THE ITERATIVE REDESIGN OF AN ONLINE UNIVERSITY COURSE: NDFS 100, ESSENTIALS OF NUTRITION

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This design case looks closely at the unique elements of redesigning an online nutrition course from April 2016 to April 2017. The online course was designed, developed, and offered for students through Brigham Young University Independent Study (BYUIS). During the course of one year, the author and stakeholders collaborated and made several iterative changes to the original online course. These iterations were based on the unique context of BYUIS, which included two paradigm shifts: moving courses to a semester-based schedule for BYU Online and shifting to a new Learning Management System (LMS). This context shaped design decisions, including the creation of eight custom animated videos, new artwork on every page, four discussion boards, eleven interactive activities, and several new content pages. Iterative design decisions were initiated by student feedback, faculty experience and collaboration, and design failures. Several production teams at BYUIS (e.g., animation, illustration) contributed to the success of this redesign. This design case seeks to give the reader a vicarious experience of the iterative one-year redesign process.

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CONTEXT

Brigham Young University Independent Study (BYUIS) is an online education program. Since its foundation in 1921, BYUIS has offered hundreds of courses to high school and university students. Brigham Young University (BYU) became one of the pioneers of online distance education in the late 1990s, when BYUIS moved from sending paper-packet courses to providing online courses. Up until the year 2016, all BYUIS courses allowed students one year to complete a course at their own pace. Since no deadlines were enforced throughout that time period, many students would procrastinate; they either would finish the entire course in the few weeks before the one-year deadline or pay an extension fee.

In winter 2016, BYUIS piloted BYU Online courses, which corresponded with the university's semester schedule and deadlines. In conjunction with the launch of BYU Online, the university created a new policy that would require incoming freshmen to complete at least 12.0 credit hours of online courses before they graduated.

The introduction of BYU Online semester-based courses caused a paradigm shift for instructional designers, online instructors (i.e., course authors), and students alike. Many students had never taken an online course. The presence of deadlines and the absence of face-to-face interactions would require students to be more disciplined and accountable throughout the semester. Instructional designers and course authors would need to strive to make the online course as informative, rigorous, and engaging as the corresponding face-to-face courses. All stakeholders at BYUIS and on the BYU campus would need to collaborate closely.

Beginning in this context, this design case will lead the reader through the iterative redesign of an online nutrition course titled, "NDFS 100: Essentials of Nutrition". The information in this design case came from my role as a graduate student employee at BYUIS and from administrators and designers at BYUIS.

This design case seeks to continually tie back to a precedent that I hope readers can use: the process of redesigning this

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online course was shaped by cycles of iterations (Boling, 2010; Howard, 2011; Smith 2010).

KEY STAKEHOLDERS

The key stakeholders in the one-year course redesign process were as follows:

- Dr. Eleanor Thorne, who has a Ph.D. in Plant Physiology, is a senior instructional designer at BYUIS and my supervisor.
- Robin Conover has been a professional animator for 26 years and has been an instructional media specialist at BYUIS for three years. Robin was responsible for overseeing the animation team.
- Scott Gutke has been a senior media manager at BYUIS for twelve years. Scott was responsible for overseeing the media team and the media studio for recording.
- The BYUIS illustration team led by Art Director Suzy Gerhart.
- The BYUIS programming team led by Daniel Teichert.
- Dr. Sarah G. Bellini is an assistant professor of Nutrition, Dietetics & Food Science at BYU and has been an instructor for the on-campus NDFS 100 course for three years. She began as an online instructor in fall 2016.
- Dr. Rickelle Richards is an associate professor of Nutrition, Dietetics & Food Science at BYU and has been an instructor for the on-campus NDFS 100 course for nine years. She began as an online instructor in spring 2017.

PHASE 1: DESIGN DECISIONS FOR FALL 2016

Though I had been an instructional design assistant for three years, this was the first time I was assigned to an entire course and to work with the professor directly. My supervisor, Eleanor, is an experienced instructional designer who has worked with BYU Independent Study for over ten years. She came to the first meeting with Dr. Sarah Bellini in April 2016 to guide me on how future interactions would occur. We began by creating a schedule to revise one to two lessons each week. We chose this schedule so that we could finish the entire course revision by the month of August, before the BYU Online version of the course would be released for the fall semester.

The Learning Management System (LMS) that housed all BYUIS online courses, BrainHoney, constrained what we could accomplish. Each unit in a course consisted of lesson pages that were designed in Adobe Dreamweaver using HTML and CSS coding. HTML pages gave us the flexibility to not only provide text, but also to embed images, videos, and even flash or HTML5 assessments and activities. Designers and employees created assessments in BrainHoney using QTI, which is a coding format that allows for a wide variety of question types (e.g., multiple choice, essay, matching). BrainHoney also includes other tools like Discussion Boards, which we utilized later. Figure 1 shows a standard student view within the BrainHoney LMS.

The most transformative changes to the course from April to August 2016 occurred while making design decisions with Sarah as she evaluated the lesson pages. She had decided that the online course must emphasize the same concepts

FIGURE 1. Student view of the NDFS 100 welcome module in BrainHoney, showing Sarah's introduction page.

as the face-to-face course in order to prepare students equally for their quizzes and exams. Sarah requested edits in the content pages to clarify points, and she altered the reading assignments to match what the on-campus students were studying. She would occasionally suggest deleting a page that looked outdated or didn't have relevant content. Quite often, Sarah would request new pages that would include nutrition content that professors felt were most necessary to cover in class. The course underwent several iterations while these design decisions were implemented before the start of the fall semester.

Filling in the Modules

Many of the lessons were populated sparsely in the previous course, meaning that students in the online section of NDFS 100 would not receive the same information as students in the face-to-face sections of the course. Figure 2 shows screenshots of lessons 9 and 10 in BrainHoney, which originally only included an introduction page, a self-check (ungraded) assessment, and a quiz. In these two lessons, our

iterations involved combining quizzes to match the face-to-face course and then adding multiple new content pages, an animation sequence, and a discussion board. This is reflective of the changes that were made throughout the course.

The new pages that Sarah proposed required design creativity. Sometimes she hand-picked supplementary videos from the Cengage textbook website. For these, we decided on which introductory text would help learners know what to look for while they watched the video. That introductory text was meant to perform the same function as a professor telling their students what to pay attention to while watching a video in class. For the videos that were especially important, a couple of programmers on my team created a way to insert ungraded, informal assessment questions on the HTML pages directly below the videos. Sarah wrote these questions to mimic the questions she would ask in class to help students gauge their own understanding. Cengage did not have a video for every important topic; in these cases, we either created a page of text with images to explain a topic

Before

Lesson 9: Energy Balance and Healthy Body Weight	
9.1 - Identify the problems associated with obesity	Lesson 9 Introduction
9.2 - Describe the components of energy balance	Lesson 9 Self Check Assignment
9.3 - Describe BMI and other ways to measure body composition	Lesson 9 Quiz
9.4 - Interpret BMI and waist measurements	
9.5 - Explain what happens during metabolism	+ Add Edit Delete Preview Copy Paste
9.6 - Describe nutrients and how they are metabolized	
9.7 - Define successful weight loss and its components	
9.8 - Identify characteristics of a healthy body weight	
9.9 - Describe the characteristics of a healthy body weight	
Lesson 10: Nutrients, Physical Activity, and the Body's Response	
10.1 - Explain the benefits of and guidelines for physical activity	Lesson 10 Introduction
10.2 - Describe how the body derives energy from food	Lesson 10 Self Check Assignment
10.3 - Identify the dietary recommendations for physical activity	Lesson 10 Quiz
10.4 - Describe fluid needs and the importance of hydration	
10.5 - Describe food intake recommendations	+ Add Edit Delete Preview Copy Paste

After

Lesson 9: Energy Balance and Healthy Body Weight	
9.1 - Identify the problems associated with obesity	Lesson 9 Introduction
9.2 - Describe the components of energy balance	Essential Information: Basal Metabolic Rate
9.3 - Describe BMI and other ways to measure body composition	Healthy Weight Loss
9.4 - Interpret BMI and waist measurements	Disordered Eating
9.5 - Explain what happens during metabolism	Save a Life
9.6 - Describe the body's response to energy balance	Feasting and Fasting Animation
9.7 - Summarize healthy strategies for weight management	Lesson 9 Self Check Assignment
9.8 - Identify characteristics of a healthy body weight	
9.9 - Describe the characteristics of a healthy body weight	+ Add Edit Delete Preview Copy Paste
Lesson 10: Nutrients, Physical Activity, and the Body's Response	
10.1 - Explain the benefits of and guidelines for physical activity	Lesson 10 Introduction
10.2 - Describe how the body derives energy from food	The Effect of Diet on Physical Endurance
10.3 - Identify the dietary recommendations for physical activity	Fuel Sources in the Body Animation
10.4 - Describe fluid needs and the importance of hydration	Lesson 10 Self Check Assignment
10.5 - Describe food intake recommendations	Lesson 9-10 Quiz
	Discussion Board #3: Staying Spiritually Fit
	Independent Study Discussion Board #3: Staying Spiritually Fit
	+ Add Edit Delete Preview Copy Paste

FIGURE 2. Example of the editing/designer view in lessons 9-10 of the online course, before and after iterations for the fall 2016 semester.

or we designed a custom-made animated video to convey information.

Creating Custom Animations

The most unique pages included new, custom-made animations created by our media and animation teams. We decided to work with these teams rather than with the BYUIS filming and video production team because the concepts (e.g., the digestive system) we chose were more conducive to animations than live-action videos. Working with our media and animation teams also simplified the communication and editing process because they were located in our building whereas the filming team was located across campus. Eleanor and I met with the team directors, Scott and Robin, to see if they had storage capacity to support the animations. At this meeting, we debated between creating (a) Adobe Flash animations that students would interact with or (b) hand-drawn and designed animated videos. Ultimately, Scott's media team and Robin's animation team were willing to take on the challenge of storyboarding and creating a series of animated videos. Creating these videos was an iterative process that required collaboration and compromise between the stakeholders involved.

Creation of Ned, a learning companion

We decided that we would create a character, Ned, to act as a relatable learning companion for online students because they lacked face-to-face contact with other students and a professor. Ned's name comes from the first two initials of NDFS 100. He represents a typical college student who is

taking this nutrition course. Each animation video shows Ned learning about nutritional concepts while he engages in college life. Eleanor and I met with the media and animation teams a couple more times to narrow down what Ned's character should look like. We decided that his surroundings should be futuristic, an environment that we felt would be more appealing to college students. For example, Ned travels on a hoverboard from place to place, which eliminated the need to animate his leg movements. In another video, Ned uses a scanner on his arm to look at the vitamin and mineral content of foods at the grocery store (see Figure 3).

Initially, Sarah found four topics to emphasize using these custom animations, which the online Cengage materials did not address fully. We ended up adding two additional animations by the end of August to create a total of six animations with Ned. The lesson numbers and animation titles are as follows:

- **LESSON 3** Mechanical and Chemical Digestion
- **LESSON 5** Fatty Acid Structures
- **LESSON 6** Digestion and Absorption of Protein
- **LESSON 7** Vitamin and Food Match
- **LESSON 9** Feasting and Fasting
- **LESSON 10** Fuel Sources in the Body

The iterations

To create these animations, Sarah sent me an outline of what she had imagined along with background information, including helpful videos and sections from the course

textbook. This was the information she had conveyed to students in the face-to-face class, which she wanted online students to access. From there, I created a rough draft of the script in a Word document. Through email, Sarah made changes to and commented on the script. We then went through several iterations of the script before agreeing on a final version. Eventually, the script went to our media team and we were ready to record audio for the animated video.

The process for recording audio for the animations also required several iterations. The BYUIS building was located downhill from campus, so Sarah walked down to our building to record these scripts in our media studio. Scott, who built and oversaw the media studio, provided direction on how to vary the speed at which we spoke and how to make

FIGURE 3. Screenshot of animation, showing Ned's hoverboard and arm scanner.

FIGURE 4. Video clip of the Feasting and Fasting animation, found in Lesson 9.

our voices more interesting to listeners. Sarah came to the recording studio four times to correct the pace of the recording, to edit content in the scripts, and to eliminate background noises.

Although this meant that Sarah needed to visit the media studio multiples times, we did not want a student employee to voice the animations. We felt that it was important to use Sarah's voice so that students enrolled in the online course felt a greater connection to their professor and so that she could explain and pronounce terms correctly. By the time we finished the audio recordings for the first four scripts, Sarah had requested two additional animations on important topics. She recorded all six scripts at that point, and the media team used her recording for the final animations.

The iterations continued after recording the audio. The animators created animatics, which contain the audio and sketches that guide what the animations will look like. For the first couple of animations, Robin sent the animatics to us, and Sarah replied with her edits. This helped us to catch a couple of content errors before the animation was completed. For the more complex digestive system video, I was assigned to work with one of the student animators who did not understand the scientific concepts initially. Robin's student employees then made changes based on this feedback and created a final version of the animation. These were uploaded to our video site Brightcove and then embedded in the lesson content pages. Click on Figure 4 to watch a clip of one of these animated videos.

Other Design Decisions

Although the process of creating custom animations was the most creative change to the course between April and August 2016, the BYU Online course underwent several other iterations before its fall semester release. Our design decisions aimed to help students feel involved in the online setting and have a learning experience that paralleled the in-class course experience.

Deleting learning checkpoints

In the previous course during the winter semester, Learning Checkpoints were periodically placed in the course, but these were more of a barrier than an asset to learning. The Learning Checkpoints would prompt students to set up an appointment with a teaching assistant (TA), and the objective of this interaction was to help students feel a connection to real people in the course. Technological difficulties, including connecting to the internet and getting the Adobe Connect conference calls to function, resulted in the TAs deciding to "pass off" students who had not completed an appointment. We decided to delete these checkpoints and instead used discussion boards to facilitate interaction. Using discussion boards tended to allow for interactions that would not be possible using only learning checkpoints.

Creating discussion boards

Sarah saw the need for students to have meaningful interactions with the teacher, TAs, and other students. These

interactions occurred in the form of discussion boards, a tool built into the BrainHoney system. Discussion boards allowed us to post a prompt, enabling students to respond to the prompt and comment on other students' posts. We created one general discussion board at the beginning of the course, which allowed students to ask questions about the structure and content of the course and which Sarah and the TAs mediated. We then added four discussion boards throughout the course which students used to relate nutritional concepts to their personal lives.

Updating assessments and assignments

The online nutrition course was outdated in many respects. Throughout spring and summer semesters, other professors from this nutrition course collaborated to update all assessment questions, including self-checks, quizzes, and main exams. They split up this job amongst themselves; I had been told to follow up with those who had not updated the document by the deadline. Eventually, I did edit the online assessments to match their revisions and other content used in the face-to-face course. There were four assignments in the course that had changed slightly over time due to student feedback. I made these changes iteratively as I

received them, and then uploaded the corrected documents to BrainHoney.

New artwork

Sarah initiated a design decision because she was concerned that the course artwork was not relatable, and thus would not capture the interest of online students. She requested to have the Independent Study illustration team redesign the "banner" artwork, which are rectangular digital illustrations that stretch across the top of every lesson page. Sarah pointed out specifically what she would want to improve: the previous artwork was simple and abstract, and she wanted pictures instead of college students preparing food or making food choices relevant to the lesson. Figure 4 shows the contrast: Sarah commented that a cupcake didn't represent lipids and fats sufficiently, and the artists applied this feedback to the new cover art. The artwork is now a teaching tool, with college-age students preparing food and making nutritional decisions.

Because an educational tool or a course can never be perfect, we recognized the need for constant iteration. We wanted all issues that arose in the fall 2016 semester to be

Before

After

FIGURE 5. Banner artwork, before and after. Note the realistic feel of the new artwork and how it relates to the lesson.

considered and changed for the next semester version of the course. As we learned more about the students and how the online course worked for them, we soon saw which aspects of the course did not work as we had anticipated. The following design failures resulted in more iterative changes to the online course for the next semester.

Design Failures

In the fall, the BYU Online NDFS 100 course became live, and students registered for it as they would register for any fall semester course. As mentioned previously, BYU Online began for all of BYU in the previous winter semester, and because there were only a few course options to begin with, many students had never taken an online course. Some students were confused about how to enter and begin the course. Online courses also required students to be disciplined to stay on track with their coursework. Sarah was very diligent in sending a weekly email to students with reminders and tips for success. However, some students in the course, including my husband, said that they were not as motivated by the online environment because they did not have the face-to-face reminders or other aids that helped them be accountable.

Deadlines

For the fall semester course, we had created a course schedule outlining the enforced deadlines for discussion boards, assignments, and exams. However, there were no deadlines for the quizzes. When we got the test data back from Exam 1, we saw a clear pattern: students who had not completed the quizzes for each lesson performed significantly worse than those who did complete the quizzes. Our data indicated that the absence of quiz deadlines decreased the chance for students to complete quizzes on time, or even before the exam when such content would be assessed. We decided that for the next semester, winter 2017, we would build enforced deadlines into the system for each quiz. In addition, students would need to complete each quiz in order (i.e., they must complete all quizzes up through Lesson 7 before they can take the Lesson 8 quiz), which would be consistent with the requirements for the face-to-face course and would increase student accountability.

Discussion board

Another change that we made for winter 2017 was based on student feedback regarding one of the discussion board prompts. For example, students had to connect a scripture in the Bible to a principle of nutrition, but for many students this was a difficult connection to make. The majority of students at BYU belong to the LDS church, but a few students with different religious faiths requested that the discussion board prompts reflect a more general audience. Although the prompts still contained personal and spiritual application of nutritional principles, we revised the prompts to be more

relatable to all students, such as recognizing truthful sources and eating with family or friends.

Assessments

An observation Sarah made concerned students who incorrectly answered assessment questions that had been covered in the animations with Ned. When she talked with a couple of students she realized that because there was no assessment tied directly to the animations, students were more likely either to skip the animations or to not take them seriously. For the winter 2017 semester, Sarah's TA wrote quiz questions to accompany these animations, which we embedded in the HTML pages.

We continued to make iterative changes to the course based on student and nutrition faculty feedback throughout the winter 2017 semester. Examples of other iterations included revising the wording of quiz or exam questions and adding content in the HTML pages that would give the online students the same advantage and information that the face-to-face students received in their classroom.

PHASE 2: DESIGN DECISIONS FOR SPRING 2017

During the winter 2017 semester, we experienced another paradigm shift: switching to another LMS. BrainHoney lacked aesthetic appeal and technical support, primarily. In order to keep pace with the rapidly growing world of online education, BYUIS needed an LMS like Canvas with more tool integration and a larger community to encourage innovation and growth. This required us to make several major changes to the NDFS course during the winter semester because it was one of the courses that was scheduled to move from the Canvas LMS to the BrainHoney LMS the following semester.

No LMS can meet everyone's needs and preferences, but BYUIS and our instructors creatively found workarounds. Canvas was not easy to work with initially. We could not pull in HTML pages or media directly or use the assessment QTI coding, but there were advantages that outweighed these drawbacks. BYUIS is actively finding new ways to use Canvas for innovative learning solutions, such as embedding activities from authoring tools (e.g., Articulate Storyline 360) and allowing students to take proctored exams from anywhere on campus using their own devices. Students in general prefer the Canvas interface, and professors have more ownership because they have autonomy to make changes directly.

I worked closely with both Sarah and Dr. Rickelle Richards during this semester. Because Rickelle was the designated instructor for the spring 2017 section of NDFS 100 (see Figure 6), she was actively involved in requesting iterative changes to the course as it transitioned from BrainHoney to Canvas, and Sarah continued to collaborate with us. Both

FIGURE 6. Screenshot of the spring 2017 NDFS 100 course in the Canvas LMS, showing Rickelle's introduction page.

professors were busy throughout the semester. I was unable to work full-time due to graduate coursework, so we collaborated as-needed through the semester rather than completing a lesson or two each week.

Additional Animations

Sarah and Rickelle proposed two new animations with the learning companion, Ned. This was based on student scores and feedback that indicated that students enjoyed the animations; however, certain concepts from different lessons were not reinforced enough. We decided that although Rickelle would be the instructor for spring 2017, Sarah would remain the voice of the animations. We predicted that students in our online course would prefer cohesiveness from one animation to the next by using the same voice actor as the narrator, or their instructor, for all the animations added in the course.

Similar to the previous process, we went through several iterations while writing the scripts, recording the audio, and reviewing the animations. Both instructors submitted ideas for animations based on what they taught in class for that subject. I drafted the script, and they both included their edits in the script. Figure 7 shows part of the Iron Deficiency Animation, in which Ned's sister, Nelly, receives nutrition counseling for anemia. The following animations were

FIGURE 7. A screenshot of one of the new animations for spring 2017, featuring Ned's sister, Nelly.

proposed and created during winter 2017 for the spring 2017 course:

- **LESSON 4** Glucose and Diabetes Animation
- **LESSON 8** Iron Deficiency Animation

The iterative changes continued even as we passed our scripts to the animation team. The animation team had many projects during the winter 2017 semester, and the shortage of available students who could work full-time limited the team's progress. Nevertheless, they agreed to complete

these animations in time for the spring 2017 semester. When Sarah and Rickelle visited the building, we went to Robin's office and checked the progress of the new animations. Sarah and Rickelle were often able to spot mistakes and make corrections before the animation was complete. However, some corrections were not identified until after the animation had been completed and uploaded to the LMS (e.g., other nutrition faculty had noticed small content errors). Robin and the animation team accepted all feedback graciously and made the necessary corrections.

Articulate Storyline Activities

As Rickelle reviewed the course, she noticed several concepts that she explicitly had taught in the classroom but that did not appear in the online course. Due to the high volume of videos already in the course and the involved process that animations required, Rickelle asked if we could create activities, such as drag-and-drop interactions. Since BYUIS recently purchased licenses to Articulate Storyline 360, I agreed that I would learn the software and create these activities.

Similar to the iterative process we had used to create the animations, I frequently communicated back-and-forth with Sarah and Rickelle to confirm the activities to create. First, Rickelle would send a summary of what she hoped to see in the activity, along with content from the textbook or from her PowerPoint presentations used in class. I then created a first draft to send to Rickelle and Sarah for feedback. They walked through each activity and emailed revisions. Each activity underwent several iterations regarding feedback for correct and incorrect answers, aesthetic changes, or content edits.

As of April 2017, we had created eleven Articulate Storyline activities during the winter semester to include in the spring 2017 Canvas course. The following list summarizes the activities and where these were located.

LESSON 1

- Therapeutic Touch activity: Drag-and-drop interaction to quiz students on what they learned in the Therapeutic Touch video, regarding the scientific method.
- Abstracts activity: A series of questions about scientific journal article abstracts to prepare students for Assignment #1.

LESSON 2

- DRI Lists activity: A series of scenarios where students identify if the fictional people meet nutritional recommendations using DRI tables based on their age and gender.
- Food Group Nutrients activity: A multiple answer activity where students identify which nutrients are found in significant quantities for each food group.

- MyPlate Food Equivalents activity: A multiple choice activity in which students select the correct equivalent for a given food serving (e.g., $\frac{1}{2}$ C spaghetti = 1 oz equivalent grains).
- Foods to Limit activity: A drag-and-drop activity for students to identify sources of fat (i.e., oil or solid fat) in foods and then identify which foods to limit in each food group.
- Food Labels activity: A series of questions about different food labels and whether they are good sources of certain nutrients.

LESSON 4

- Lactose Intolerance or Milk Allergy activity: A drag-and-drop activity in which students match characteristics with either lactose intolerance or a milk allergy.

LESSON 8

- Iron Absorption activity: A drag-and-drop activity where students decide what type of iron that a food contains in addition to any promoters or inhibitors to iron absorption the food contains.

LESSON 11

- Cardiovascular Disease (CVD) Risk Factors activity: A series of scenarios where students determine whether or not fictional people are at risk for CVD.

LESSON 12

- Food Safety activity: A slider activity in which the student moves a slider (that mimics a thermometer) to the safe internal temperature for cooking different types of meats.

Other Design Decisions

Although the main changes to NDFS 100 for the spring semester included the new animations and the Articulate Storyline activities, we also made alterations to the course to help students have a positive experience in the BYU Online course. These changes, which occurred before the spring semester began, included accommodating the transition from the BrainHoney LMS to the Canvas LMS, removing the banner artwork in the course, and adding Rickelle's new content pages.

Canvas

Converting a course from BrainHoney to Canvas was a new, iterative process for all of BYUIS, and the NDFS 100 course was among the first set of courses to be converted. Some of the instructional designers created a master Google doc that provided helpful Canvas conversion information to promote consistency and collaboration. I frequently referred to this document and asked questions while transferring the

Scientific Method: Sailors and Scurvy

A basic knowledge of scientific methods is critical for sorting out fact from fiction when it comes to nutrition. Based on the foundation knowledge you will gain by studying the concepts in this course, you will have the tools to know which sources to trust when you hear something related to nutrition. You will also see examples of research throughout the course to solidify that principles of nutrition are based on scientific evidence.

The following is an example of the scientific method in two classic nutritional studies. This will help you better understand the scientific foundation for nutrition.

Scientific Method

1. Sailors & Scurvy

Historical Examples of the Scientific Method

[Scientific Methods: Sailors and Scurvy Transcript](#)

FIGURE 8. Screenshot of a basic content page in Canvas without banner artwork.

content pages, the assessments, and the discussion board prompts. Each of these had settings that needed to be carefully selected.

BYUIS continued to collaborate to find ways to improve the course conversion process. Assessments in Canvas are not built using QTI coding like BrainHoney, which require many “clicks” to create even one question. However, our programming team created a QTI-to-Canvas Quiz Generator that automatically created the quiz questions so that only minor edits were needed. Converting the course also required copying and pasting code from the BrainHoney HTML pages into the Canvas content pages, which also required formatting and aesthetic adjustments. The instructional designers later found a way to embed the HTML pages in Canvas, saving time and avoiding formatting errors.

Banner artwork

Another iterative change occurred when Rickelle asked if we needed banner artwork in the Canvas version of the course. The Canvas LMS gives instructors more autonomy because they can edit content directly, which also gives instructors greater control over the aesthetics of the course. Due to the layout of Canvas pages, the previous banner artwork for all courses was too tall, requiring students to scroll up

and down in order to see lesson content. In response, the illustration team began to alter the banner images for each course, including NDFS 100. Instead, Rickelle and another NDFS faculty member decided that they would not use the banner artwork in Canvas. They liked the more minimalist feel of displaying text along with the current images and videos on a page (see Figure 8).

New pages

At the end of the winter semester, we copied the Master version of NDFS 100 in Canvas to Rickelle’s section of the course. At this point, she had the freedom to add her own pages or to edit any pages that we didn’t have time to review together. Over the course of a weekend, Rickelle added new content pages to the course. These new pages addressed topics that she knew students would struggle with or ask questions about based on her prior teaching experience. I went through each of these new pages to make sure that we had proper BYUIS copyright and formatting, but Rickelle had already done most of this work. The NDFS 100 faculty who teach the online course in the future now have the option to either copy Rickelle’s section to the next semester’s version of the course or to begin from the Master version of the course.

Conclusion

I have found that my own learning is iterative, and so is the process through which I approach design. I wrote this design case in April 2017, about a year after we began the entire redesign of NDFS 100. Within just a year, this course had changed dramatically. Beginning with a sparsely populated course in BrainHoney, the course underwent several iterations and grew under the guidance of Dr. Sarah Bellini. This included adding new lesson pages to modules, new artwork, and several custom animations. We implemented student feedback from our design failures in the fall semester, such as adding enforced quiz deadlines to increase accountability. Then, in preparation for spring semester, the course continued to go through important iterative changes under the direction of Dr. Rickelle Richards. We moved the entire course to the Canvas LMS, created new animations, and produced several interactive activities. The collaboration of all stakeholders made these successful iterations possible. I look forward to continually learning through experiences like

this online course redesign as this process already has taught me more about being an instructional designer than any classroom setting.

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