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Latham Science Communication Project

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## Science Speaks

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# Science Speaks

By: Nicholas McCarty

Science Speaks ([sciencespeaks.org](http://sciencespeaks.org)) started as a small project with a big idea—to improve national scientific literacy, primarily for high school students, through the simplification of primary research articles. We take tough-to-digest scientific pieces and simplify them so that they are easier to understand. Through this simple idea, we hope to teach young students about some of the historical perspectives of scientific research and the experiments which helped to shape their textbooks and understanding of what it means to be a scientist.

## Why This Project?

- Large need for improved scientific literacy in high schools within the United States
- A 2009 Pew Research Center article uncovered some interesting results (<http://www.people-press.org/2009/07/09/public-praises-science-scientists-fault-public-media/>). 85% of scientists think that the ‘public does not know very much about science’. So why aren’t we doing all that much about this?
- Science Speaks was created to teach about science **without** removing the ‘gruesome’ bits
  - Rather than reading about a discovery in a textbook, Science Speaks is all about disseminating scientific information in its intended format
  - Primary research articles are selected and then simplified to the comprehension level of roughly a high school student

- The abstract (synopsis), introduction, materials and methods, results, discussion and references are all maintained, in the hopes that students will appreciate the depth of historical knowledge which was needed to move the field forward in each of the articles
- **Science Speaks seeks to improve the scientific literacy students in the hopes of fostering a generation with an enhanced appreciation and understanding for scientific research**

### **How Was It Done?**

- Skype conferences were held to choose the beginning categories – biology, chemistry, health, psychology
  - Meeting minutes were kept for every interaction. Eventually, an Evernote account was created to manage the large (and growing) list of tasks to complete (not shown)
- Roles were disseminated and split
  - Science Speaks Team
    - Rishabh Marya, B.S. Computer Science, Facebook Employee
      - Set up framework
      - Wrote the search algorithms
  - Michael McCarty, B.S. Biomedical Engineering, Boeing Employee
    - Loaded the site onto the hosted server
      - Worked on debug for hosted server
    - Implemented ‘Accounts’ system
  - Nicholas McCarty, B.S. in Biochemistry (2017), UI Student
    - Write all articles, created all images

- Work with graphic designer, implement ‘tagging’ system
- Set up and debug Redactor HTML editor (more on this later) to allow for article creation
- Article Selection
  - Articles that could be considered **classics** were selected to begin
  - As much as possible, I wanted to avoid a potential lawsuit for copyright infringement (from large journals like Nature, Science, Cell, etc.)
    - Eventually, I did some research and I *think* that my content is original enough and distinct enough from the original articles that I could claim fair use. In addition, all of my articles are free to access and are for educational purposes – two points which are also highlighted in the fair use clause

## Goals

- Initial Goals
  - Produce a ‘minimally-viable product (MVP)’
  - Just get a basic framework up and running and populate it with some articles!
- Goals Today
  - Work with a graphic designer to produce a beautiful, integrative, and flexible user interface
  - Create more articles through author recruitment and the implementation of an 'author network'
    - Verify credentials in the field (i.e. Ph.D. or graduate student in Physics) and then grant them author access. All names of authors will be given in their respective article

- As the network of authors grows, I hope to transition to more of an editorial role
  - Upgrade the ‘back end’ of the site – add more tools for HTML editing and design
  - Work on a Pitch Deck and business plan for sustained growth – begin going to business pitch competitions
- Work Flow
  - Work began with **two** main articles (*Protein Structures* and *Insulin Lowers Blood Sugar Level*)
    - ‘Distilled’ articles were written completely independently of one another
    - We then realized that we had to shoot for some sort of consistency between articles, so I created an extensive template for writers (not shown)
      - The template discusses what should be mentioned in each section of the article, how figures should be generated, and every font/color/size of text to use for each of the sections
  - Creation of instruction manual for Science Speaks site
    - To ensure that authors, editors, and curators knew how to utilize every aspect of the site and perform their roles, an in-depth instruction manual was created (not shown)
  - While writing articles, Rishabh and Michael were working together (via GitHub) to implement the site’s ‘bare bones’
    - This involved lots of Skype calls between the two
    - Once the basic site was launched, I could both upload articles and modify aspects of the code to improve HTML text functionality and the ‘tag’ system

- The software ‘Redactor’ was ultimately used as our WYSIWYG HTML editor
- The functionality of the current site can be easily explored by watching the narrated video on this IDEAL page
  - All aspects of this project were done **digitally** – no face to face meetings took place, and there are no ‘on paper’ article components
- Explore the Site...
  - This IDEAL page has some of the images which were taken directly from Science Speaks
  - It also has images that were used to write the initial articles
    - The original notes and papers of Banting and Best, two Canadian doctors, are shown in the Images section
      - These were used to write the article entitled *Insulin Lowers Blood Sugar Levels*

## **Impact, Knowledge, and the Future of Science Speaks**

- Knowledge Gained
  - Refreshed my memory on GitHub, HTML, and some JavaScript
  - Got to work with people all over the country to create something I enjoyed
    - I received the opportunity to share this project with others and heard positive reviews – this was encouraging
- Project Impact
  - Digital Outreach Analytics
    - There have been 732 visits to the site as of 4/28/2016

- 387 of these visits are from unique IPs
- Future Directions and Sustainability
  - Working with graphic designer now to create a more fluid interface
  - Brainstorming sessions are currently in the works
    - We want Science Speaks to continue for many years to come
  - Recruitment of authors
    - Build a network of professionals in each of the aforementioned fields to generate content
    - I would move to an editorial/administration role
  - Implement a 'validation' system – users that have confirmed Ph.D.s in a given field would be given some sort of 'badge' on the site to bolster their accreditation to users
  - Current team is willing to stay on for the years to come
    - A lot of progress can be made in the near future, now that the initial framework has been constructed
- Lessons and Challenges
  - Communication over the internet is nice, but it's still difficult to find a time!
  - Everybody has different ideas of what should be done
    - Our team had different focuses, usually as a product of their discipline (C.S., Engineering, or Natural Sciences)
  - Writing code takes a long time – particularly when you want the code to work...
  - Working with others and admitting that you need help leads to far better outcomes. I never could have launched this project by myself – there were too many advanced features which we wanted to implement

- Thank You...
  - Latham Science Engagement Initiative and its generous donors and administrators
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    - Matt Gilchrist and Rebekah Walker
    - Bahri Karacay, PhD
    - Mark McDermott, PhD
    - Cornelia Lang, PhD
    - Maurine Neiman, PhD
    - Kevin Ripka