provides an exact description of every physical system, but some things are massive enough that quantum mechanics can be reliably approximated by classical mechanics. That's all that classical mechanics is: an approximation. I think this is really the right way to do it, not just logically but pedagogically as well. That way we don't fall into the trap of thinking that quantum mechanics is basically just classical mechanics with a couple of new gimmicks thrown in.

## 3. Conclusions

- I achieved in creating a science education website that targets a teenage audience.
- The finished site provides a good basis and framework that I can later extend into a full working website if I choose.
- **Shortcomings**
- Given the visionary nature of this project, there were a few originally planned features that, for many reasons, failed to make it into the final site.
- A few features were impossible to implement without also doing the **back-end** server coding. These included working sign-up and login, session progress storage. At the time, I simply lacked the skills successfully implement these features.
- The audio player, such a central feature during the design stage, mostly fell to the wayside during production. Successful execution would have made the final website too memory intensive, requiring too much space. In the

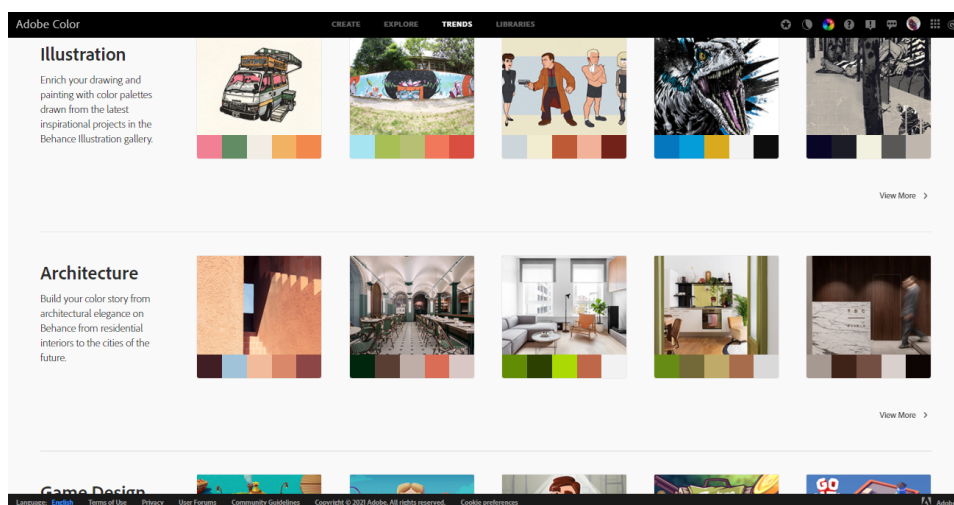
end, I focused more on using the illustrations and images to achieve the original goals.

## Improvements

- Reflecting on this project, there are some things I would have done differently if I had to do this project again. I would have kept in mind the very short production **time frame** of the project. This would allowed me plan the project better, avoiding the elaborate plans for various features that ultimately couldn't be implemented.

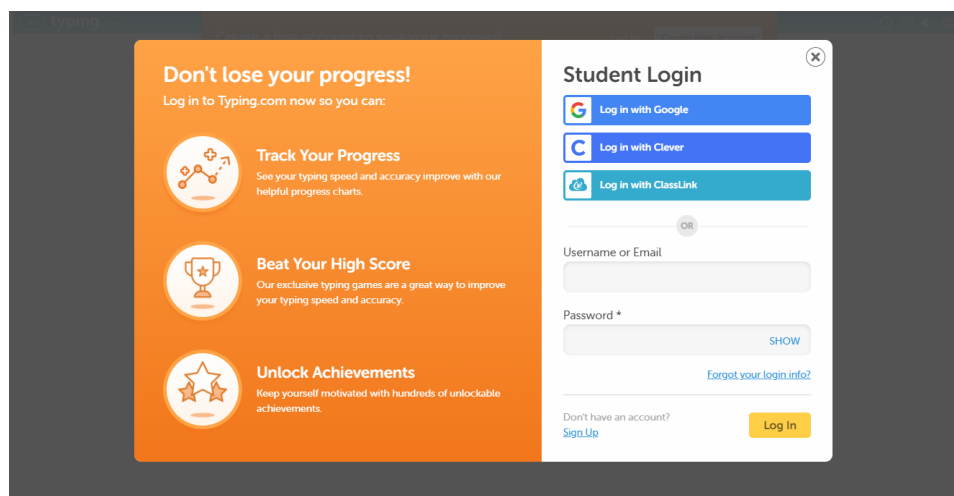
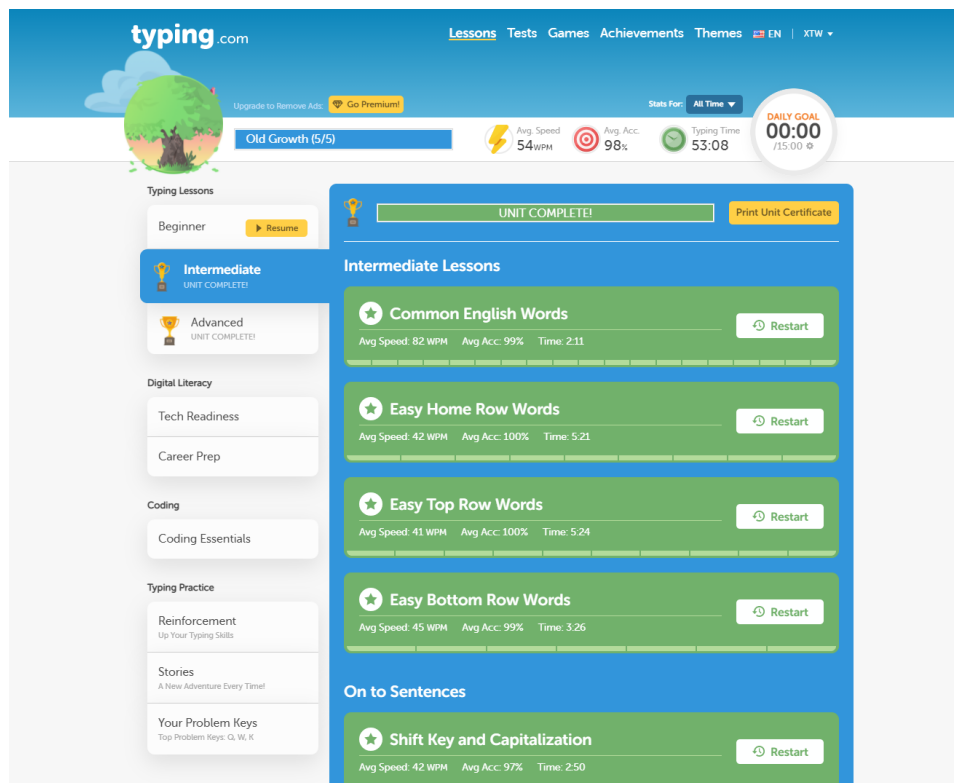
## 4. References

- Eloquent JavaScript
  - Sean Carroll: Something Deeply hidden book
  - <https://www.w3schools.com/>: For information on how to implement difficult components (e.g. parallax, audio player, progress bar)
- ▼ Colour scheme. <https://color.adobe.com/trends>

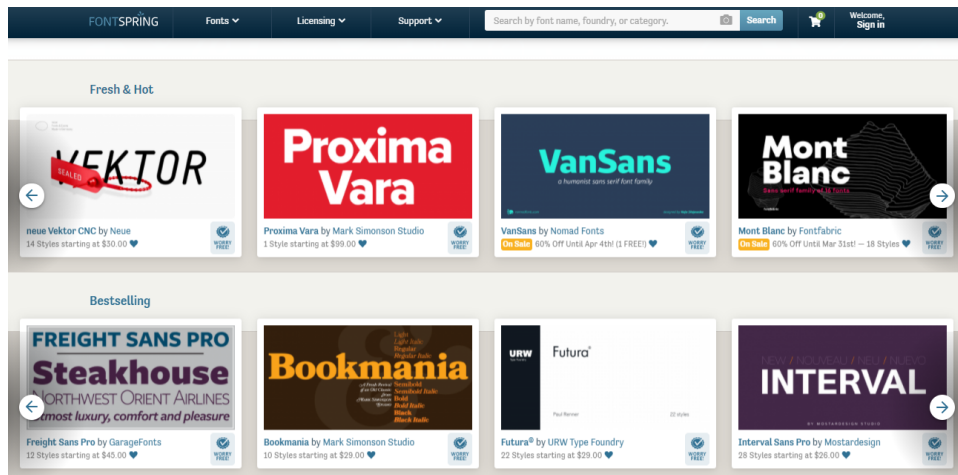


- ▼ Visual layout inspiration: <https://www.typing.com/student/lessons>





▼ fonts. <https://www.fontspring.com/>



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