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| National Library of Medicine |
| Developing Educational Videos about National Library of Medicine K-12 Resources |
| Spring Project Report |
|  |
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# Structured Abstract

## Background

The National Library of Medicine has several K-12 resources in the areas of science and health education. The project involved creating a short, engaging video to promote some of the resources, explain the basic features of the resource, and provide tips for using the resources in the classroom.

## Objective

The purpose of the project was to create a 3-4 minute educational video covering [NLM’s K-12 genetics resources](http://sis.nlm.nih.gov/outreach/k12.html).

## Methods

The project was accomplished by focusing on three K-12 genetic resources: Genetics Home Reference, Harry Potter’s World, and GeneEd. In order to provide context, the Associate Fellow reviewed 9th-12th grade national science curriculum standards, and reviewed the genetic contents of several often used science textbooks. Four teachers were contacted and asked to review the K-12 genetic resources. They were interviewed about their experiences with their responses captured on video. Two classroom settings were video-taped, one a mock setting and the other a real-life setting. The video was edited and produced using the Camtasia software.

## Results

Two videos were produced as a result of the project. One video explores all three genetic resources, Genetics Home Reference, Harry Potter’s World, and GeneEd. The second video focuses on the newest resource, GeneEd. While the project was successful, it was filled with challenges because of software and hardware issues. The resulting videos will be used at teacher’s conferences and perhaps be placed on the GeneEd website.

## Conclusions

Educational videos provide a rich medium to appropriately market the features of helpful resources to teachers and students. The video filming, editing and production process is complex and not to be undertaken lightly.

# Screenshot outlining the several topics to choose from for the video project.Background

The National Library of Medicine’s Division of Specialized Information Resources has created and collaborated on several Science and Health Education resources available to K-12 teachers and students. The resources are free of cost and help teachers introduce, reinforce and supplement education programs.

The project specified choosing one of the Science and Health Education topics (see Figure 1), and creating an educational video to promote the resources available on that topic. This would be accomplished by explaining the basic features of the resources, and provide tips on how the resources could be used in the classroom.

All of the topics have interesting resources worthy of being promoted, but there was time enough for only one video. I decided to create a video on the Genetics topic because I wanted to learn more about the GeneEd resource.

Figure 1: Science and Health Education screenshot (sis.nlm.nih.gov/outreach/k12.html) outlining the several topics to choose from for the video project.

# Methods

**National Science Content Standards**

**Website:** [**http://www.nap.edu/catalog.php?record\_id=4962**](http://www.nap.edu/catalog.php?record_id=4962)

**Check out:** Life Science Content Standard C (p. 181)

## Curriculum Review

In order to prepare myself for creating the video, I wanted to get a feel for the areas of genetics that teachers introduce students to in the 9-12 grade curriculums. I decided to review the National Science Content Standards and the Science Content standards of my home state, South Dakota.

The National Science Content Standards helped me understand the width and breadth that science teachers encounter when covering genetic topics in the classroom. The fast moving world of genetics is a difficult target for teachers to take on, but the implications of students not achieving some level of genetic literacy are too great, as noted in the standards:

**South Dakota Content Standards**

**Website:** [**http://doe.sd.gov/contentstandards/**](http://doe.sd.gov/contentstandards/)

**Check out:** Core High School Life Science Standards

*“Because molecular biology will continue into the twenty-first century as a major frontier of science, students should understand the chemical basis of life not only for its own sake, but because of the need to take informed positions on some of the practical and ethical implications of humankind's capacity to manipulate living organisms (National Committee on Science Education Standards and Assessment, 1998, p. 181).”*

South Dakota’s Core High School Life Science Standards request that students at the most basic level, can:

* *tell how DNA determines protein formation*
* *explain how traits are transmitted from parents to offspring*
* *predict the impact of genetic changes in populations (mutation, natural selection and artificial selection, adaptation/extinction). (South Dakota Department of Education).*

While scientists may consider these basic concepts, this level of inquiry and knowledge can be difficult for teachers to pass on to students, especially if students have difficulty in the sciences. Resources, such as Genetics Home Reference, Harry Potter’s World, and GeneEd can provide creative ways to accomplish these learning objectives in the classroom.

## Textbook Review

**Prentice Hall: Biology**

**Website:** [**http://www.millerandlevine.com/intro.html**](http://www.millerandlevine.com/intro.html)



Looking for even more creative inspiration for the video, I decided to check on how science textbooks cover the topic of genetics. I looked at two of the major textbooks used in science classrooms: *Biology* by Glencoe, and *Biology* by Prentice Hall.

Glencoe covers Genetics in Unit 3, and includes chapters on Sexual Reproduction and Genetics, Complex Inheritance and Human Heredity, Molecular Genetics and Genetics and Biotechnology. Prentice Hall covers Genetics in Unit 4, and includes chapters on Introduction to Genetics, DNA and RNA, Genetic Engineering, The Human Genome, Darwin’s Theory of Evolution, and Genes and Variation.

Both textbooks provided me with an outline of the most basic topics covered in the classroom, and reminded me that resources such as GeneEd can be used to reinforce these topics through the use of games, labs and experiments, and videos.

**Glencoe: Biology**

**Website:** [**http://glencoe.mcgraw-hill.com/sites/0078802849/**](http://glencoe.mcgraw-hill.com/sites/0078802849/)



## Conversations and Meetings with stakeholders

When the project began, I made a list of people I wanted to contact because of a specific expertise I hoped they would share with me, or because they work on one of the resources covered in the video.

Below are some of the people I met with or consulted with by email. I am thankful for how generously they shared their time and talents with me.

* **Office of Communications and Public Liaison**
  + Contacts: Melanie Modlin and Shana Potash
  + Advice on interviewing and video editing
* **History of Medicine Division**
  + Contact: Jiwon Kim
  + Gain better understanding of Harry Potter’s World
* **Audiovisual Program and Development Branch (APDB), Lister Hill**
  + Contacts: Anne Altemus, Mike Detweiler
  + NLM Logos, website graphics, stock music and images
* **MEDLARS Management Section**
  + Janet Zipser and Kate Majewski
  + Education expertise
* **Division of Specialized Information Services**
  + Jim Charuhas- video filming experience and editing expertise
  + Berneatta Barnes- gain better understanding of GeneEd

## Video Storyboard

Using the inspiration I had from the curriculum and textbook review, and the conversations I had about NLM’s K-12 genetic resources, I set about creating a video storyboard, which is a document that contains all the visual, audio and time components of a video. I decided to create two storyboards, a Client Story version, and an Animated version. The Client Story version was a video about a teacher’s experience with the Genetics resources, and would be based on a true story. The Animated version was a cartoonish description of ways to use the resources in the classroom.

My project sponsors and I decided to use the Client Story version for a few reasons:

* **Software:** Camtasia Studio, the software identified for this project, would pair well with video footage from an interview with a teacher. The Animated version might require software which had not yet been identified.
* **Experience:** I wanted to work with a population outside of the National Library of Medicine, and in the process, help promote the resources. The Client Story version seemed like a good way for me to meet people and experience how these resources are used in real life. The Animated version might keep me glued to a computer screen, with few options for outside interaction.
* **Outreach:** Stories as told by real-life people can be powerful tools for promoting important resources. The animated version was a fun idea, but might not connect in the same way with the human experience as the client story version.

## Interviews

After we decided upon the Client Story version, the next task was to find teachers who would tell the story of their experiences with the resources. These stories would include a human interest aspect because we would be interviewing actual teachers who use the resources, and the stories would provide ideas for how the resources could be used in the classroom.

I began my search for interviewees through the Division of Specialized Information Services (SIS), where I found Berneatta Barnes, a science teacher working with SIS to develop curriculum and ideas for the GeneEd website. Following a lead from Alla Keselman in SIS, I also contacted Dr. Daniel Levin, a former high school science teacher and current professor at the University of Maryland. These contacts provided me with the perspective of both teachers and curriculum developers.

My search for interviewees also led me to contacting Walter Johnson High School, which is conveniently located a few blocks from SIS. After a few emails, phone calls and mail exchanges, and several weeks, I was able to connect with Science Resource teacher, Patricia Richards. Alla Keselman provided me with a connection to Kathryn Sander, a former intern at SIS, who was now a science teacher at Wooten High School. These two interviewees provided me with access to current teaching strategies and insight into the classroom experience.

The final interviewee list included:

* Berneatta Barnes (Science Teacher)
* Daniel M. Levin (Ph.D. Clinical Assistant Professor, University of Maryland)
* Patricia Richards (Science Resource Teacher, Walter Johnson High School)
* Kathryn Sander (Science Teacher, Wooten High School)

Before the interviews, I developed a set of questions based on the Client Story version of my storyboards. I scheduled the interviews in locations that would provide good background footage, and I sent the interviewees the questions head of time for review. For more detailed information on how I set up the interviews, recorded audio and filmed video, and other considerations, please see the document, “The Making of…a beginner’s experience with creating Education Videos at the National Library of Medicine.”

## Filming B-Roll

Almost every video needs some kind of background footage, or b-roll, to serve as an alternative to the main footage . In order to capture the genetic resources being used in a classroom setting, I needed a school and teacher willing to let me film their students. I also needed to have the parents of the students sign Permission and Consent forms. Kathryn Sander offered to have us film her science classroom and we set about sending off and gathering up the appropriate forms from parents. Filming the B-roll in Katy’s classroom went over seamlessly, as there were several people there to help out and make sure filming went well. The only difficulty was determining which students had completed the Permission and Consent forms. In the end, I made a list of students with forms, and Kathryn Sander looked at the footage to determine that the students in the video had given consent.

As a backup plan (in case something fell through with the real classroom experience) I decided to film B-roll in a staged setting with student and teacher actors. I created a schedule of scenes to film, recruited teenage sons, daughters and friends of SIS employees, and reserved a room with a smart board. The process took some coordination, and several SIS staff members provided assistance. In the end, I had an hour of B-roll covering all of the genetic resources.

## Editing Process

I began the editing process once all of the video had been filmed and transferred to my computer. I reviewed each video file and took notes in a spreadsheet on whether or not I wanted to use it in the video. While writing the Client Story version of the storyboard, I had envisioned only one teacher telling a story of the various resources. After filming, I ended up with four teachers reviewing their use of one or more of the resources, so I rewrote the storyboard to fit the situation.

I was new to using Camtasia so I prepared by watching several online tutorials about editing video. I imported my video and began cutting and stitching clips together. At first this seemed like an easy process, but many small, and some rather large, technical issues plagued the project until the very end. After the editing process was completed, I produced the video and gave the video files and transcripts to my project sponsors.

# Discussion

## Technical Issues

At the beginning of the project, I was unaware that my computer was not exactly optimal for running Camtasia and working with large video files. As the editing process continued and the video file grew in size, my computer was unable to play the video smoothly so that all I saw were choppy video sequences. I also had to save my work every two to three minutes because Camtasia crashed about every five minutes. I originally thought the issue was because I was working with an older version of Camtasia, so I moved my files to a workstation with the newest version of Camtasia. The conversion process didn’t go well, and I had to re-edit large portions of my video. While trying to do this editing, I found that the new workstation with the updated Camtasia was even more sluggish then my computer, although it didn’t have problems with crashing. After several frustrating hours of trying to edit on a sluggish computer, I decided to move the video back to my computer, only to find that I couldn’t open the video on my computer since it had last been saved in the newest version of Camtasia. I opened an older video file without the edits I had spent so much time on, and set to work again on my computer.

Everything was moving forward nicely, and then Microsoft sent out an automatic update that clashed with Window Media Video (.wmv) files. Only the bottom half of the screen was visible in any .wmv video file, which was the format that all of my video files were in. I waited for two weeks, anxiously reading tech blogs and checking the Microsoft website to see if they would fix this issue, to no avail. I finally contacted Camtasia to see if there was anything I could do, and the unfortunate response was that nothing could be done and it was becoming clear that Microsoft might not fix this issue for many weeks. I loaded all my video files onto a Mac Airbook and converted them to .MP4 files and then moved them all back to my computer. I had to start over on the entire video with the new .MP4 files. After two more weeks, I had my new video back up to its previous level of editing.

At this point, I hadn’t seen the video all the way through because my computer was only able to play a few seconds smoothly before becoming choppy. I decided to produce the video to see how it all came out and quickly found that my computer was unable to produce the video. The error messages from Camtasia led me first to believe that some of the video files had become corrupt, so I worked on replacing and re-editing the problem files. After several more unsuccessful attempts at producing the video, I finally contacted the TechSmith support team and was connected with technician Robert, with whom I would exchange over thirty emails in the coming weeks.

After more than a week of emails back and forth, Robert preliminarily determined that my problem was the older version of Camtasia. Taking this into consideration, I moved my video to the older workstation with the newest version of Camtasia and spend several days re-editing the parts that did not convert well. In the conversion process, several of the files corrupted so even trying to produce the video on that workstation was not an option until all the files were fixed. Next up were several unsuccessful attempts to produce the video. Robert next thought that Camtasia was taking issue with my files which were saved in a networked system. I moved my files to the desktop and tried to produce the video, and was again unsuccessful.

Robert finally determined my overall problem was the computers that I was using; a problem that was confirmed after sending him profiles about the type of computers I was working on. He asked me to upload my video to the Techsmith website so that he could produce it for me. Once I viewed the produced video, I noticed several issues, some of which happened because the video played back so choppily that my edits weren’t precise enough, while others were due to the conversion process between the older version on my computer and the new version on the sluggish workstation.

I made more edits and spend hours adding captions to the video. I had, much earlier than this, created three versions of the video. The first was the long version which included clips on all three of the genetic resources. The other two videos were shorter versions which included clips of only GeneEd. All of these technical issues affected each video, and editing the three versions was time consuming.

Once Robert diagnosed the problem as “under computing” I decided to take the videos to Jim Charuhas at SIS, who had filmed the interviews for me, and has experience editing and producing quality videos. I had wanted to do as much of the editing and problem solving on my own so that I could learn the process, but at this point I couldn’t do anything about the computer issue. Jim worked steadily on the videos from his more optimal computer, and eventually produced a nicely edited version of the long video, and one version of the shorter video.

## The Making of…

I documented all of what I consider my “lessons learned” into a guide to take with me in the anticipation that I will continue to be involved in media projects. I also hope the guide will be useful to others beginning video projects at NLM. All of the facts that I gathered, processes I went through, practical tips I learned and people I contacted are found in the guide, “The Making Of… a beginners experience with creating educational videos at the National Library of Medicine.”

## NIH MedlinePlus Magazine

One of the strongest supporters of my work on this project was Shana Potash from the Office of Communication and Public Liaison. She has experience in video producing and offered to review my work and make suggestions for improvement, and her assistance was very helpful to me. Shana also works with and writes stories for the NIH MedlinePlus quarterly magazine. Since the summer 2013 edition centered on the topics of Genetics, Shana came along with me to Kathryn Sander’s interview and helped me film B-roll in the classroom. She included portions of the interview and some photos of the classroom in her article on GeneEd for the NIH MedlinePlus magazine.

# Acknowledgements

I wish to acknowledge the project managers, Alla Keselman and Andrew Plumer for the guidance, and support they provided to me during this project. I would also like to acknowledge Kathel Dunn, NLM’s Associate Fellowship Coordinator for her support and oversight of this project. I am very thankful for assistance of James Charuhas for filming the interviews, teaching me about background setup, lighting and audio, and for all of the hours of video editing. Finally, I would like to thank the National Library of Medicine, Dr. Lindberg, Betsy Humphreys, Joyce Backus and Dianne Babski for providing me with the opportunity to learn from and work with the National Library of Medicine.

# References

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