

Pathways Web

Final Report

CS 4624 Multimedia, Hypertext, and Information Access Capstone

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Executive Summary

Virginia Tech is updating its general education requirements, replacing the Curriculum for Liberal Education (CLE) with the Pathways Program. With this effort the Office of General Education is trying to improve the way that courses are publicized. The goal of this push is to allow students to make a more informed decision about which courses to select to fulfill their general education requirements. Our team worked with a team in the Office of General Education to revamp the current Pathways website by producing new content for courses. For each course, this included creating a course trailer, taking photographs of the course, writing synopses, and interviewing students about their experiences with the course. Additionally, we produced a series of more faculty oriented podcasts to provide some context for the program on the whole. This new content was added to an updated version of the website we created which at the time of writing is awaiting approval as a part of a larger Pathways web presence overhaul.

Introduction

The Pathways project is a coordinated effort between the project team and the client team. The project team consists of a group of students from the Multimedia, Hypertext, and Information Access Capstone (CS4624) taught by Dr. Edward A. Fox. The client team consists of three Virginia Tech staff members who guided the project team in creating the Pathways content to suit the needs of Virginia Tech. The project team coordinated with professors and created multimedia content for each Pathways pilot course, as well as compiled existing information. This will be uploaded to the Pathways website, where it will be used by Virginia Tech students to make informed choices on which courses to take.

The objective of the project is to improve the student experience when deciding which courses to take to fulfill their general education requirements. The current information provided to students on this subject is judged by the client team as exceedingly limited. The production of more content in the form of student interviews and course trailers presented as a part of the Pathways website is intended to address this problem. The team additionally produced podcasts targeted at existing faculty to raise interest and awareness of the program at large. Furthermore, the team compiled many pre-existing resources that the client team and individual professors possessed together and added them to the Pathways website.

User's Manual

Current Access to Website

The webpages created for this project are part of a larger Pathways website. The rest of the Pathways website is not yet completed, so the general public cannot see the pages we created. We were able to get the Pathways client team to approve access for our specific pages as a staging, or review phase. This means that anyone with a current Virginia Tech PID and password can view only the Pilot Course pages if they login with their information. Logging in with your PID and password at the link below will take you to the Pilot Course Homepage.

<https://pathways prov.stage.cms.vt.edu/PilotCoursesHomepage.html>

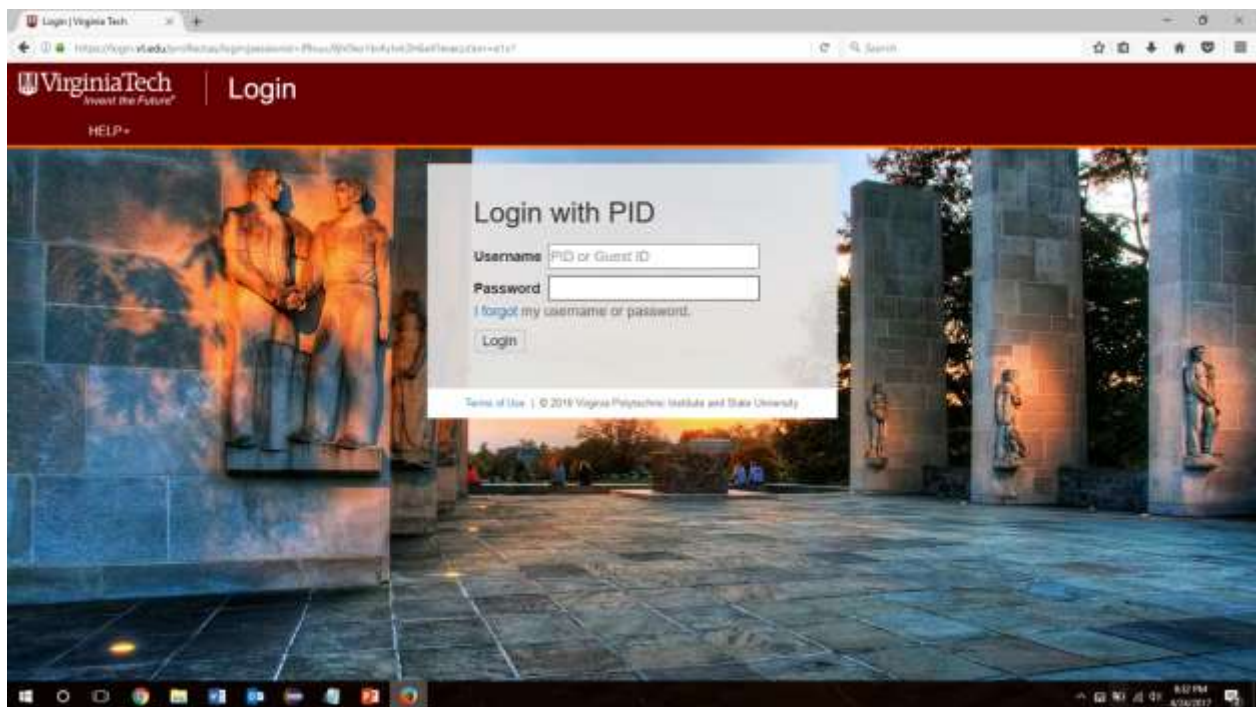


Figure 1
Virginia Tech Login Screen

There is a known problem viewing images when using the staged website in certain browsers (Virginia Tech, "Issue with images on Stage site", 2016). Because of this, the user must use Firefox, Safari, or Microsoft Edge to avoid these issues.

Future Access to Website

As of right now, the rest of the Pathways website is not completed since the Pathways program is not expected to be deployed for another year or so. Once the rest of the website is completed and everything is approved and tested, the website as a whole will be published for the general public (people with a PID and people without) to see. Anyone wishing to view this website will be able to put in

the link for the Pathways website or navigate there from within a wider Virginia Tech website. Disclaimer: we are not entirely sure how the rest of the website will be set up, but the following will be based on our assumptions. The Pathways website will have an overall homepage, and from the homepage, you can navigate to other parts of the website including News, About Pathways, and Pilot Courses. There will be tabs at the top of the page that will link to these other pages. Pilot Course will be one of these tabs and will link you to the Pilot Course Homepage.

General Use of Website

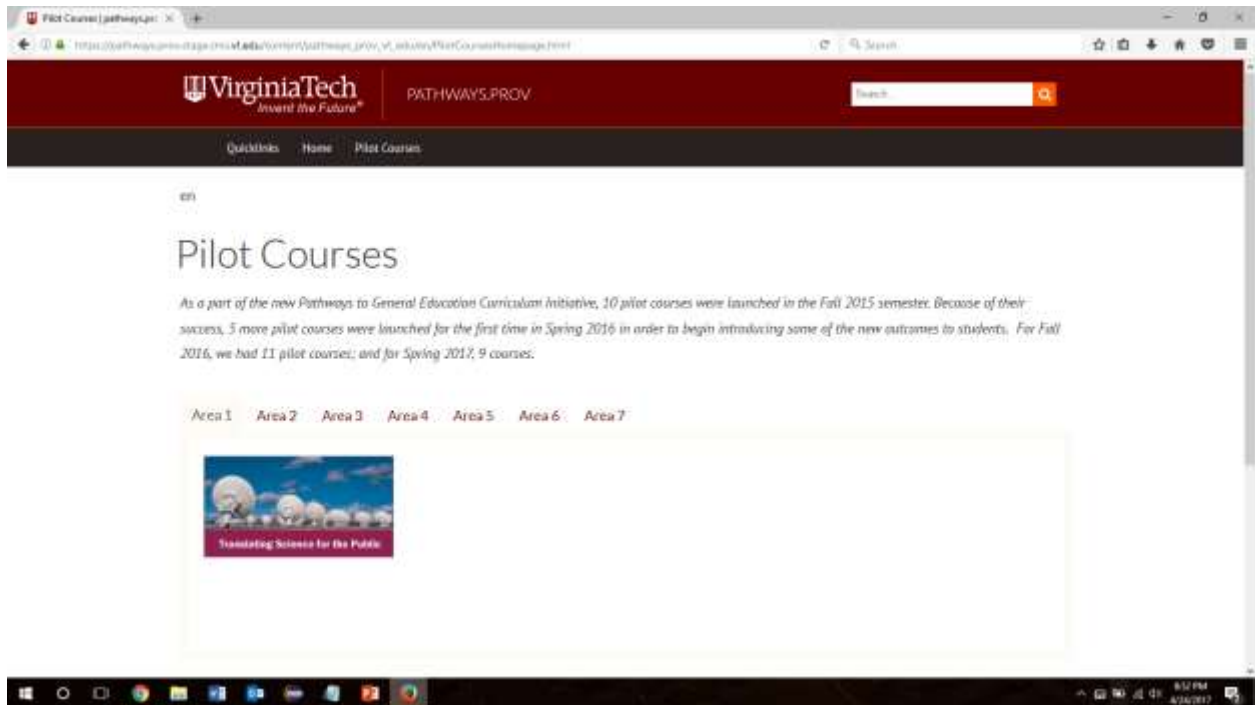


Figure 2
Pilot Courses Homepage

Figure 2, which is the Pilot Courses Homepage, shows the initial screen a user will see. From the homepage, a user will be able to click on the tabs based on which CLE Area they want to view. The small paragraph at the top of the page explains the pilot courses in general. When a user clicks on a course graphic, it will redirect them to one of two places. If content has been collected or created for that specific course (pictures, video, quotes, or podcast), then the user will be directed to that course page. If there is no content for a specific course, then clicking on the course graphic will direct you to a PDF of the course flyer that displays in the same window (Figure 3 shows this).

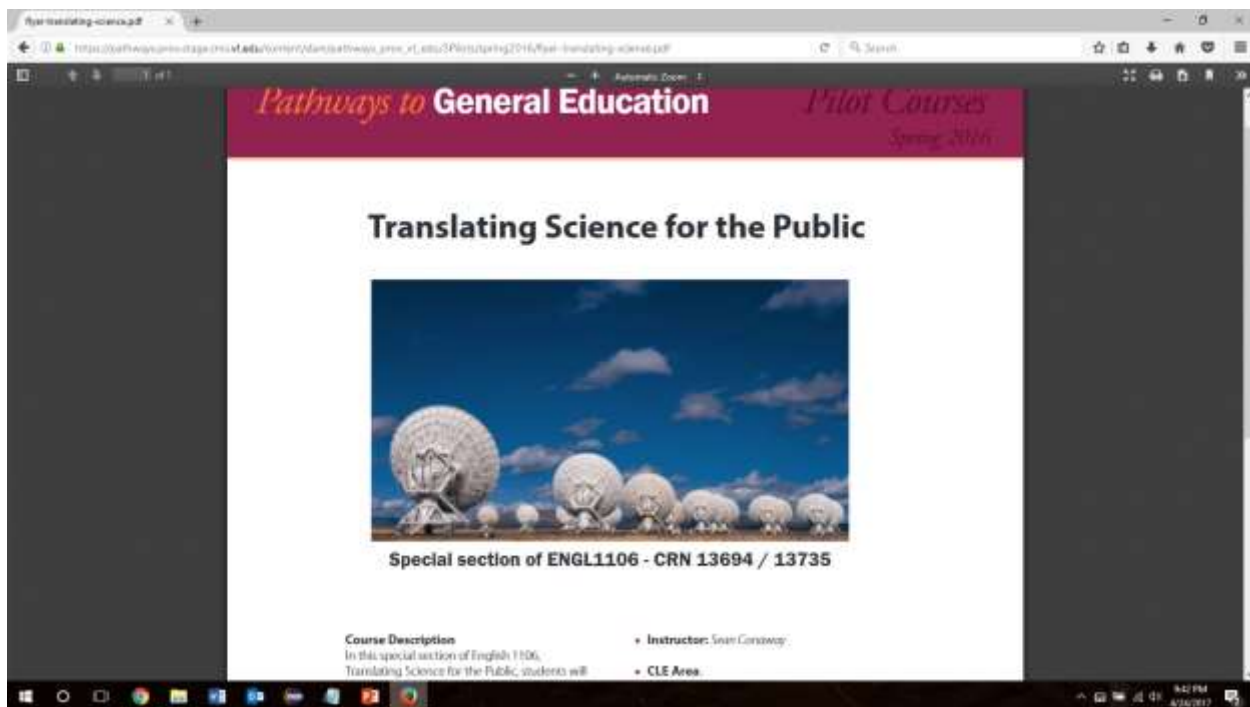


Figure 3
Course Flyer for Translating Science for the Public

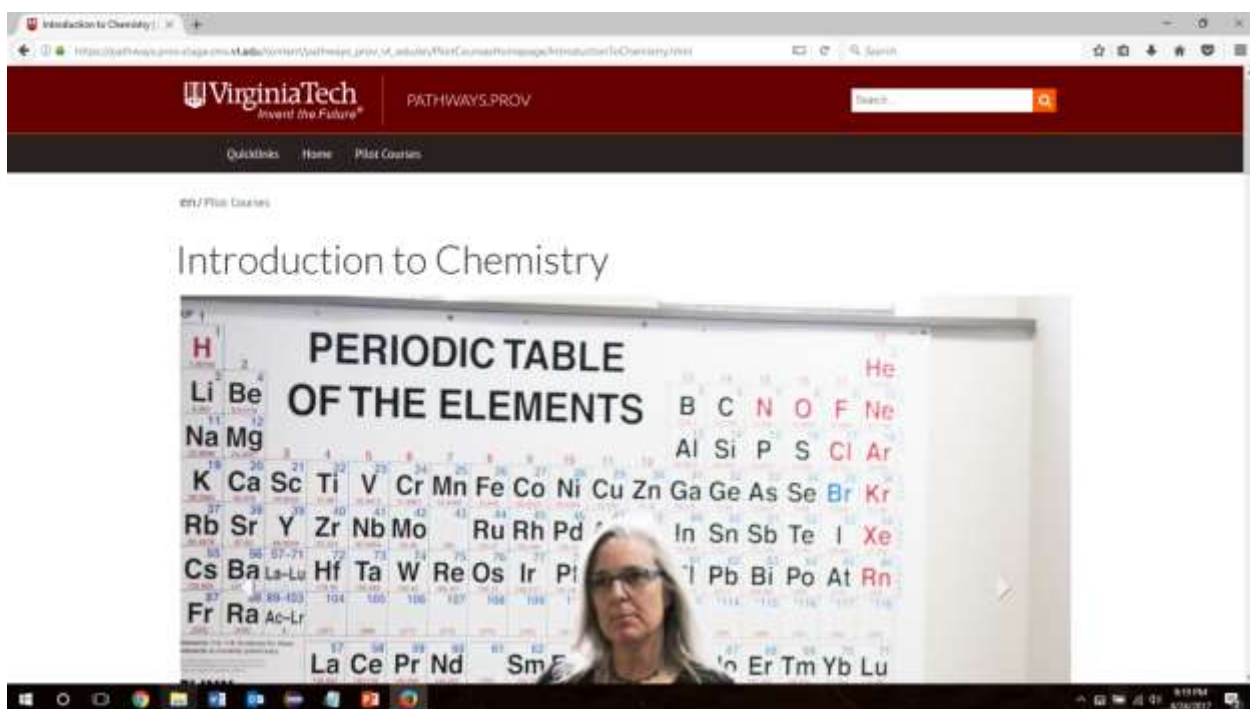


Figure 4
Introduction to Chemistry Webpage Part 1

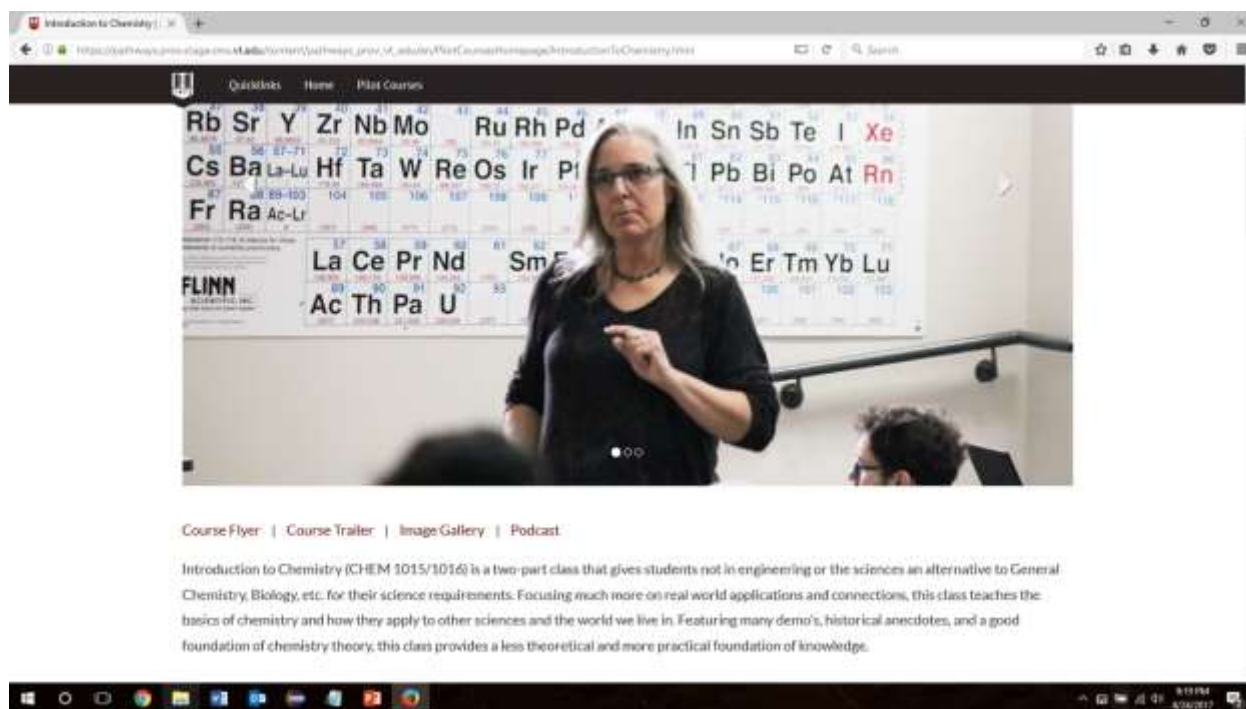


Figure 5
Introduction to Chemistry Webpage Part 2

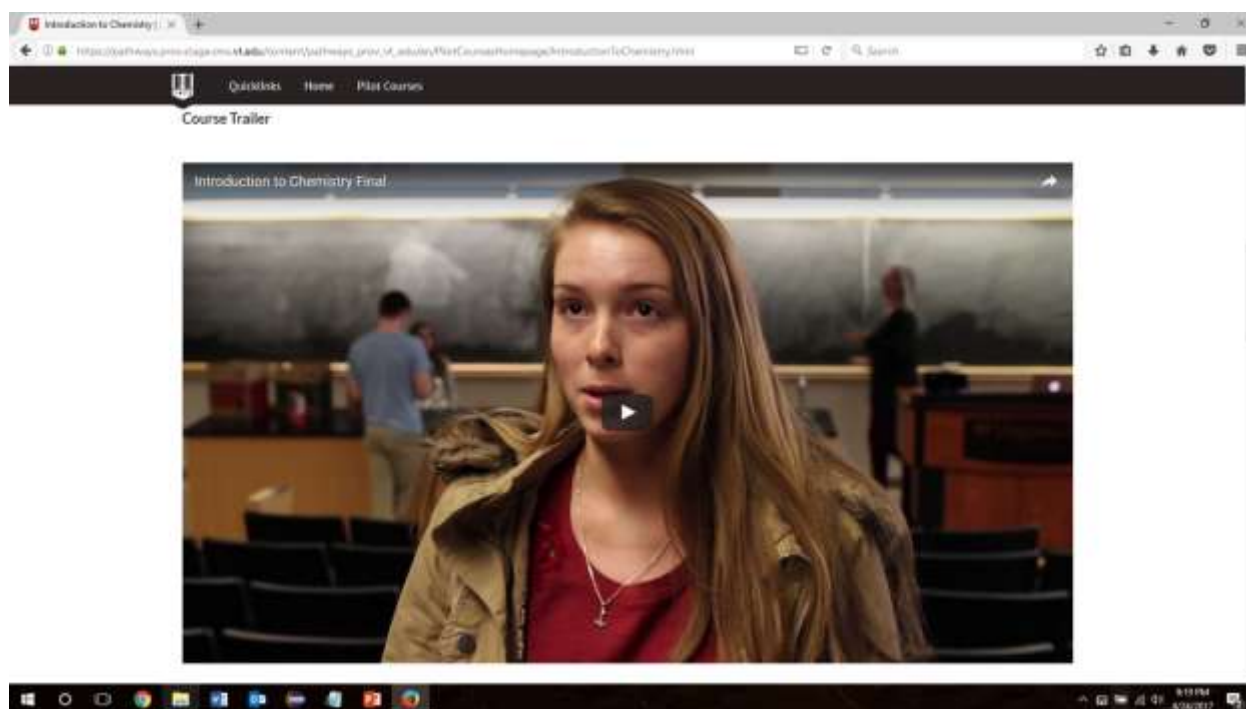


Figure 6
Introduction to Chemistry Webpage Part 3

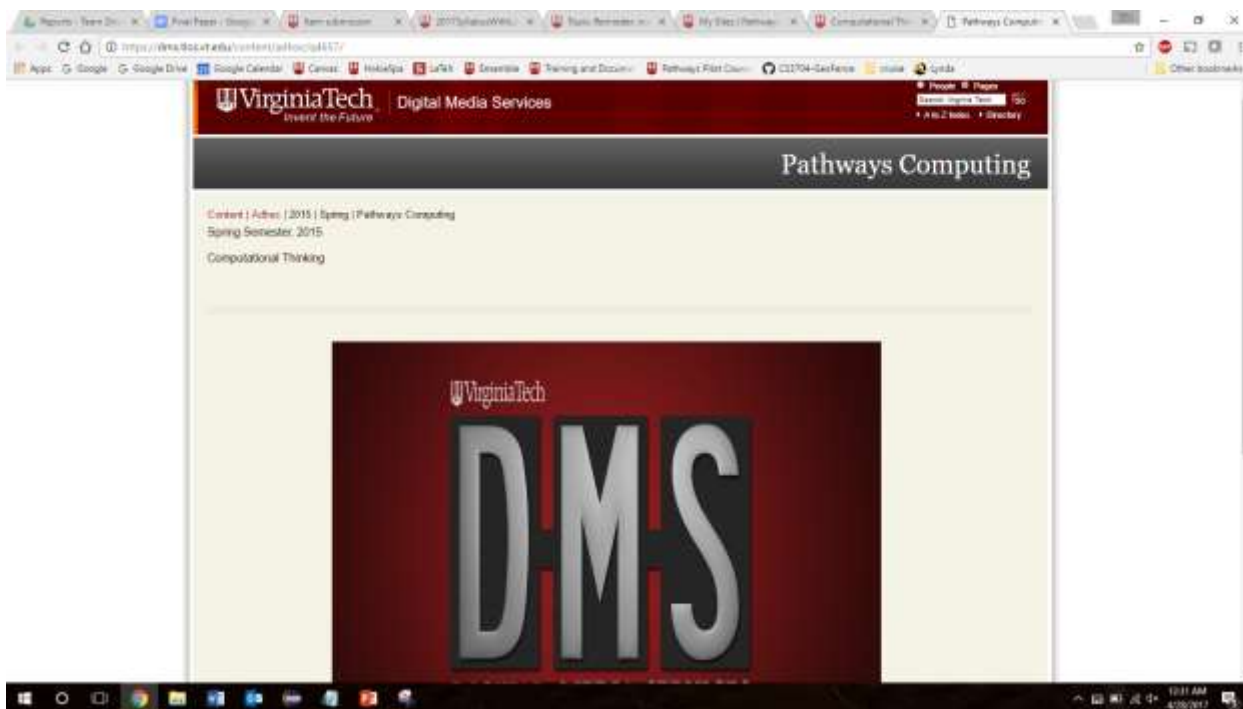


Figure 7
Introduction to Chemistry Webpage Part 4

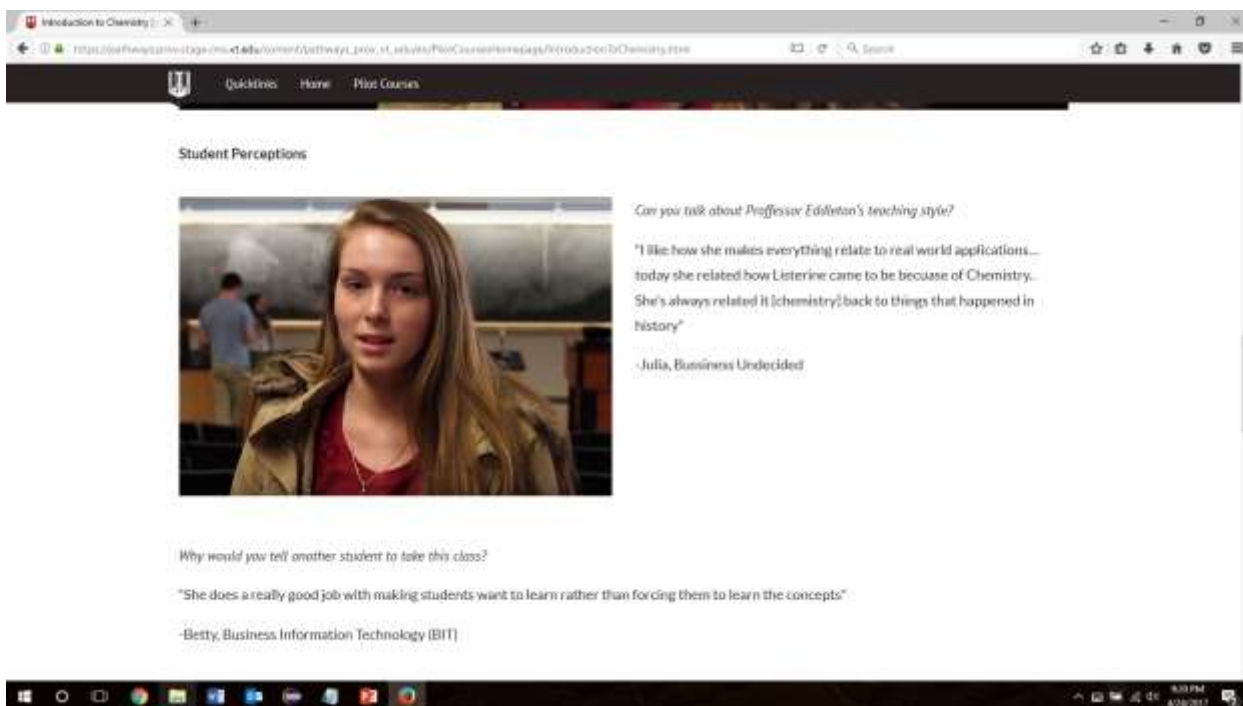


Figure 8
Introduction to Chemistry Webpage Part 5



Figure 9
Introduction to Chemistry Webpage Part 6

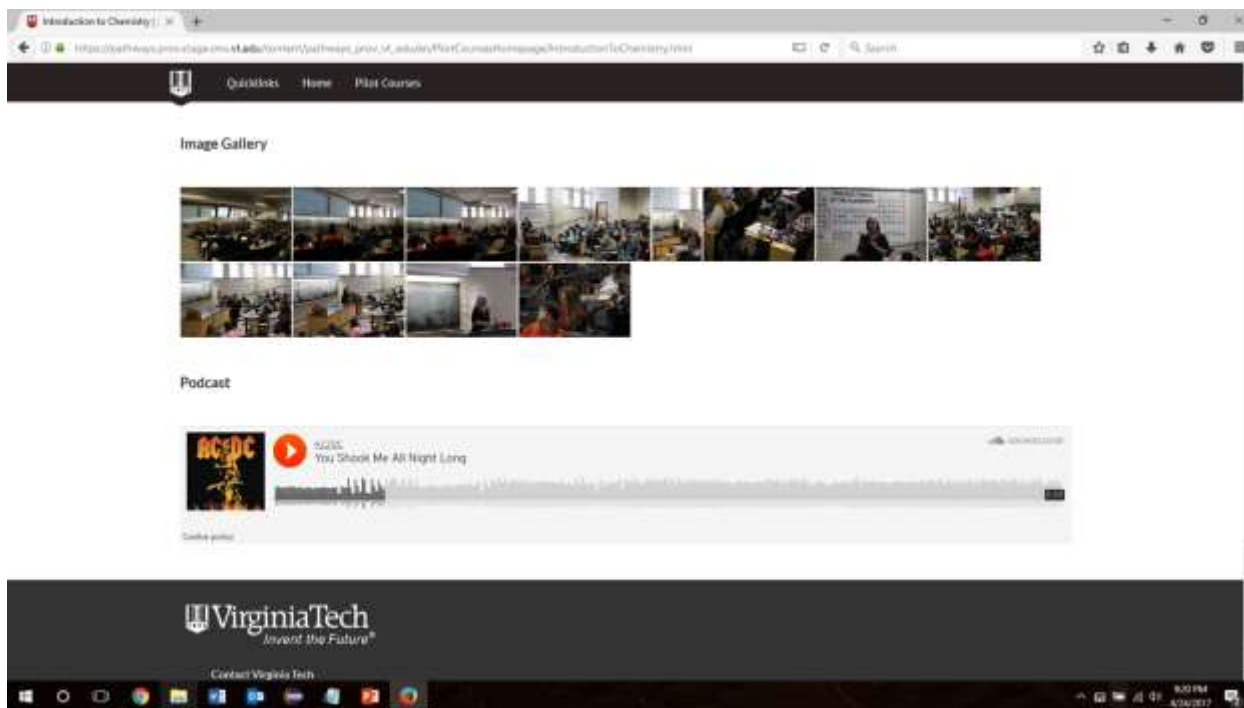


Figure 10
Introduction to Chemistry Webpage Part 7

Figures 4 through 8 show what a typical course page looks like as you scroll down the page. The page might vary based on the content that we have. For example, if there is no course trailer for a class, then the “Course Trailer” section will not be visible. At the top of the page is a carousel gallery that contains one to three pictures. The user can rotate through the pictures by clicking on the arrows on the right and left of the picture. Beneath the carousel gallery is a list of links separated by “|” to denote the different links (this is shown in *Figure 5*). When you click on one of these links, a jump will be made to that specific section. For example, clicking on the “Course Flyer” link will pull up a PDF of the newest course flyer in the same window and clicking on the “Image Gallery” link will jump down the page to the image gallery. Under the links on every page is a short description about the course and what the course can offer to students.

Scrolling down more will take you to the Course Trailer section. There are two types of videos here: videos that we produced and videos that were produced in previous semesters. If it is a video that we produced, then the video is embedded from YouTube in the page and can be played right inside the page (Boswell, "Here's What 'YouTube' Really Is", 2016). *Figure 6* shows a view of the embedded video. The user can press the play button, and the video will play. The screen size of the video will stay the same, although there is the option of enlarging the screen. If we did not produce the video, then the video is linked to another page (as shown in *Figure 7*) and will open in a new tab. The videos produced in the past are hosted by Virginia Tech’s Digital Media Services (DMS) (Virginia Tech, "Digital Media Services", 2011).

Below the Course Trailer section is Student Perceptions (*Figure 8*). These are quotes from students about the class. Their picture is next to the quote and under the quote is their name and major.

The next section is the Image Gallery. All the featured pictures from this course are in the gallery. The gallery is called a lightbox gallery (Miyashita, "Lightbox Gallery", 2016). This means that when you click on one picture, the picture will open up and be the center of the screen as shown in *Figure 9*. You are able to scroll through the pictures with left and right arrows, and you are able to exit the screen by clicking on the X in the upper right corner, or the escape key.

The last section at the bottom is the Podcast section. The podcasts are hosted on SoundCloud (Lu, "The Beginner's Guide to SoundCloud", 2013) and are embedded in the page (shown in *Figure 10*). To play the podcast, the user simply has to push the play button within the podcast embedded box. Each podcast is titled to show which professor was interviewed for the Pathways podcast.

The user is able to click the back button in the Web browser to navigate to the previous page they were on. It is similar with the forward button.

Developer's Manual

Project Management

A large portion of the project involved coordination between our team, the client team, and various professors. Throughout the semester, we refined our process to include three phases: Coordination, Visit, and Content Coordination.

Coordination

This step was the 'setup' phase. We sat down with the client, finding out what media they wanted created, who they were targeted at, and what classes and professors to work with. In this step we determined the client team wanted us to create student perceptions (quotes), course trailers, podcasts, synopses, and featured photos. We then received a list of professors who we were to work with. We were introduced via email by a member of the client team they knew. After that introduction we sent out a survey (using Virginia Tech Qualtrics) shown in *Figure 11* to gauge the willingness of each professor to allow us to visit, interview, and record, as well as gather info on when and where to meet (Virginia Tech, "Qualtrics Survey Software", 2014).

Q6. What is your title, first, and last name?
Dr. Lisa Hester

Q7. Would you be willing to have a student photographer come take pictures of your class on a day of your choosing?
 Yes
 No
 Other _____

Q2. Would you be willing to participate in a 1/2 hour podcast discussing these topics?
- How you became involved with iPathways
- Discussing basic principles of inclusivity, relevance, and integration and how you are currently applying or plan to apply this to the classroom.
- Talk us through how you integrate ethical reasoning or Intercultural Global Awareness within your classroom.
- How you see your work paying off for your students in the short term and in the future?
 Yes
 No
 Other _____

Q4. Would you be willing to be briefly interviewed/ have students video segments of the class?
 Yes
 No
 Other _____

Q5. Would you allow Pathways staff obtain quotes from students regarding their experiences in the class?
 Yes
 No
 Other _____

Q6. If you are willing to allow any of the in class portions, what are the meeting time(s) of the class this semester?
T-Th 9:30-10:45

Figure 11
Virginia Tech Qualtrics Survey

After receiving the responses, we worked individually with each professor to schedule a time we could visit their class. In order to boost response rates, we had members of the client team remind unresponsive professors when they ran into each other in other meetings, as well as sent out reminder emails. Together this doubled our response rate from six to twelve.

Visit

The visit involved many activities. Once a time acceptable to the professor was agreed upon, our team worked to ensure we had adequate people and equipment available to gather everything we needed in one visit. During every visit we attempted to have at least two team members present. Each team member had photography equipment, either personal or rented from Innovation Space at Virginia Tech. During this visit we captured as many photographs as we could, as well as B-Roll footage. After the class, we worked to interview at least three students and the professor about the class, using a pre-created set of questions, shown in *Figure 12*.

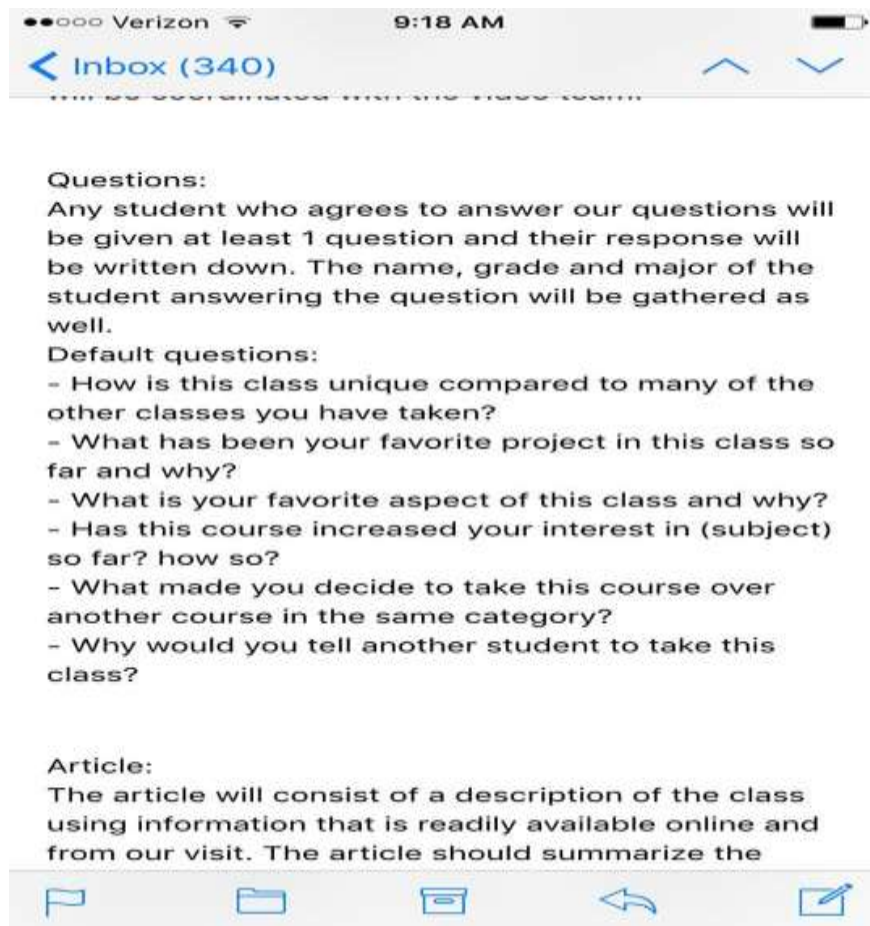


Figure 12
Questions Asked of Students

In addition, we asked the professor for a brief synopsis of their class and a pitch for why students should take their class. We also worked with professors to schedule a separate podcast visit at this time. All of the raw content gathered from these visits was uploaded to our team drive, outlined in the Project Inventory section below. The raw content was then reviewed by the video and web team to ensure it met our goals and to see if any reshoots were needed.

Content Creation

Content Creation required all other steps to be completed first, so ensuring everything moves on schedule is important in order to have appropriate time for this step. Here the video, podcast, and story teams edit all of the raw content to create the finished products - a Course Trailer, Class Blurb, Podcast, and Featured Photos. In addition to creating the content, we had to get all the content uploaded to the new Pathways website and approved by the client team.

Project Inventory

Data Storage System

Our team recorded, created, and received a large number of files. Part of our job was to compile and organize these files in a manner that worked for us, any developers continuing the project, and any administrators wanting to use our work. To do this the team utilized Virginia Tech's Team Drive (Google, "Get started with Team Drives", 2016), which provides several specific advantages:

- Large storage space. Since it is set up through Virginia Tech, it has no individual file size limit, allowing the project to expand as needed.
- Simple Access Control. Anyone with a Virginia Tech email can be added to the drive, and since no one person controls the folder, transferring ownership as the team changes is a simple process.
- The file system is searchable.
- Familiarity. Using the same interface as Google Drive allows many of the non-technical members of the client team to better utilize the repository.

In order to make good use of this repository, we needed an easy to understand organizational system. Therefore, we split up the resources into folders as shown in *Figure 13*.

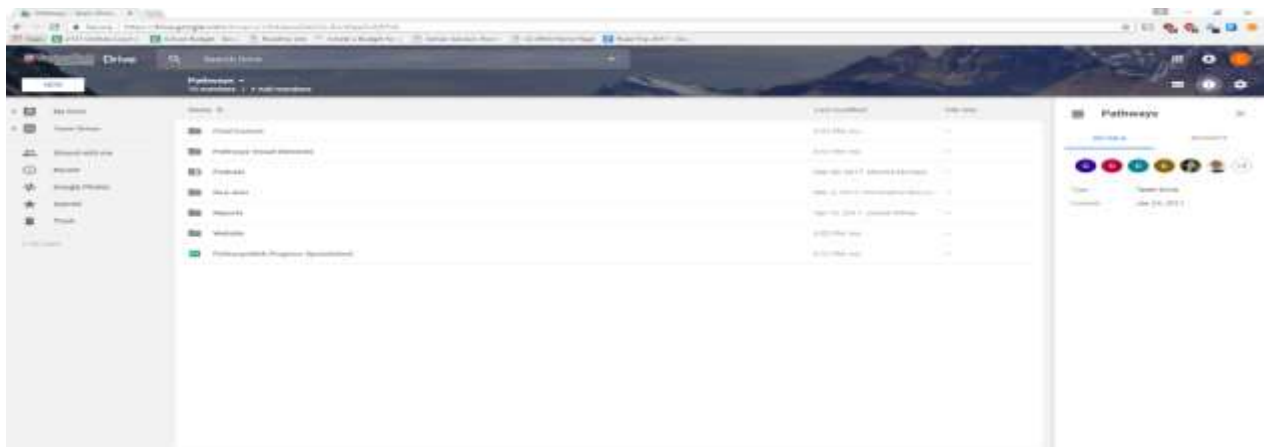


Figure 13
Top Level File System of the Team Drive

Several folders (Podcast, Reports, Website) contain the resources needed for that part of the project, such as intro slides, templates, and raw audio files. The 'Raw data' folder contains all of the photos, pictures, and video footage obtained from visiting classes, as well as all the old photos and videos

provided by the client team and professors from previous semesters. The 'Final Content' folder contains the final product - the course trailers, featured photos, student quotes, etc., that are to be published on the Pathways website, sorted by class.

Program Inventory

The team used a spreadsheet to keep track of what had been done for every class. That spreadsheet listed every professor that responded to our survey agreeing to participate in at least one part of the project. As different portions were scheduled and completed, they were marked on the spreadsheet, shown in *Figures 14 and 15*.

Professor	Course	Stage	Status	Professor Status	Email	News Status	Prof Response	Professor	Medical Response	Status	Notes	Status
Dr. Lisa Michael	ORGANIC	1-81	9:30-10:30am	Completed	Completed	Yes	Completed	Completed	Completed	Yes		Completed Professor
Timothy Cahill	General Sustainability IIS	1-81	9:30-10:30am	Completed	Completed	Yes	Completed	Completed	Completed	Yes		Completed Professor
Madison Ely	Principles of Earth Science	7	2:00-3:15pm	Not Completed	Completed	Yes	Completed	Completed	Completed	Yes		Completed Professor
Dr. Jonathan B. Wilson	General Chemistry	2-81	11:00-12:00pm	Completed	Completed	Completed	Completed	Completed	Completed	Completed		Completed Professor
Dr. Alan-Mike Kumbach	Intro to Chemistry: Part 1 & 2	8-21	5:00-11:00am	Not Completed	Not Done	N/A	N/A	N/A	N/A	N/A	Class moved they talked with you on how this connects to acceptable content	
Alan-Mike Kumbach	Genetics and Health: Experience	N/A	N/A	Completed	N/A	N/A	Completed	N/A	N/A	N/A	Class moved they talked with you on how this connects to acceptable content	
Frank Roggeby	8th Grade											

Figure 14
Progress Spreadsheet

Course	Podcast	Class Visit	Raw Video	Professor Interview	Pictures	Student Interview	Video Trailer	Notes
CREATE!	✓✓	✓	✓	✓	✓	✓	✓	Two professors, each made a podcast
Seeking Sustainability	✓	✓	✓	✓	✓	✓	✓	
Foundations of Environmental Science		✓	✓	✓	✓	✓	✓	
Introduction to Chemistry	✓	✓	✓	✓	✓	✓	✓	
World Crops & Systems		✓	✓	✓	✓	✓	✓	
Creativity and Aesthetic Experience	✓			✓				Class not offered this semester

Figure 15
Finished Deliverables

As multiple professors were not teaching a Pathways class this semester, didn't respond, or were otherwise unavailable, anyone wishing to continue this project can extend this spreadsheet to track classes as needed. Additionally, the team created a website spreadsheet that allows us to track content that is on the website, shown in Figure 16. This was created separately due to the fact there is legacy content on the old website that needed to be ported to the new one, as well as classes that the team obtained old photos for, that the client team wanted posted. This separation allowed us to track the classes the team was creating content for separately from the classes the team was placing on the website.

Course Title	Description	Video	Audio	Podcast	Other
Computational Thinking	CS, 101	Yes	Yes	Yes	
Introduction to Chemistry	CH, 101	Yes	Yes	Yes	
Introduction to Microbiology	MB, 101	Yes	Yes	Yes	
Introduction to Physics	PH, 101	Yes	Yes	Yes	
Introduction to Biology	BI, 101	Yes	Yes	Yes	
Introduction to Earth Science	ES, 101	Yes	Yes	Yes	
Introduction to History	HI, 101	Yes	Yes	Yes	
Introduction to Art	AR, 101	Yes	Yes	Yes	
Introduction to Music	MU, 101	Yes	Yes	Yes	
Introduction to Theater	TH, 101	Yes	Yes	Yes	
Introduction to Film	FI, 101	Yes	Yes	Yes	
Introduction to Journalism	JO, 101	Yes	Yes	Yes	
Introduction to Public Health	PH, 201	Yes	Yes	Yes	
Introduction to Environmental Science	ES, 201	Yes	Yes	Yes	
Introduction to Business	BU, 101	Yes	Yes	Yes	
Introduction to Law	LA, 101	Yes	Yes	Yes	
Introduction to Political Science	PS, 101	Yes	Yes	Yes	
Introduction to Sociology	SO, 101	Yes	Yes	Yes	
Introduction to Anthropology	AN, 101	Yes	Yes	Yes	
Introduction to Linguistics	LI, 101	Yes	Yes	Yes	
Introduction to Philosophy	PH, 301	Yes	Yes	Yes	
Introduction to Religion	RE, 101	Yes	Yes	Yes	
Introduction to Health Services	HS, 101	Yes	Yes	Yes	
Introduction to Criminal Justice	CJ, 101	Yes	Yes	Yes	
Introduction to Social Work	SW, 101	Yes	Yes	Yes	
Introduction to Human Services	HS, 201	Yes	Yes	Yes	
Introduction to Early Childhood Education	ECE, 101	Yes	Yes	Yes	
Introduction to Child Development	CD, 101	Yes	Yes	Yes	
Introduction to Family Studies	FS, 101	Yes	Yes	Yes	
Introduction to Human Services	HS, 301	Yes	Yes	Yes	
Introduction to Health Services	HS, 401	Yes	Yes	Yes	
Introduction to Health Services	HS, 501	Yes	Yes	Yes	
Introduction to Health Services	HS, 601	Yes	Yes	Yes	
Introduction to Health Services	HS, 701	Yes	Yes	Yes	
Introduction to Health Services	HS, 801	Yes	Yes	Yes	
Introduction to Health Services	HS, 901	Yes	Yes	Yes	
Introduction to Health Services	HS, 1001	Yes	Yes	Yes	
Introduction to Health Services	HS, 1101	Yes	Yes	Yes	
Introduction to Health Services	HS, 1201	Yes	Yes	Yes	
Introduction to Health Services	HS, 1301	Yes	Yes	Yes	
Introduction to Health Services	HS, 1401	Yes	Yes	Yes	
Introduction to Health Services	HS, 1501	Yes	Yes	Yes	
Introduction to Health Services	HS, 1601	Yes	Yes	Yes	
Introduction to Health Services	HS, 1701	Yes	Yes	Yes	
Introduction to Health Services	HS, 1801	Yes	Yes	Yes	
Introduction to Health Services	HS, 1901	Yes	Yes	Yes	
Introduction to Health Services	HS, 2001	Yes	Yes	Yes	
Introduction to Health Services	HS, 2101	Yes	Yes	Yes	
Introduction to Health Services	HS, 2201	Yes	Yes	Yes	
Introduction to Health Services	HS, 2301	Yes	Yes	Yes	
Introduction to Health Services	HS, 2401	Yes	Yes	Yes	
Introduction to Health Services	HS, 2501	Yes	Yes	Yes	
Introduction to Health Services	HS, 2601	Yes	Yes	Yes	
Introduction to Health Services	HS, 2701	Yes	Yes	Yes	
Introduction to Health Services	HS, 2801	Yes	Yes	Yes	
Introduction to Health Services	HS, 2901	Yes	Yes	Yes	
Introduction to Health Services	HS, 3001	Yes	Yes	Yes	
Introduction to Health Services	HS, 3101	Yes	Yes	Yes	
Introduction to Health Services	HS, 3201	Yes	Yes	Yes	
Introduction to Health Services	HS, 3301	Yes	Yes	Yes	
Introduction to Health Services	HS, 3401	Yes	Yes	Yes	
Introduction to Health Services	HS, 3501	Yes	Yes	Yes	
Introduction to Health Services	HS, 3601	Yes	Yes	Yes	
Introduction to Health Services	HS, 3701	Yes	Yes	Yes	
Introduction to Health Services	HS, 3801	Yes	Yes	Yes	
Introduction to Health Services	HS, 3901	Yes	Yes	Yes	
Introduction to Health Services	HS, 4001	Yes	Yes	Yes	
Introduction to Health Services	HS, 4101	Yes	Yes	Yes	
Introduction to Health Services	HS, 4201	Yes	Yes	Yes	
Introduction to Health Services	HS, 4301	Yes	Yes	Yes	
Introduction to Health Services	HS, 4401	Yes	Yes	Yes	
Introduction to Health Services	HS, 4501	Yes	Yes	Yes	
Introduction to Health Services	HS, 4601	Yes	Yes	Yes	
Introduction to Health Services	HS, 4701	Yes	Yes	Yes	
Introduction to Health Services	HS, 4801	Yes	Yes	Yes	
Introduction to Health Services	HS, 4901	Yes	Yes	Yes	
Introduction to Health Services	HS, 5001	Yes	Yes	Yes	

Figure 16
Website Content

Those two documents together provide a good status of the program, and should be referenced by any future developers to ensure work is not being duplicated.

Course Trailer

Recording the Content

Making the course trailers started with the initial email to the professor. If the professor was recording a podcast, we would ask to do the video interview after the podcast interview. This way, there was a separate time outside of class in which they could interview. It also was the most efficient for the professor in terms of time. They could complete both the podcast and their part of the course trailer within an hour window.

Initially we recorded the video interviews in a side room of Innovation Space. But, for the last video interview we used a black screen. The black screen has benefits and negatives. It does look very professional and is not a distracting background.

If the professor was not doing a podcast, then the video interview would typically take place right after their course on the day in which we conducted a visit. The background for the interview would then be of the classroom. This often gave a better feel for the course than if the interview was conducted in a studio. The student interviews always took place after class. The filmers would ask 3 to 4 students to stay after to ask them questions about the course.

Finally, B-Roll footage had to be collected. Typically professors would suggest the filmers to come on certain days when there were either demos, student presentations, or group work. While capturing B-Roll, there was an effort to capture both wide and close angle shots of the professor teaching, wide angle shots of the entire class, plus close up shots on specific students. If the filmer had an idea of who they would ask to interview, then close up shots should be taken of that student. If the class was a lab or there was a demo occurring, then some close up shots of the activity (without any faces) were very useful. A tripod was used for collecting B-Roll. Without a tripod, most footage was shaky, and shaky footage is bad footage. Finally, a key thing to remember is that there is no such thing as too much B-Roll.

Editing videos

We created a template for the course trailer which was developed through editing the first trailer. The basic template was to start with the professor introducing themselves, then cut to a title slide with course information. The professor then described the course. Next, the video cuts to students describing what they think of the course. Finally, the professor ends the video with a brief message to prospective students on why they should take the course. Depending on the interviews, the actual video sometimes differed from this, but for the most part we were able to stick to the template.

The first step of the editing process was to cut up the professor interview into an explanation about the class. Depending on the interview, sometimes more decisions had to be made during editing. If the interview was long and the professor had multiple takes saying similar things, then the editor had to decide on which take was best. Sometimes the ordering of statements was re-arranged. However, when the interview is played, it should sound like one cohesive explanation. If the edited interview sounds choppy, then more editing is needed.

Next, the goal was to find a common thread with the student interviews. Most of the time what the students were saying would coincide with what the professor had said about the course.

After that, the editor would figure out the best way to join both the professor and student interviews. In some videos, we would go from professor explanation about the course, to student interviews, to professor pitch about the course. Other times, the professor would pitch the course to students and explain why a student should take the course during the explanation about what the course was. In these trailers, the student interviews followed the professor interview portion. There was not a cut back to the professor at the end of the video.

After there was a cohesive video which explained the course, the title slides were added. There is a title slide with the course information which is added over a clip of the professor saying the name of the course and the CLE and Pathways area that it fulfills. Next, the title slides “What students are saying” and “Why you should take this course” are added to the video timeline. Lastly, student title cards are added which contain the student’s first name and their major.

Finally, the B-Roll footage is added. The first shots of B-Roll take place while the professor is explaining the course. So, there was an effort to use well lit, wider angle shots of the professor teaching in class. For the student interviews, there was an effort to have at least one clip of B-Roll be of the student who is talking. This makes the video feel more cohesive, since the viewer gets to see who they are listening to. B-Roll is added then throughout the rest of the project, though there is no formula for how much or how little to add. The important part is to ensure the B-Roll makes sense when it is shown while a student or professor is talking. The last edit necessary was to add the Virginia Tech branded video outro.

The audio in the B-Roll clips was lowered to ~-18db. This was per request of our client, as they desired to have faint background audio to make the B-Roll feel livelier. The audio in the student interviews had to be boosted to ~+3db to make it easy to hear and to match the audio level of the faculty interview.

The final step was to exporting. First, we exported the video trailer itself using the H.264 codec at 1920x1080 resolution. Additionally, we exported a package of the Premiere project. We exported the video itself using the H.264 codec at 1920x1080 resolution. Additionally, a package of the Premiere project was exported. The process of exporting a project copies all the video, image, and audio files used in the video, along with the Premiere file, into a single directory. This directory, along with the final exported course trailer were uploaded to the Team Google Drive. This way, the Office of General Education has all the resources needed to edit the video in the future, as well as working copies on which to base future video projects.

The videos were also uploaded to one of our team member’s personal YouTube channel and embedded on the appropriate course webpage. Eventually, the videos will be hosted on the Office of General Education’s YouTube channel, but our clients were unable to provide us with the login information before the end of the project.

The whole process for filming and editing videos is summarized in *Figure 17*.

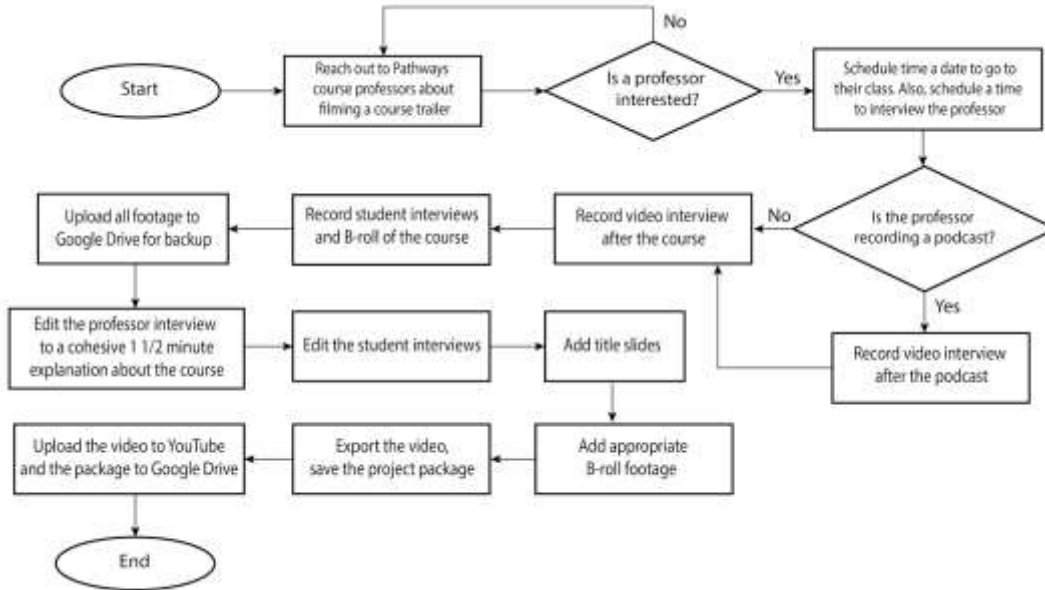


Figure 17
Video Filming and Editing Process

Podcast Recording

The first and most challenging step of the process has been finding interested professors. Most professors were not exceedingly eager to sit down and be recorded, but after having actually conducted interviews they seem excited about getting to hear the final results. A lot of the hesitation involved seemed to stem from an anxiousness involved in the permanence of the production. That what they are recorded saying will actually be distributed and have persistence, while a regular lecture in front of their class will most likely only live on in the minds of the students. This made it fairly difficult to convince professors to meet for an interview. Once interested professors have been identified we would schedule a time to meet that worked for both them and the team, and then reserve this time with "Innovation Space" (Virginia Tech, "Innovation Space", 2015).

All of the recording done to date has been conducted in the "Innovation Space" utilizing the sound bays they offer. Utilizing the iMacs in the audiobay, Audacity is set up to record the session. We ensure that the microphone is set up for the provided Blue Yeti Microphones instead of the built in microphone of the computer as seen in *Figure 18*. Then we conduct a sound check to ensure everything is working correctly by recording a short section and playing it back.

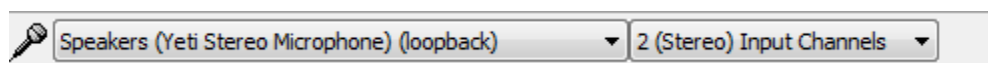


Figure 18
Computer Recognizing Blue Yeti Microphone

Once a session has been fully recorded we upload the Audacity project files and a .wav file of the session to the previously discussed team drive. This is then edited in Audacity first by cutting sections of content not relevant to the final version and then by cutting out filler words and extended pauses. Following this the whole streamlined version is listened to an additional time, this time with the goal being to identify breaks in the conversation that would benefit from an audio transition. At these points our transition sound is spliced in by creating a gap in the interview audio and adding the transition sound (Diminished Seventh Chord). Following this a short outro is recorded crediting everyone involved in this episode, including restating the professor who was interviewed, naming the interviewer, and crediting the transition and both intro and outro music. Finally intro outro music is added to play slightly softer, usually ~-10db from a regular listening level to play with the introduction and the conclusion and credits. This is then exported as an MP3 and uploaded to both the team drive and whatever is the current form of distribution. At the time of writing, this is a SoundCloud account specifically for these podcasts. This whole process is summarized in *Figure 19*.

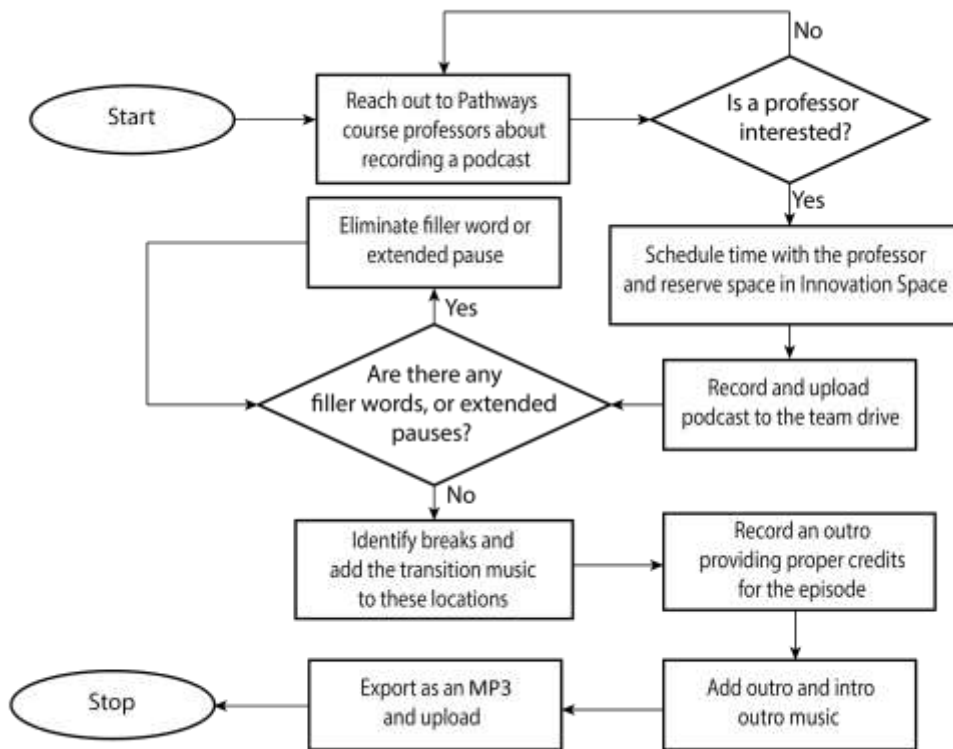
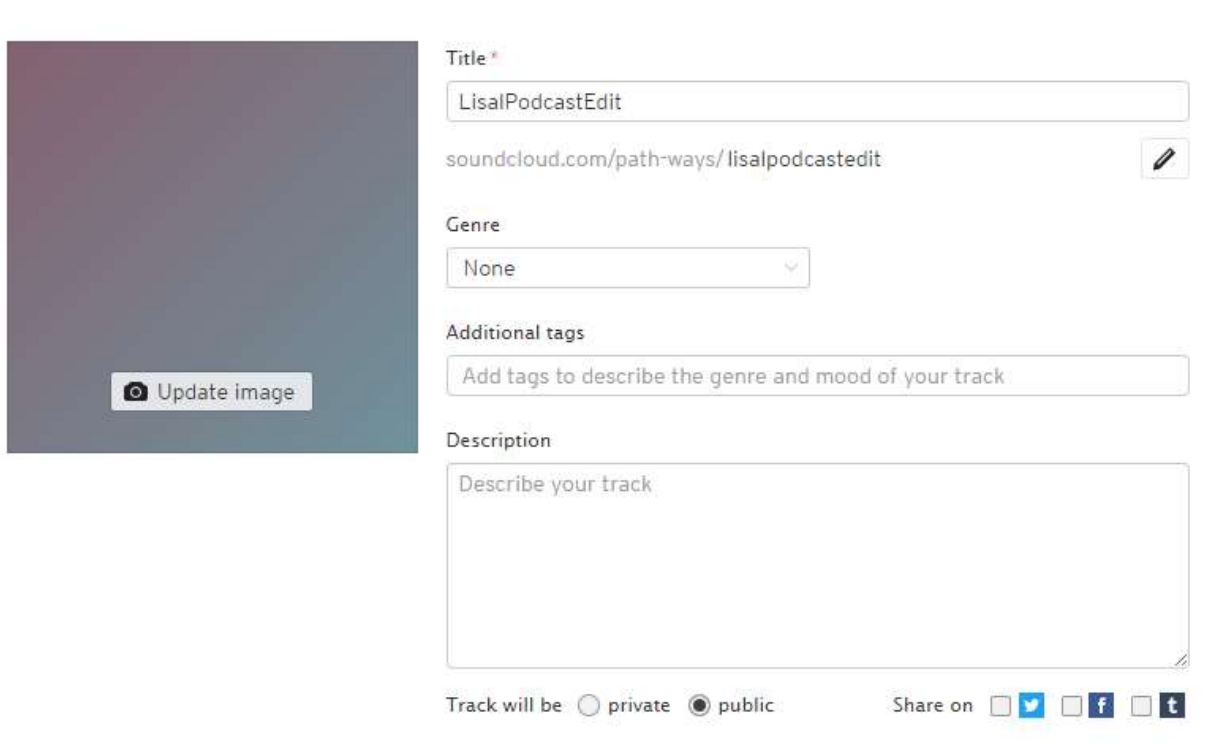


Figure 19
Podcast Creation Flowchart



Figure 20
SoundCloud Upload Button

Currently the credentials information for the SoundCloud is provided directly to the client team. In order to upload a new recording, simply select the upload button depicted in *Figure 20* circled in red, select the file that you want to add, then fill out the accompanying form depicted in *Figure 21*, available from the Team Drive, under Podcast.



The image shows a web form for uploading a podcast track. On the left is a large image placeholder with a camera icon and the text "Update image". To the right are several input fields: "Title *" with the value "LisalPodcastEdit", a URL field "soundcloud.com/path-ways/lisalpodcastedit" with an edit icon, a "Genre" dropdown menu set to "None", an "Additional tags" field with the placeholder text "Add tags to describe the genre and mood of your track", and a "Description" text area with the placeholder text "Describe your track". At the bottom, there are radio buttons for "Track will be" with "private" unselected and "public" selected, and a "Share on" section with icons for social media platforms.

Figure 21
Podcast Form

Website Development

The webpages were built using Virginia Tech’s Ensemble CMS. It allows website contributors to update their Web content without worrying about the technical details of creating, editing, and maintaining websites. You have to sign in with your PID and password to get into the Ensemble page. There are basically two parts to Ensemble: Sites and Assets. The Sites part lists the different sites that you are an author for or have access to. The Assets part is a digital repository that contains all the folders of media (pictures, videos, PDFs, etc.) that you have in your site. If you are not externally linking to some sort of media then that file needs to be somewhere in your Assets folder. There is a training video and website that can teach you about everything you need to know while using Ensemble (Welcome to Ensemble, 2016).

To create a page within Ensemble, navigate to the location where you want to make the page, click on the “+” icon, and choose create page. After clicking Create Page, you can choose the template for the page you’re building. There are various templates, but we used the General template to create all of our pages. After choosing the page template, click the Next button in the upper right portion of the screen. The next screen features the properties for the page you’re building. The name of the page is what will appear in the URL. The title is the title of the page. The page style is whether the page will have a right column. The hide in navigation means that the page will not be included in the site navigation.

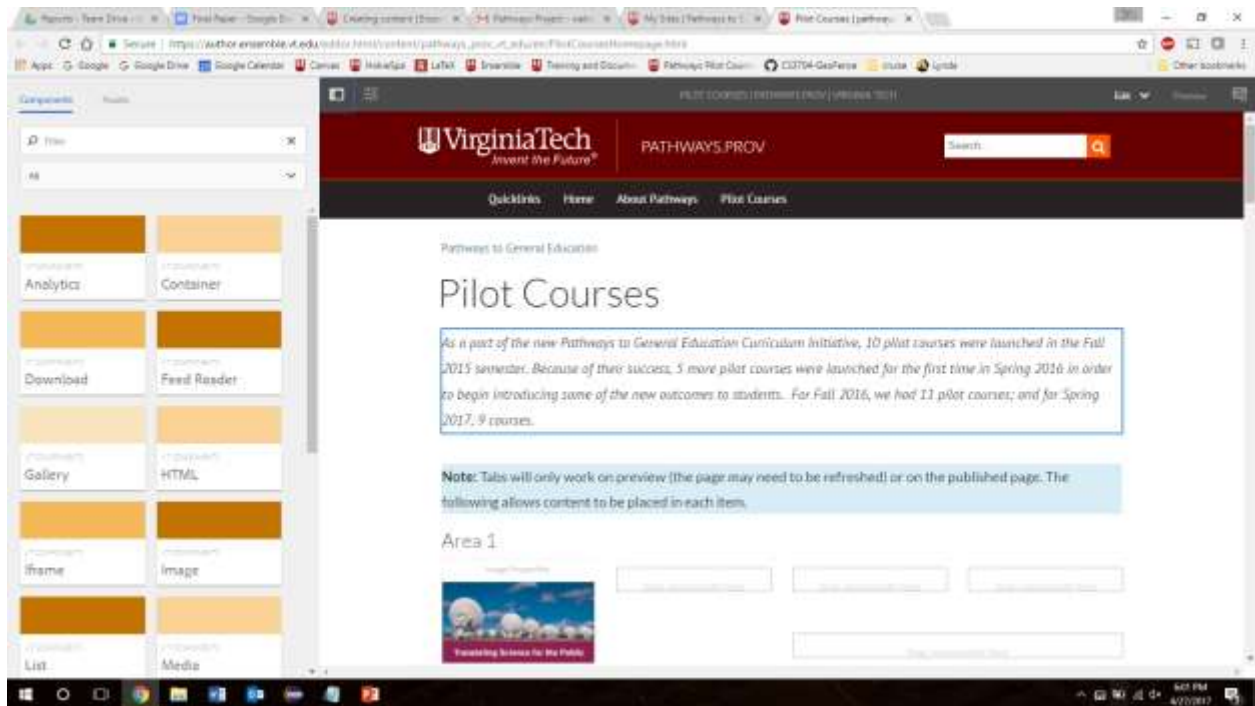


Figure 22
Available Ensemble Components

Once you have created the page, you can open it and edit it. On the left hand side of the page, you will see a list of the available components (Figure 22). To add a component, select it from the menu on the left and drag it to the box where you want it to appear on the page. An arrow will appear in a rounded, blue tab indicating the insertion point for the new page component. To remove a component, select it and click on the trash can icon.

The homepage only has a few components on it. At the top of the page is the title, “Pilot Courses”. This can be changed by viewing the page’s properties and editing the title. The first component on the page is a Text component. You can edit this by clicking on the component and then the pencil icon (Figure 23). After that you can type text directly into the page.



Figure 23
Webpage Component Editing Tools

The next component is the Multi-Tabs and Accordion component. To edit this, you must click on the component and then the wrench icon. *Figure 24* shows the properties of this component. Under Type, we chose Tab, but it can be changed to Accordion. The Headings are what the user will see as the text on the tabs. You can edit this by clicking in the textbox and typing what you want. The trash icon will let you delete that tab, and the arrow icon will let you move it up or down.

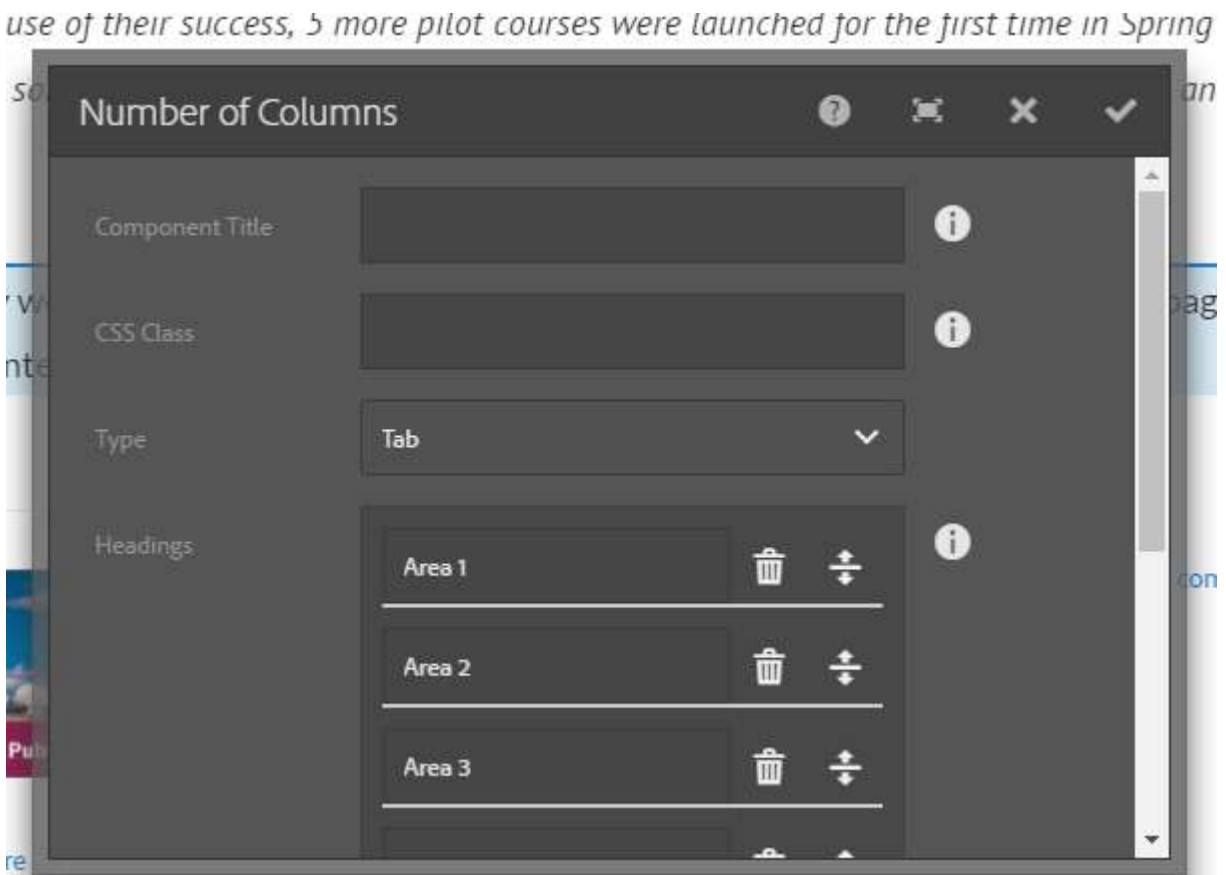


Figure 24
Component Properties

Within the tab component we put a Multi-Column component in each tab. We configured the Number of columns to 4 because we wanted a tile-like view (*Figure 25*).

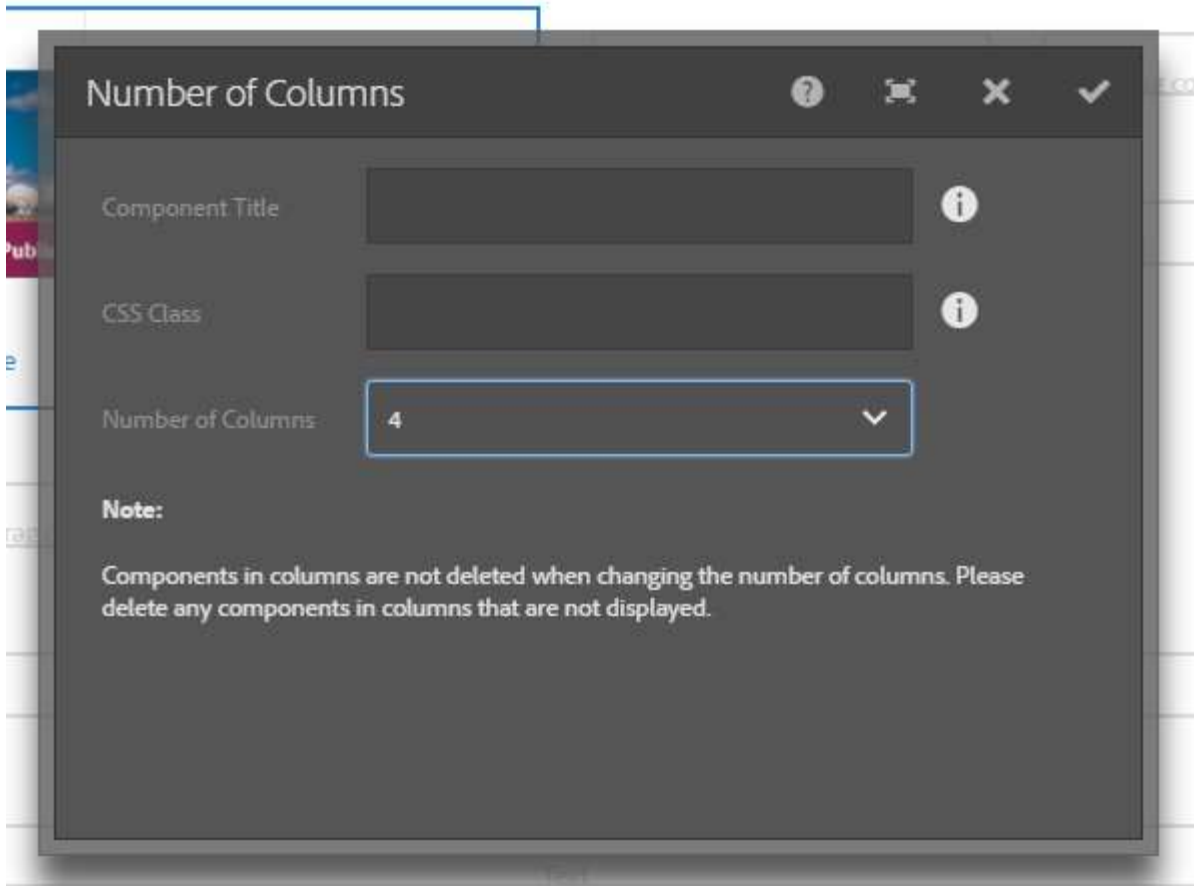


Figure 25
Column Configuration

To finish the homepage, we added Image components to each column. To add images, click on the Assets tab on the left hand side of the page, navigate to the folder where the image is stored, and drag it into the image component. The tabs are sorted by Area (later this can be changed to Learning Core Outcome). Within each Area the classes are sorted in alphabetical order.

At the top of each course page is a Gallery component. We chose Carousel for the Gallery Type (*Figure 26*) because we want it to rotate through a few photos that best represent the class. We left the Play Speed at the default of 6000, although this can be changed by using the “+” and “-” buttons. *Figure 27* shows the Items tab of the gallery. This is where you add the pictures that you want in the gallery. To do this, you click Add Field and then navigate to the folder where the picture is in the Assets tab and drag it into the box. To delete a picture you click the trash icon, and to move a picture you use the arrow icon.

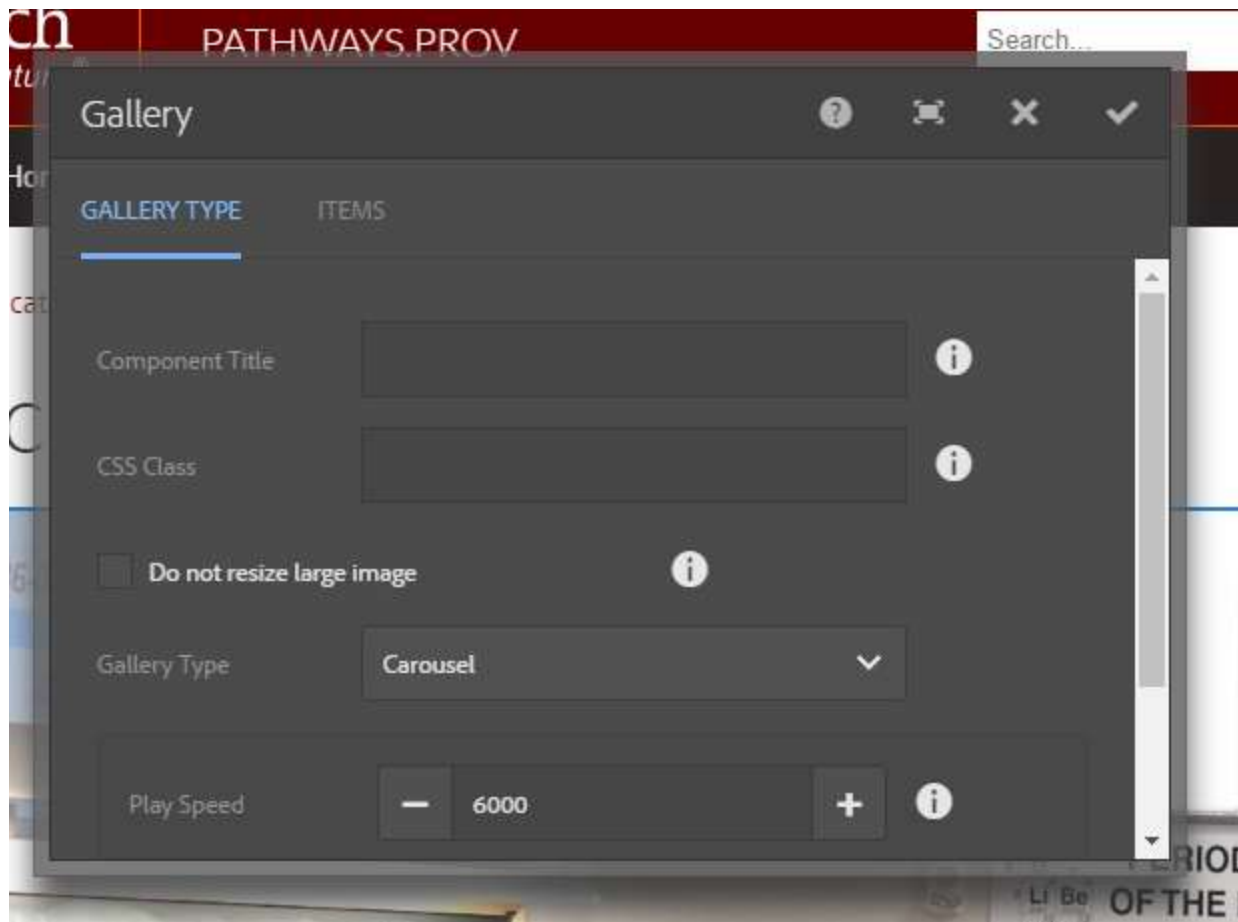


Figure 26
Gallery Type Selection

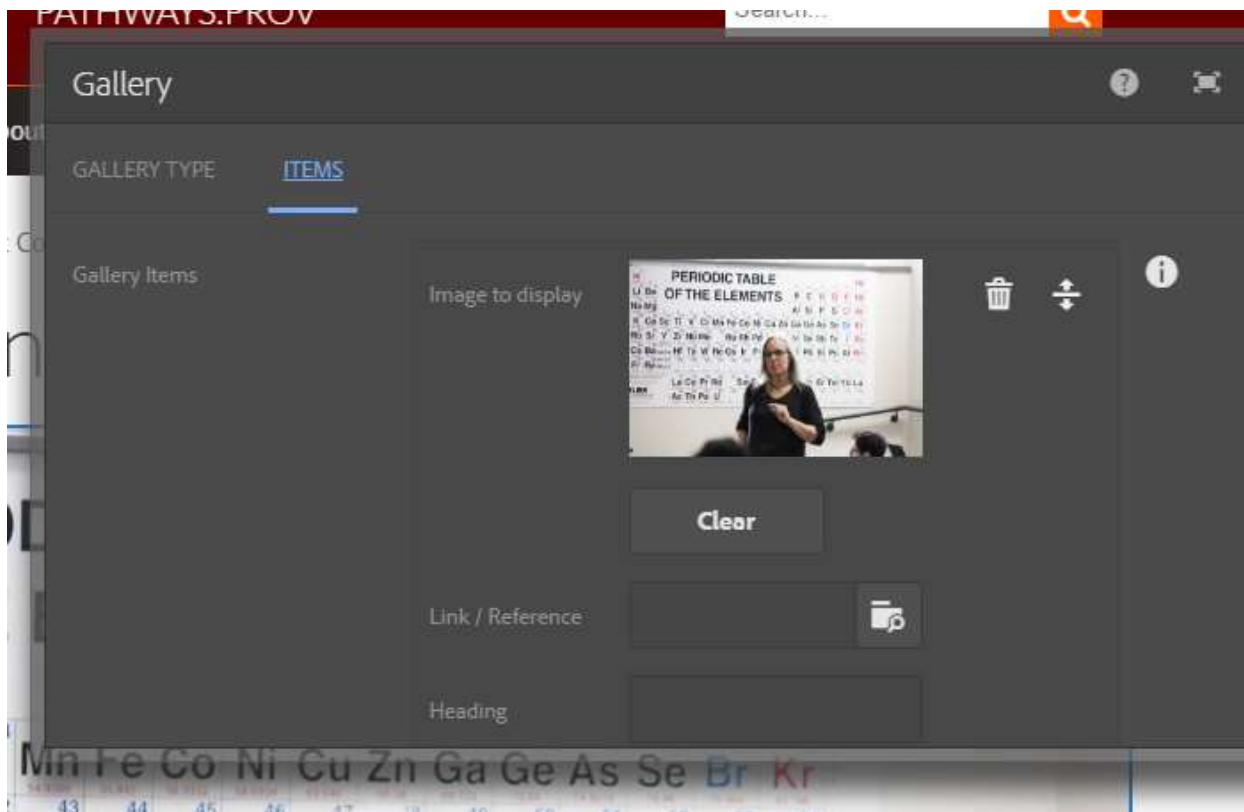


Figure 27
Gallery Items Tab

Below the Gallery component is a Text component. In this textbox are links to the course flyer and other parts of the page, and a description about the course. You edit this by clicking on the pencil icon and writing in the box. The links are a little more complicated. In order to edit the links, you must first break the link by clicking on the icon that looks like a link is breaking (Figure 28). Next, you must highlight the text you want to be linked and click on the icon that looks like a chain. We have two different types of links, one for the course flyer and one that will jump down the page. To link to the course flyer, you must first type "/" and "/content" will automatically appear. Then you have to type "/dam", which means you are linking to something in Assets. Repeat "/" after each level and navigate first to the Pathways website, and then to the folder where the flyer is stored. The links that jump to somewhere else in the page will link to an "anchor" (which will be talked about next). To link to an anchor, you must first type "#" and then the name of the anchor.

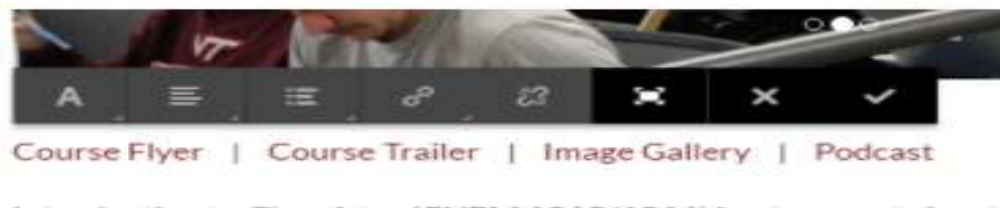


Figure 28
Editing Links

The next component is another Text component. This is just the heading of the section, but it must be anchored so we can link to it. First, you click on the expanding box icon and this will give you more

options for the text. Next you click on the anchor icon (*Figure 29*) and type in what the anchor should be called. Click the check mark when you are done.

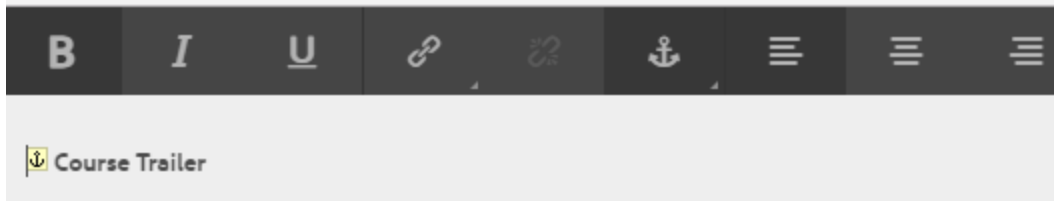


Figure 29
Anchor Icon

The next component is either a Media-External or an HTML component. The Media-External is for videos that we produced and are on YouTube, while the HTML is for the videos that we do not have and so must to link to another page. In the Media-External component, you have to put in the URL of where the video is located on YouTube and the embedded iFrame code (*Figure 30*). You get this code by right clicking in the YouTube video and then “copy embed code.” Paste this into the textbox for Media “iframe” Embed.

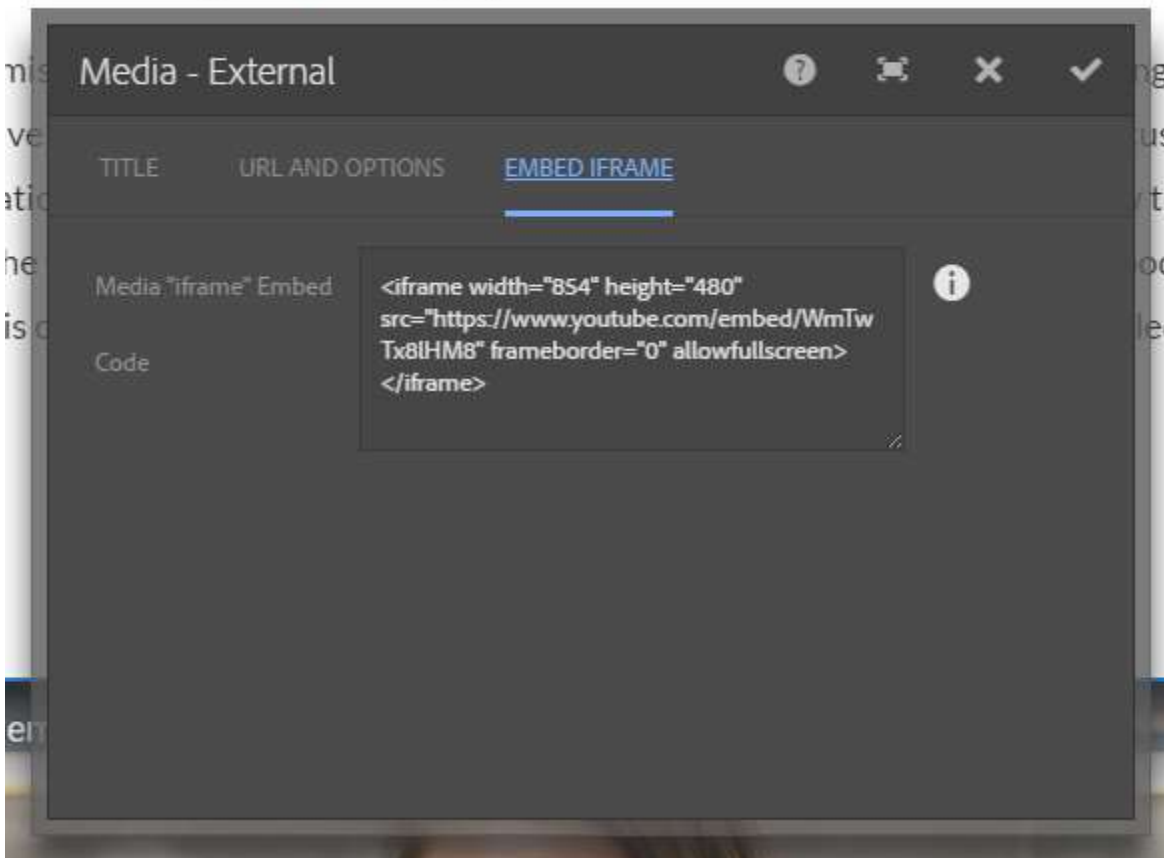


Figure 30
Embedded iFrame Code

We use HTML code on the website to link to the videos. The code that we put in the HTML textbox is: `Click here` to view the Course Trailer

The link in the first set of quotes is the URL of the Digital Media Services (Dalton, J. E) page that the video is on. The target part means that it opens in a new tab, which can be completely removed if you want it to open in the same page. The word “here” is the only part that is linked.

The next part is the Student Perceptions section. There is a Text component at the top and it must be anchored. Then we put in a Multi-Column component (described above) with two columns. An Image component is in one column and a Text component is in the other (described above). We want the pictures and text to alternate so that a picture is on the left first, then on the right, and so on. Edit the text with the quotes from the students with their name and major below the quote. The picture is dragged from your Assets into the Image component.

After the Student Perceptions section is the Image Gallery. First, there is a Text component that is anchored for linking purposes. Then there is a Gallery component. This Gallery Type is a Light Box Gallery and the Controls Style is set to the default (Figure 31). You add pictures to the gallery exactly like you do for the Carousel gallery at the top of the page.



Figure 31
Gallery Type Selection

The last part is the Podcast section. We put the podcasts on SoundCloud and embedded them in our webpage. The component we used is the iFrame component. To embed this, you have to go to SoundCloud and navigate to the podcast you want. Click the “Share” button and then the “Embed” tab. Copy all of the code in the textbox right below “Code and Preview” and paste it into the “Target Application” textbox (Figure 32). You do not need all of this text though. You must delete everything up until the “http” (without the quotation mark). At the end, you must delete “></iframe>” (also delete the last quotation mark). We changed the “true” at the end to false. This just changed the visual element of it (meaning how it is seen in the webpage).

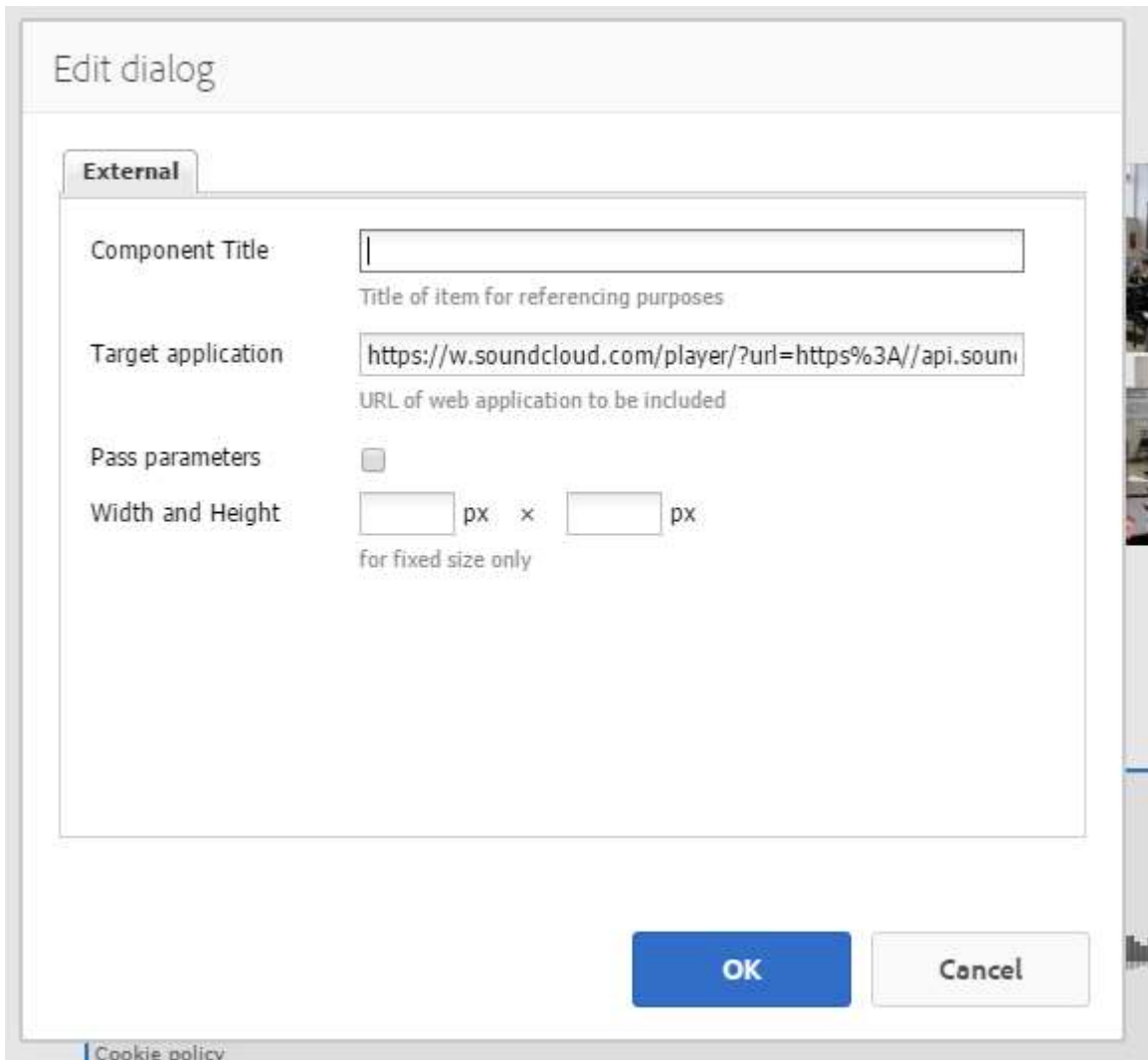


Figure 32
Editing Dialog

Lessons Learned

Timeline/Schedule

In order to organize the scheduling and complete as many deliverables for the project as possible we decided to split the project up into four teams that worked near simultaneously, though with some teams having an information dependency with each other. These teams were separated into the Story, Podcast, Video, and Website teams. The Story team started the project off as it included contacting the professors and gathering the raw data needed for the other teams. For the first week the Story team created a Qualtrics survey (Virginia Tech, "Qualtrics Survey Software", 2014) asking professors for their name, course, availability and willingness to participate in a visit and/or podcast, and sent it to every professor that the client specified as having a Pathways course. During this time the Website team was working on a structure for the website that would contain the deliverables and other multimedia once completed. Likewise the Video and Podcast teams were considering how best to go about formatting the raw video and/or audio information once they receive it, i.e., if they should put transitional music into the podcast or what flow they should give the course trailer. Then, once the professors had responded to the survey the Story team would send emails to those professors who agreed to meet. The purpose of the emails was to attempt to schedule a class visit and confirm podcast availability. The goal was to make at least one visit a week if possible until every professor who agreed was visited. The Video team would then use the raw video gathered from a class visit and create a course trailer for the class, the goal being to have one course trailer per class visited. The Podcast team meanwhile tried to schedule a podcast with every professor who was available and edit the podcast with the goal of getting a podcast with every willing professor. Finally the Website team would wait for relevant finalized information such as student interview quotes or deliverables such as the podcast or course trailers in order to add them to the website. In addition to every team's individual schedules, the group as a whole was scheduled to meet with the client every other Wednesday at noon to discuss our progress.

Problems

The largest and most common problem we faced as we worked on our project was scheduling. A majority of the professors who were interested had their class on Tuesday and Thursday from 9:30am to 10:45am. As a result we were unable to email all of the professors simultaneously or they could have invited us to show up on the same day. As many of their classes occur at the same time it would have been impossible to attend all of them at once. Furthermore, many of our group members were busy at this time of the week so it was especially difficult to find a specific date that worked for both the professor and the team member(s) visiting.

Another problem we faced was a result of our less than optimal raw data gathering practices in the very beginning of the project's life cycle. We didn't gather enough B-Roll footage when we visited a class and what we did gather was mostly shaky or slightly out of focus. Furthermore, while we did interview students and get their quotes we did not get viable footage of the interview itself. As a result the Video section had a lot of trouble creating a good course trailer with the raw data for two of the classes we visited.

During the visits we found that when we started to interview the students to get a quote from them they would often be a little reserved, possibly from the pressure, and as a result would not give the most thought-provoking responses to our questions. A similar effect was also noticed with the professors, though since the professors were interviewed for a lot longer they would naturally open up as the interview went on. Still, getting the professor to open up as quickly as possible was necessary to get the best interview or podcast.

The website was pretty straight-forward, but we did run into a couple of problems. One was that we couldn't download the pictures that were on the old Pathways website (Virginia Tech. "Pathways Pilot Courses", 2014). We needed this content so we could put it into the new website. Another problem was that the videos from the old website are hosted on Virginia Tech's Digital Media Services (Dalton, J. E.) and our clients do not actually have those video files.

The most difficult aspect of the podcast ended up being to get professors to open up a little during the recording session. Every professor we met with mentioned being a little timid since what we recorded ends up being permanent, unlike a lecture which they felt was more fleeting.

Solutions

We solved the conflicting professor class times problem the best we could by asking our client which professors took priority. This way we could email them to schedule a visit first in order to ensure that their class would be visited. Therefore, if we ran out of time or another problem came up we could still visit the more important classes.

The only way to solve the problem of mediocre raw data was to revisit those two classes that needed more data. Once visited we recaptured the B-Roll footage and student interviews with our improved recording techniques and equipment. Thankfully there was not too much trouble finding a time that worked with the professors to revisit as every other possible class had already been visited.

In order to get the students we were interviewing to open up we found that starting the camera well in advance and simply talking to the student for a little bit as well as telling them what question we would be asking them ahead of time and letting them think it over. Furthermore we would try to ask a follow up question based on their initial response to get more thought-provoking information.

Solving the website problems were relatively simple. We asked our client if they could obtain the pictures from the old website and share them with us. It took a little bit of time, but we were given access to the pictures and were able to put them in the webpage. After going back and forth with our clients about the video problem, we decided that it would be easier to link to the Digital Media Services page within our own webpage. Using one line of HTML code, we were able to link text in our page so that it would redirect you to the DMS page for that video in a new window.

In order to solve issues with professors opening up, the podcasts started having longer recording sessions and asked more off the cuff, personal questions. These resulted in a more casual demeanor on the part of the professors.

Future Work

The future work that needs to be done by the next group will be very similar to what we have done so far. They will simply repeat our process for more Pathways courses as our process is a simple cyclic one. The cycle goes as follows: Obtain information and raw data from a Pathways class visit, create a course trailer using the raw footage, record and edit a podcast, put all of the deliverables and relevant information onto the website, receive permission from client and professor, and repeat. Additionally, future groups that work with our client will not have to remake a website for holding the completed work as the website created by our group will still be used. They may, however, have to replace the word "Area" when it appears on the website to "Learning Outcomes" as that is technically the correct term used by the Pathways program.

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We would like to thank Dr. Edward A. Fox for directing us to the project, as well as his feedback and guidance throughout.

We would like to thank Innovation Space for allowing us to use their sound booths and equipment to record.

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APPENDIX A

REQUIREMENTS

I. APPLICATION OVERVIEW

OBJECTIVES

The goal of the Pathways Web project is to build a new section of Virginia Tech's Pathways website (Virginia Tech. "Pathways Pilot Courses", 2014) in order to showcase pilot courses. This will also involve producing additional text, audio, and video content for a number of courses.

BUSINESS PROCESS

Currently, Virginia Tech students often rely upon unofficial websites like Koofers when choosing their Curriculum for Liberal Education (CLE) courses. CLE courses are elective courses taken by Virginia Tech students in order to provide a more well-rounded education. The new Pathways system and its accompanying website will change how students learn about and choose their courses. As an alternative to the current CLE approach of choosing unrelated courses, the Pathways system aims to guide students through a "path" of meaningful and related courses. The Pathways website describes the system as "a vibrant, flexible, and innovative general education program, that provides a coherent and meaningful learning experience and allows students to integrate the learning for use throughout their lifetimes." (Virginia Tech, "About Pathways", 2015)

USER ROLES

Client Team:

- Jenna Haynes – Story Coordinator
- Najla Mouchrek – Web and Graphics Design Lead
- Stephen Biscotte – Overall Project Lead

Student Team:

- Christopher Deisher – Fieldwork (photos, footage, and quote collection)
- Christopher Rocconi – Fieldwork (photos, footage, and quote collection)
- Erin Gaughan – Student Web Development Lead
- Jordan White – Video Production Lead, Assistant Web Developer
- Mischa Michael – Podcast Production Lead
- Riley Kohl – Student Team Lead, Liaison, Quality Control, Newsletter Production

INTERACTIONS WITH OTHER SYSTEMS

The student deliverable website is a subsection of the larger Pathways website (Virginia Tech, "About Pathways", 2015). The purpose of this subsection is to provide more detailed information about specific courses within the Pathways program.

II. FUNCTIONAL REQUIREMENTS

STATEMENT OF FUNCTIONALITY

The subsection of the website for specific Pathways courses will display a list of courses. Each course will have its own webpage. Course webpages will provide a "story", i.e., a multimedia description of the course. Course stories will include summary articles describing the course, images from the course, a course trailer video, podcast interviews with faculty, and quotes from the students and staff. These will be structured in a clear, concise, and coherent fashion.

SCOPE

The project will utilize a waterfall methodology (Royce, 1970). This splits the project into five distinct phases.

1. Requirements
2. Design
3. Implementation
4. Verification
5. Maintenance

During the Requirements Phase we will meet with the client team to discuss and finalize all of the project requirements and goals. During the Design Phase we will meet with the client team to determine the processes by which we will create the content to fulfill the requirements set in the previous phase, the concepts that the content needs to cover, and the specific look and feel of the way we will complete requirements. In the Implementation Phase, content will be created following the finalized design and requirement guidelines from previous phases. The Verification Phase will involve submitting content to professor and the client team for review and approval. The Maintenance Phase will involve ensuring that the created content is properly organized and accessible as well as creating guides for continuing the project after our role has been completed.

PERFORMANCE

The implementation of the website subsections will be done in such a way as to prevent excessive load times. Students will be able to load the course list page, which lists all courses, and each course webpage, within five seconds.

USABILITY

The webpages, course videos, podcasts, and stories will be structured and organized in a manner designed to clearly and concisely convey information to the user. They will follow consistent specifications, so after working with one, another of the same type will be easy to access and use. The user will be able to quickly and easily navigate to the desired information on a specific webpage.

III. WEBPAGE UI REQUIREMENTS

EXISTING PATHWAYS WEBSITE

The existing Pathways website is being migrated from the old Virginia Tech Content Management System to the new one called Ensemble (Welcome to Ensemble, 2016). Ensemble is the Web content management system (CMS) for Virginia Tech. It allows website contributors to update their Web content without worrying about the technical details of creating, editing, and maintaining websites. This project's focus is the Pilot Course page and subpages. *Figure A1* shows the existing Pathways website, *Figure A2* shows the current Pilot page, and *Figure A3* shows one of the course webpages.



Figure A1
Current Pathways Website



Figure A2
Current Webpage for Pilot Courses

Pathways Pilot Course - Intro to Computational Thinking - Dennis Kafura, Fall 2016



Introduction to Computational Thinking, Fall 2016 | Interview with Dr. Dennis Kafura

1. What is the idea behind your class?

The Introduction to Computational Thinking class (CS 1014) uses real-world data (big data) resources from a variety of fields to motivate student engagement. The class is organized into 4-person peer-learning "cohorts" that work together in each class. This class is largely open to students in non-engineering and non-science majors. We want to convey a quantitative, information-based view of the world.

2. What are your goals for your students in this class?

Beyond the degree Learning Outcomes, our students should:

- 1. see the relevance of computing to their career interests.

Pathways Pilot Course

As a part of the new Pathways to General Education Curriculum initiative, 10 pilot courses were launched in the Fall 2015 semester. Because of their success, 8 new pilot courses were launched for the first time this Spring semester in order to reach a majority of students. For Fall 2016, we had 11 pilot courses, and for Spring 2017, 9 courses.

► [Click here about all the Pathways to General Education pilot courses.](#)




Image Gallery - Pilot Course - 2015/2016

Figure A3
Intro to Computational Thinking Course Page

Pathways to General Education *Pilot Courses*
Fall 2016

Come take a course on a valuable 21st-century skill that employers want!



CS1014 - Computational Thinking
Think | Compute | Create | Explore | Discover

Course Description

Big Data: Work with real-world data streams from social media, and more.

Algorithms: Learn practical skills and tools from Computer Science.

Professors: Dennis Kafura and Gary Bart

Class Meets:

- CSN 00306** - Tuesdays and Thursdays, 2:00-3:15 PM, New Classroom Building, 216
- CSN 00409** - Tuesdays and Thursdays, 5:00-6:15 AM, McLeod Hall 102

Figure A4
Computational Thinking Course PDF Document

The existing webpage for listing pilot courses has a single PDF document (as shown above in *Figure A4*) for each course. Part of this project will involve replacing the PDF file with a dedicated webpage for each Pathways course. This change will allow for the inclusion of videos, photo galleries, and podcasts. It will allow for a better flow to the website while making it easier to add content to the pages.

WEBPAGE REQUIREMENTS

The design and functionality of the webpages developed during the project will follow a specific set of requirements.

1. Webpage(s) must follow the visual identity of the Pathways program.
 - Specific colors (maroon, orange, blue, green)
 - Graphics (arrows)
2. Webpage(s) must be integrated into the developing site on the Ensemble CMS.
3. Webpage(s) must include content from courses offered in the past as well as the current offered courses.
4. Webpage(s) should leave a framework for adding courses in the future.
5. Webpage(s) must include specific content.
 - Video about course
 - "Story" about course
 - Quotes from students
 - Gallery of pictures
 - Course flyer

IV. VIDEO REQUIREMENTS

The course videos will have a set of minimum requirements.

1. Video(s) must use the Pathways logo
2. Video(s) must use footage of a professor of the course
 - Professor-provided explanation of course content
3. Video(s) must use footage of at least two different students from the course
 - Talking about coursework
 - Talking about aspects of the course
4. Video(s) must showcase footage of the class in action
5. Video(s) must use a Virginia Tech video outro, a short clip displaying the Virginia Tech logo

V. PODCAST REQUIREMENTS

The podcast(s) will provide insight into the role the professor plays in the classroom.

The podcast(s) will provide context for the class in the greater mission of the Pathways program. The podcast(s) will be primarily targeted at faculty and staff, rather than directly at students. Design choices will be made with audience in mind.

The development of the podcast(s) will take an iterative design approach seeking to present drafts and allow for feedback and re-editing to make sure they accomplish the goals of the pathways team.

DESIGN

I. WEBPAGE

Figure A5 shows the initial Pilot Course homepage. The existing tile/box design was suitable, and thus will be integrated into the new design. The homepage will allow students to view both current and previous courses. In order to organize the information better, the webpage will use a tab design; each semester will have its own tab with the current semester automatically selected upon coming to the page. Each course picture will link to a subpage exclusive to that course.



Figure A5
New Pilot Courses Webpage



Figure A6
New Course Subpage Design

Figure A6 showcases the rough designs for each course subpage. Each course page will follow a similar format in order to streamline the process of adding courses and editing pages. Each page will have a rotating gallery of feature pictures and a description of the course or a feature “story.” Quotes about the course and the entire course gallery will be toward the bottom. Along the right side of the page there will be links to the course flyer and videos. This design for the website will leave a framework for courses that are added in the future, thus making it easier to maintain and navigate.

II. STORY

The design for the story section of each course webpage can be broken down into distinct multimedia components.

Pictures:

Each of the students who agreed to answer a question about the course should have their picture taken for use with their quote answering our question. Other pictures may include elements of the classroom that are unique (such as interactive screens or the classroom setup), the class/students in action, or other interesting events that take place during our visit that we believe help illustrate the class well. For example, these may be pictures of final projects, unique labs, demonstrations, field trips, etc.

Video: See Section IV on page 6 and Section IV on page 12.

Questions:

Any student who agrees to answer our questions will be given at least one question, and their response will be written down. The name, grade and major of the student answering the question will be gathered as well.

Default questions:

- How is this class unique as compared to the other classes you have taken?
- What has been your favorite project in this class so far and why?
- What aspect of this class is your favorite and why?
- Has this course increased your interest in (subject) so far? How so?
- What made you decide to take this course over another course in the same category?
- Why would you tell another student to take this class?

Article:

The article will consist of a description of the class using information that is readily available online and from the student team visit. The article should summarize the class in a straightforward way as it is meant to help students who are looking at available courses to come to a decision. Furthermore, there will be a "Student Perceptions" section near the bottom that contains quotes from some of the answers to questions we have asked the current students, potentially with their pictures next to them.

III. PODCAST

The podcast recording and editing will both take place using Audacity (Audacity, "About Audacity", 2000). Editing will focus on cutting content for time, without losing context or impact. This will also include cutting filler words such as "um" or "like" to create a more easily consumed piece of media. The intro and some transitions will include music with the goal of providing a more cohesive and smooth flow. During interviews follow up questions will aim to create an interesting discussion. Interviews will be conducted using the recording booth spaces available at Innovation Space.

The podcast design was created by the client team before being delivered to the student team. The standard format of the podcast interview is as follows:

Intro (Voice Over): Hello and welcome to today's "General-izing Pathways Podcast". Today we will be speaking with _____ who is an <associate, full, assistant professor> in the Department of _____ who has taught a Pathways Pilot course on _____.

Questions

Talk a bit about how you became involved with Pathways.

The Pathways curriculum is cultivated around three basic principles: inclusivity, relevance, and integration. Does one of these really resonate with you? What are some examples of how you currently or plan to apply this in the classroom?

Talk us through how you integrate ethical reasoning or Intercultural and Global Awareness within your classroom.

How do you see your work paying off for your students in the short term, and down the road?

IV. VIDEO

Video footage will be edited with Premiere Pro (Adobe, "What is Premiere Pro?", 2015), and a template file with the general outline of the videos will be available.

The goal of the videos is for a potential student to get a feel for a course within 1-2 minutes. The general format will be focused on a course description from the professor. This will provide a meaningful, yet concise explanation of the course. Additionally, there will be segments featuring students describing aspects and elements of the course from a student perspective.

The videos will also incorporate elements from the class into the videos. For example, music produced in the class may be used as background music. Student films, artwork, or pictures may also be included.

Video Storyboard

Pathways Logo + Course Info 5s	Professor on white background explaining the course 5-7s	In class B-Roll 2-5s	In class B-Roll 2-5s	Back to professor 2-5s
B-Roll 2-5s	Professor (close of explanation) 5-7s	B-Roll of class work or project 2-5s	Student 1 talking about a project 7s	B-Roll of student 1 working on a project 2-5s
B-Roll of another student 2-5s	Student 2 answering question: "How was this class different?" 5-7s	B-Roll (ideally pertaining to the question) 2-5s	B-Roll 2-5s	Final wider shots of the classroom / professor teaching 2-5s
Virginia Tech outro 3s				

Table A1: After brainstorming, we came up with this storyboard for the video which gives an idea of the shots needed. The sequence is by row left to right, then rows top to bottom.

APPENDIX B

IMPLEMENTATION

I. GENERAL PROJECT OVERVIEW

The Pathways Project is proceeding at a rate within expectation. Given the nature and dependencies of several different types of multimedia deliverables, progress has been held back. Fortunately, work will shortly pick up and snowball, resulting in a faster progression than that in the first nine weeks. This is illustrated below in *Figure B1* in the form of a Gantt chart.

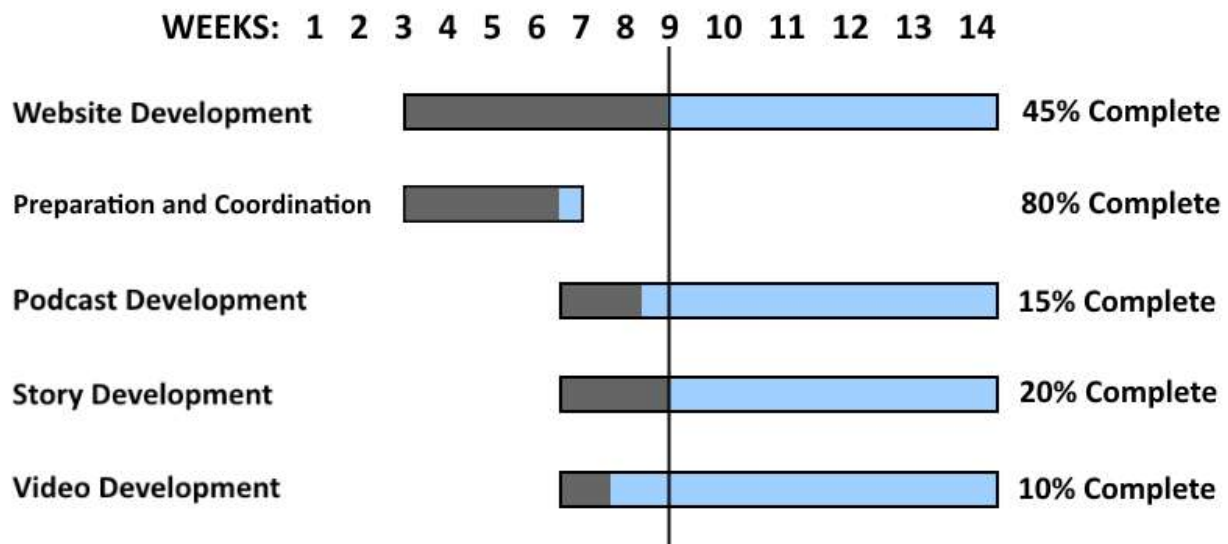


Figure B1
Gantt Chart of Project Progress During Semester

II. WEBPAGE

The webpage will be built using Virginia Tech’s CMS (content management system) called Ensemble (Welcome to Ensemble, 2016). Ensemble allows website contributors to update their Web content without worrying about the technical details of creating, editing, and maintaining websites. It is powered by Adobe Experience Manager (AEM) and is a joint effort between University Relations and the Division of Information Technology. Ensemble employs a “click and drag” or “drag and drop” concept.



Figure B2
View of Webpage During Editing

Figure B2 is the typical view of the webpage when you are constructing it. On the left hand side, you can see the components menu; these are the items that will be dragged and dropped onto the page on the right. Components include things like images, text, media, lists, charts, etc. Once you drag and drop them onto the page, you can fill it in with content. You can make your own content or choose content from the assets menu. Assets are images and other files that you wish to feature on your website. Assets are uploaded to Ensemble and stored in a digital repository for use by anyone who can access them. While you may not be able to change an asset's properties (depending on permission levels) you can customize how an asset appears on a page.

The webpage will be developed in steps:

- Step 1: Initial Design - An initial design for the course homepage and individual page will be made. It will be presented to the client and we will receive feedback on it.
- Step 2: Construction of Homepage - After receiving feedback from the clients about the initial design, we will create the pilot course homepage. We will constantly keep in communication with the client and exchange images of the webpage for their approval.
- Step 3: Moving Old Content - Content from the old Pathways pilot courses webpage will be moved, updated, and redesigned for the new webpage. We will not be getting new content for every pilot course, so this old content is essential for a completed webpage. Webpages for each pilot course will be created and the old content will be placed in the relevant course.

- Step 4: New Content - Once the new content has been collected, edited, and constructed, it will be placed in the webpage in the relevant location.
- Step 5: Review - When everything is in place, we will review the webpages as a whole to make sure the design (colors, layout, graphics), content (images, videos, text), and functionality (links, user experience) are as desired.

Currently, Step 1 is completed and we are in the late stages of Step 2 and early stages of Step 3. The homepage has been constructed, but after some feedback, we need to adjust a few things and add some graphics to it. We have started the migration process for the old content and a couple of course webpages have been created. Due to the original setup of the website (not being able to download the images), and permission issues that required contacting and getting approval from multiple people, we are waiting on access to some of the old content. We will continue to move and integrate the content to the new webpage as it becomes available.

III. STORY

So far, the story and content team have reached a number of milestones. Firstly, contact has been made with the 'Pathways Piloters', information has been acquired, and the team has worked to find times to visit and get content (videos, interviews, photos, quotes, etc.) from the participating classes. The team has visited one class and has scheduled at least one more. There is consistent work being done to find more times and professors to visit, and one to four more classes are expected in the next two weeks. After each visit, the team compiles all the information together to provide the raw content needed by the other teams, which ranges from video footage to photos.

Currently, the story team has completed approximately 20% of the expected work. The initial progress was slow due to the lengthy process of finding and establishing contact with each of the professors, but the team expects that work to generate a snowball effect allowing the pace to continuously improve, which is helped by the client personally meeting with many of the professors and bringing up our work. Besides additional visits, the only work remaining is to help with packaging the content to fit the new website. The schedule is to have one more class visited and one more scheduled by March 31. Additionally, we plan to have an additional two classes visited by April 15, for a total of six classes visited with all footage, interviews, and photos obtained.

IV. PODCAST

The podcast is conducted by first reaching out to faculty involved in Pathways and scheduling available times between them, and Jenna Haynes, who actually conducts the interview. Currently we have scheduled:

Name	Time
Lisa McNair	10-11 on 3/20
Alan Weinstein	1:35-2:30 3/20
Liesl Baum	10-11 on 3/22

Table 2: Scheduled Podcasts.

The podcast is recorded in the sound isolated booths in Innovation Space, and then edited in Audacity (Audacity, "About Audacity", 2000). This is then shared with the Pathways team which provides feedback. Once the podcast has undergone revision and approval it is published to iTunes by posting it to a yet-to-be implemented RSS feed.

The plan to implement the RSS feed is based on a tutorial that the team followed outlining a bare minimum implementation in order to submit an RSS feed to "iTunes" (How to Publish). First all of the final approved versions of the podcasts will be uploaded to an "Amazon Web Services S3" instance (Amazon, "What Is Amazon S3?", 2006). Next a minimum "Blogger" (Karch, 2016) instance will be created and its embedded links section will be changed to allow an RSS feed to embed the hosted "S3" files. Individual posts will be created for each episode with the post title being "Pathways Podcast - XX" where XX is the professor's name with which the individual episode is associated. This feed will then be redirected through a service "Feedburner" which is optimized to host RSS feeds that will be submitted to the iTunes store (Granholt, 2014). This new RSS feed is then submitted for approval through "iTunes Connect." This process involves some account creation; in order to ensure that appropriate credentials are used and passed on to whoever may continue the development of the podcast, we must further discuss the account used to create the "Blogger" which Amazon account should be used to create the "S3" instance and what credentials should be used to create an "Apple ID" (Apple ID, 2016).

V. VIDEO

The videos will consist of a short introduction and explanation about the course from the professor. It will then cut to a couple of student perspectives. While the course is being talked about, the video will cut to B-Roll shots of students in class, the professor teaching, and projects being presented.

We are still gathering content for the videos, thus editing has not begun yet. The professor interview

part of the video will take place during the scheduled podcast time in the Innovation Space. The student interviews will take place during the class visits.

As far as tools which will be used, DSLRs will be used to capture the video content and Adobe Premier will be used for editing. After Effects (Adobe, "What is After Effects?", 2016) may be used to create a beginning graphic, but that is still to be determined. Besides producing roughly five videos about different courses, another goal is to produce a template so that course videos in future semesters can be easily produced while maintaining a consistent style.

APPENDIX C

PROTOTYPING, REFINEMENT, AND TESTING PREFACE

I. PODCAST

At the time of writing we have recorded a total of four podcasts. The final goal is to record six total episodes, two additional, but currently only one new professor has followed through to schedule a time. Over the course of these four podcasts improvements have been made to the content and the formatting of the discussions in an iterative process through feedback from the Pathways team. In the prototyping section we will discuss the recording and editing of the first podcast with Lisa McNair going into detail about the decisions involved in this process. In Section 6 we will discuss the changes and adjustments that have been made in this process as a result of feedback from the Pathways team and experience gained through the process of recording multiple times. In the testing section details about the feedback process and notes received from the pathways team are addressed. This section is ~75% complete with the main sections of work being to record any remaining professors, and completion of editing based on feedback from the prototype.

II. STORY

We have currently visited five classes to gather raw video footage and photos for the video and website as well as to interview three to four students and the professor for information. This puts us over 90% complete as we have visited every professor who gave the team permission to do so. The remaining 10% is compiling all the raw information and working on ancillary tasks. Over time our process for gathering this information has improved greatly and the quality of the information improved as well. In the prototyping section we will discuss the information gathered during our visit to the "CREATE!" course. This was the team's initial attempt at gathering all the necessary materials for the class stories, the recording of video, the taking of photos, and the interviewing of students. We will be going into detail about the process that led to the information being gathered and decisions made as to what information to gather and how it should be done. In Section 6, we will discuss the improvements made in the process for our visit to the "Introduction to Chemistry" course and beyond. In the testing section, we will discuss the methods used to validate and approve the final versions of each story deliverable.

III. WEBSITE

Currently, the course homepage and all 21 course webpages that are part of the Pathways program (both courses offered now and in the past) have been created, and we are going through small

design/refinement iterations. These iterations are meant to improve the webpages using feedback we get from the client. We have already done about two refinement iterations and made some necessary changes, but we are waiting on other parts of the team to put together their deliverables so that it can be added to the website. Once that is done we can do a last round of refinement and then move into the testing stage. This means we are about 65% done with the website. The prototyping section will talk about the work of creating the initial webpages and moving all content into the page. The refinement section will talk about the process of discussing with the client, getting their feedback, and modifying the webpages with their feedback. The testing section will go over the plan for testing the webpage once all content is approved.

IV. VIDEO

Right now, we have enough content to produce video trailers for four courses: "CREATE!," "Intro to Chemistry," "World Crops," and "Seeking Sustainability." The general format for the videos along with the video for "Introduction to Chemistry" is complete. Editing on the other three videos still remains. So, this puts us at ~30% completion of the video trailers. The content which is needed to produce a video trailer is an interview with the professor in which they discuss the course and why a student should take it, along with B-Roll, which is supplemental footage from the course, and two to three student interviews. The prototyping section will cover the editing process for the first video which was designed for "Introduction to Chemistry." The refinement section will talk about improvements which have been made to the process, including both editing and recording. The testing section will go over how we receive approval and feedback.

PROTOTYPING

I. PODCAST

The first podcast was recorded on March 20th with Lisa McNair. Preparing for recording we reviewed the prepared questions with Jenna Haynes, who conducted the first interview with Lisa. Then a short sound check was conducted by simply opening "Audacity" (Audacity, "About Audacity", 2000), an audio editing and recording software, and recording an under five second clip and playing it back to ensure that audio recording was working as anticipated. Following this Jenna and Lisa were situated in the booth, and the recording was started. During the recording session the project team was not in the recording booth. Upon the conclusion of the session, the "Audacity" recording was stopped and a team member uploaded the full Audacity project as well as a WAV file of the full recording to the team drive to be edited. The WAV file format was utilized since it is an uncompressed audio format that can be used to edit, but it also has playback support in Windows and OSX, allowing the client team to listen to the unedited version if they desired.

The first step in the editing process was to trim out any large section that was not going to be included in the final version of the podcast. For Lisa's recording this was the very beginning and the end where she chatted casually before the formal introduction and after the formal close. Following this initial rough cut the next step was to remove as many of the filler words, used by both Jenna and Lisa. Filler words in this context mean words said out loud during regular conversation to fill space between thoughts or while thinking of what to say next, namely "uhh" and "like" (Mele, 2017). An example of this is shown in the difference between *Figure C1* which shows a screenshot of the waveform "um" and then with it removed in *Figure C2*. This was done by simply deleting sections of the audio where filler words could be isolated, using the snipping feature of Audacity. Not all filler words were possible to remove in this fashion, such as when either Jenna or Lisa slurred a filler word into the rest of a phrase; this meant that removing the section of audio would lead to unnatural inflection. In addition to the removal of filler words, music was added to the beginning and end of the recording. The music that was added was *Bagatelle du Bayam Sellam de Nkololoun* (Yepmou) which was obtained by searching for music covered under creative commons (Creative Commons, "What we do", 2001). This music then had a decrescendo effect applied in the opening, starting loud to give a strong initial impression to a listener and softening to allow Jenna's voice to be heard clearly as the main focus as she moves into the intro. Similarly a crescendo effect was applied at the end to let the rising music give a softer closer to the episode (Costill, 2014). This finalized the prototype version of the podcast which was then distributed for testing.

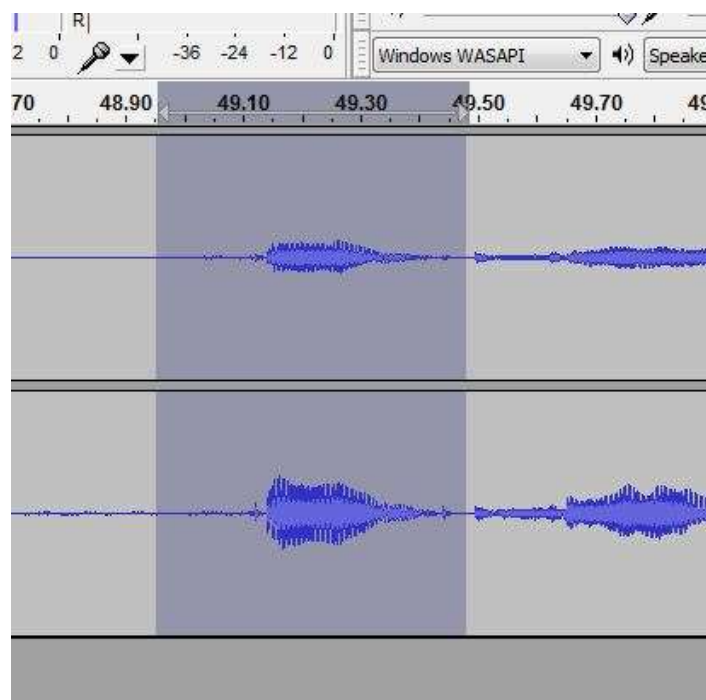


Figure C1
Unsnipped Audio

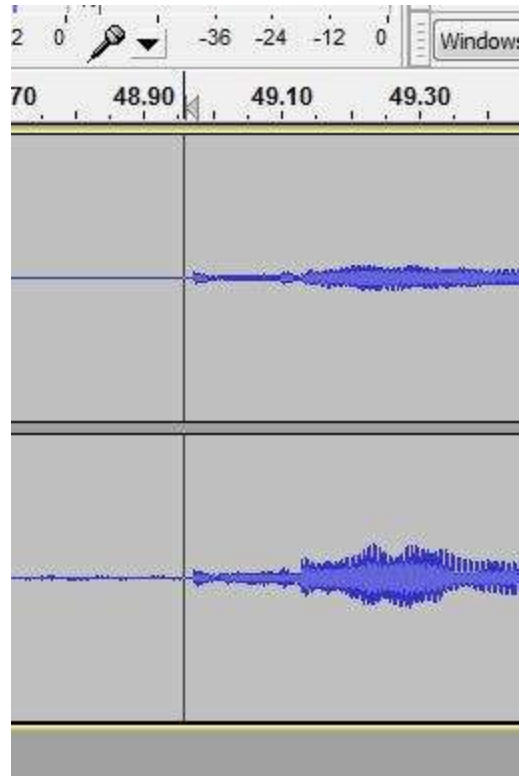


Figure C2
Snipped Audio

II. STORY

The first visit to classes for information gathering and prototyping was for the pathways course “CREATE!”. To start the process several emails were exchanged with one of the “CREATE!” professors, Liesl Baum, in order to reach an agreement on which class period would be best to visit. After an agreement was reached an email detailing the time and location of the visit was sent to Jenna Haynes, one of our client’s staff members, who wished to join us in our visits. In preparation for the visit a video camera was rented from Virginia Tech’s Innovation Space to ensure better video and picture quality. During the class visit photos and video were gathered, focusing on the demonstration and group work aspects of the class. As the pictures and video are going to be edited and used as advertisements for future students, more dynamic content was thought to be more valuable. Therefore the decision was made to capture them. For example, the guest speaker sitting on the floor with a group discussing their project was recorded in preference over two students sitting in their seats and talking. We asked students if they were willing to be interviewed as the class was nearing its end. This way information could still be gathered before every student left for their next class but they did not forget or disrupt the current class. The information resulting from this process was adequate but not high quality. The pictures were good quality and usable but the videos were somewhat shaky as a tripod was lacking. The answers received from the student interviews were good quality and thought-provoking but there was no video of them talking for use in the main video trailer.

III. WEBSITE

There are 21 course webpages in total, plus a general course homepage where all courses are listed. There are nine pilot Pathways courses offered this semester (spring 2017) with all the other courses offered in the past (starting fall 2015). We started with creating the course homepage. We wanted it to be a very simple design with a short synopsis about the Pathways courses at the top and tabs for each semester with the courses offered during that semester in the tab section. We thought this would be a good design because it would not be confusing and it would be easy to navigate as all you would have to do is click on the desired semester's tab. The way you would get to each course's unique page is to click on the picture or graphic that represents that course (see *Figure C3* for example of this graphic). These graphics would be set up in a tile pattern.



Figure C3
Computational Thinking Course Graphic

We wanted the individual course webpages to be set up in a standardized design so courses could be added in the future without a lot of thought to design. Each page would have a carousel gallery at the top, which means that a few pictures will be rotated through in a circular pattern changing every couple of seconds. Ideally, this would feature a few of the pictures that best represent the course, to entice the user into looking at the rest of the page. Underneath the carousel gallery would be a short description of the course, an interview with the professor, or the “story” of the course. This would help the reader learn about what the course has to offer to them as a student. Below that, there would be quotes from students called “student perceptions”. On the right side of the page (called the right column) there would be links to the course trailer, complete image gallery for that course, and the course flyer.

To set up the webpages, a couple of people from our group had to gain access to the Ensemble website (Welcome to Ensemble, 2016), the CMS that is used to build Virginia Tech's websites. Virginia Tech is currently in the process of moving over from an old CMS to Ensemble, the new CMS. The website for Pathways was already set up in Ensemble, but we needed to add pages to the site under a Pilot Courses folder. Before adding the new content that we have been collecting and creating, we were tasked with moving existing content over to Ensemble. This migration process included moving text and pictures from the old Pathways website (Pathways Pilot Courses, 2014) into the new website. Some of the courses had the course flyer as the only content, so we have been trying to find content for those courses as well as collect new content.

IV. VIDEO

The process for editing a video begins with recording a professor interview in which they discuss the course, generally what it is about, and why a student should take it. Next, a visit to the course happens, to capture B-Roll shots of the professor and students in action as well as a few student interviews.

The first step in editing is to cut up the professor's interview. The goal is to capture the essence of what they are saying about the course, in roughly 1 minute 30 seconds. This leaves 30 seconds for the student interviews. The target length for the entire video is two minutes. This time frame was chosen after talking with our clients because it was long enough to explain the course in detail without being too long that a student would become uninterested.

The professor interview is the core content of the video, so it needs to be clear. Next, the student interviews are edited. The goal is to have a unique statement from each student, while supporting what the professor has said about the course. The interviews will be positioned after the professor has described the class and before they directly tell students why they should take it.

At this point, we go through the B-Roll to find shots which match and go along with what the professor and students are describing about the course. B-Roll is also sometimes used to cover hard cuts, where students or professors misspoke, but we still wanted to use the content. The general format for the video is to use straight cuts between students and B-Roll (no animations and fades). The reason is so that it is easy to copy and maintain this style moving forward. The project of documenting Pathways Pilot courses will continue on after we are finished with our capstone, so we want to leave a format which is repeatable. All editing has been done in "Premiere Pro" (Adobe, "What is Premiere Pro?", 2015), Adobe's video editing software, so future teams can edit the videos.

During the initial stages of the project, we developed a table with a general idea for the video. This was helpful for general brainstorming, but the practicality of this table fell flat upon editing. The timing of the cuts is something which is so dependent on the interview and B-Roll, that it cannot be highly planned out in advance.

REFINEMENT

I. PODCAST

Podcast: Over the course of recording the prototype and receiving feedback from the client team, we made some changes and adjustments to the recording and editing pipeline. The largest and most impactful change was to extend the initial audio check. In the prototype, the built in microphone of the iMac in the sound booth was used instead of the provided Blue Yeti microphone, due to a mistake selecting devices during sound check. Additionally, in order to better balance the volumes of the podcast participants the position of the microphone and the gain of the microphone is now adjusted. Further, a musical interlude is being added around the halfway point in the podcast as was suggested by the client to "break up" the content. A conclusion is also being added after the standard close used in the prototype, in order to include an appropriate credit for the music used.

In order to address the "stiffness" of the interview a shift is being tried where instead of sticking to the scripted questions, less formal questions are also asked in response to professors answering the scripted questions. This made sure that the podcast still addresses the information required but also felt less formal.

We have produced some podcast cover art, as seen in *Figure C4*, which matches the current branding of Virginia Tech and the Pathways program. It uses a maroon overlay on top of a picture, owned by the university, of Burruss Hall along with using the two Pathways fonts, Garamond and Franklin Gothic.



Figure C4
Podcast Cover Art

II. STORY

We found the scheduling method used in our prototype phase was effective in coordinating a time that worked for the team and professor, while maximizing the value of the specific class period attended. We did tweak the process to request to attend further in advance, as this allowed the professor to inform us if any specific day was likely to be more conducive to our project (i.e., no tests, a demo/lab day, etc.). We discovered in our prototyping phase that for larger classrooms, bringing at least three photographers was extremely beneficial for gathering a wide variety of usable photographs, while smaller classes only required one to two photographers. Additionally, the feedback provided by the video editor allowed us to improve the usability of our raw data. This was achieved through bringing a tripod, and framing the lighting better for the B-Roll footage. We also obtained and used a higher quality shotgun type microphone (Takstar, "SGC-598 Camera Recording", 2012) with the tripod for the student interviews to minimize background noise. This new equipment, with the tripod, cameras, and microphone, is shown in *Figure C5*. Additionally, we learned that working with the professor prior to attending the class by discussing the topics and goals for their video interview drastically improved the educational value, smoothness, and quality of the professor's responses.



Figure C5

Classroom Visit Equipment. Picture includes tripods, microphone, camera

III. WEBSITE

Once we had a rough draft of the pages, we showed the client and we discussed how it looked and changes that should be made. Overall they were pleased with everything, but they had some comments about how we could optimize the pages.

They liked the simple tab view of the homepage, but the client team believes we should organize it differently. They think that organizing it by CLE Area (1 through 7), which will later be rebranded as Pathways tracks, would make more sense. They argued that students looking at the Pathways website are trying to find a course that would fulfill their general education requirements and most of the time they are only looking for a class within a specific area. The client team believes that by the time the students come to the Pathways website, they would have already looked at the Timetable of Classes and they are trying to get more information on specific classes in that area. They asked us if this is what student do and as students ourselves, we agreed with them. It was not hard to reorganize all the courses by area rather than by semester; all we have to do is rename tabs and drag the course graphics into different places.

The client liked the general setup of the individual course pages and did not have many comments about it. They suggested that if we could not get content for a course (primarily courses that are not offered this semester) then we could link the course graphic on the homepage to the course flyer as each course is required to have a course flyer. We agreed this is a good idea because it would not look good to have a mostly blank course page. It would always be easy to go back and link the course graphic to the course page when they get content because the framework is already there.

When we make these changes, we will meet the client again and get more feedback, continuing this iteration until we all are satisfied with how the pages look.

IV. VIDEO

The content which has been recorded during classes has greatly improved since the start of the project. After the first video was edited and finished, it gave the story team a better sense of the shots that were necessary. Also, when conducting the interviews after class, the team is now waiting until students have left, or are doing them someplace quiet to prevent noise distortion (which happened in the first video).

The cut screens in the video have also been improved to match the style and brand of Pathways, as shown in *Figure C6* and *Figure C7*. This has been done by using the Pathways maroon, HEX color #8A153F, with a vignette for the background with a Pathways font, Franklin Gothic. Also, the content on the opening screen has been updated with more information about the given course as per request by our clients. Another small improvement is that during filming, we try to capture B-Roll shots of the students that we interviewed. This results in a more cohesive feel upon watching the video.

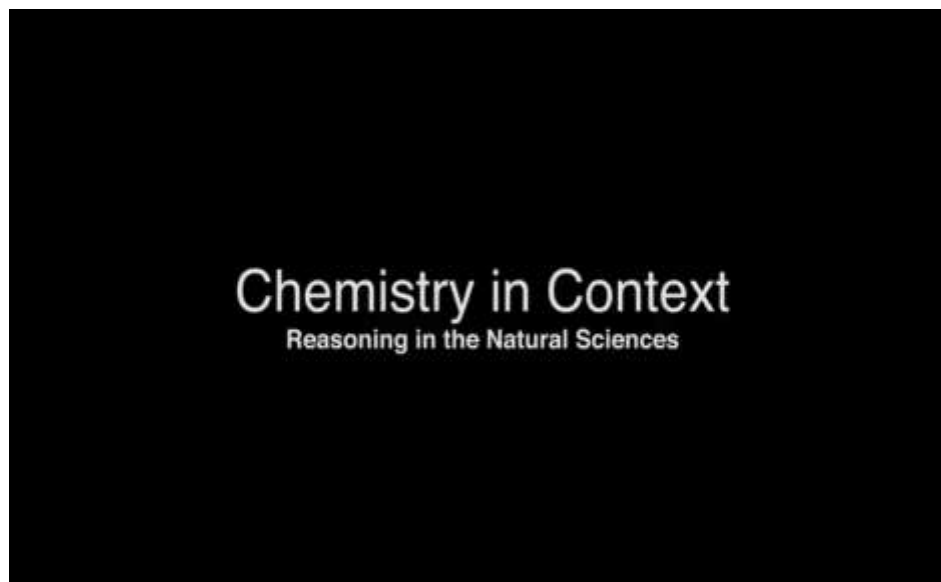


Figure C6
Original Cut Screen

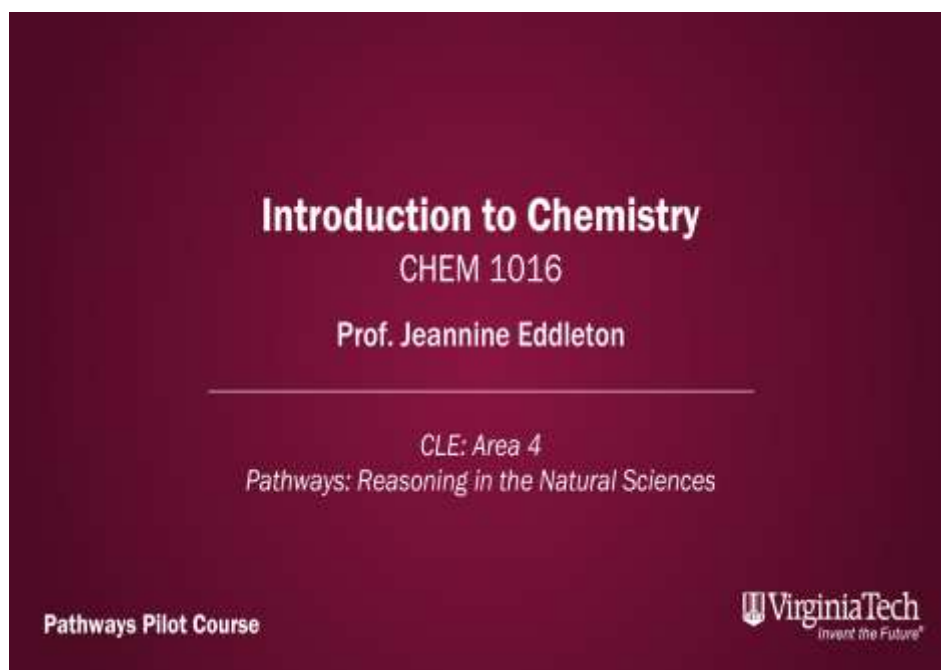


Figure C7
New Cut Screen

APPENDIX D

TESTING

I. PODCAST

To ensure that the podcasts are produced and edited to the standards of the client, the initial edited version was shared with the client on the morning of March 22nd and then discussed at a meeting that afternoon. The feedback offered by the client was almost universally positive. Some of the suggestions that were offered were to break up the conversation a little by adding some sort of break in the middle, or between some questions. While meeting with the client team, the podcast prototype launched a more general discussion about the format of the podcast since the whole interview felt a little stiff and formal. Both of these critiques are being addressed moving forward and a musical break is being added into the prototype before its final review.

Before the final versions of the podcast are published, they must undergo some further revisions. After an episode has been reviewed by the client team it is then passed onto the professor that was interviewed. They can offer feedback before it is finally published. After the criticism of the client team is addressed, it is passed onto Lisa and then can be moved forward to be published.

Additionally, the process of developing an RSS feed and submitting it to iTunes was conducted as a dry run, utilizing files for a different project; this allowed us to gain a much more in depth understanding of how every piece of the publishing process was connected. This dry run occurred exactly in accordance with the implementation strategy discussed in the implementation section.

II. STORY

For testing we start by sending our raw information to our partners in the website and video sections so that they can edit it and work on their respective parts. Our first wave of feedback comes from our own teammates as they discover problems while editing the raw information, or information that is lower quality than desired. We look at their feedback and edit our process accordingly. Our second wave of feedback is given by the client during our weekly meeting. We present the edited works of the other teams. With their critiques and feedback of the edited work comes direct feedback for how the information itself was acquired. For example, during our interview of a student in the “Introduction to Chemistry” class our client commented on how “the student was hard to hear” but how they “liked the sound of students in the background.” In the future we will also have a third wave of testing as we need to send out the near finished product to the professors for their approval. If the professors have any feedback, then we will need to modify it a final time to meet their feedback.

III. WEBSITE

As soon as all the pages are approved, we will go into a short testing stage. This will mainly consist of everyone on the team (student team, client team, and anyone else the clients want) trying to use the website. We want to make sure that all the links are in place correctly, meaning that if you click the image gallery link for a class that it takes you to the correct image gallery. We also want to make sure that everyone can navigate the page. Navigating the page is a big factor because it was a major problem on the old website. We want navigation to be as smooth as possible. Upon discussing goals for the new webpage, our clients have deferred most design decisions to us, the student team. The reason for this, is that in our client's eyes, a successful product is one which students enjoy using. So, if we enjoy and like the site, then our clients are pleased.

IV. VIDEO

During the video editing process, we will ask fellow student team members what they think and if the professor's description of the course is clear and well edited. Making sure that the description is clear and the student interview answers relate is key.

After all the B-Roll shots have been added, the video is exported, uploaded to YouTube, and sent to our clients and the full student team. The next meeting, we discuss the video and receive feedback from the client. Ideally they are also able to show the video to others in the Office of General Education. After tweaks and changes requested by our clients the video is sent to the professor along with the rest of the content to ensure that their course is being represented as they want.