Transforming Online Education with Collaborative Course Development

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August 16, 2017

Introduction

Since Internet-based distance learning emerged in the early 1990s, educators have sought to find the most effective techniques of designing and teaching online courses that appeal to students with a wide range of diverse experiences regarding e-learning technology and course topics (Casey, p. 47). Many researchers have examined the form and features of online classes, offering suggestions for moving material and assignments to an online setting. These suggestions often focus on methods instructors may use to recreate physical face-to-face class interactions in the virtual environment, such as substituting online discussion forums for face-to-face class discussions. Other studies focus on problems generated by online courses, such as the difficulty of enforcing academic integrity in an online environment, or the potential inequity in learning outcomes of students in face-to-face and online courses.

While many educators have written about the methods and best practices of online course development, there is significantly less research on the identities of the creators, developers, and students of online classes. Typically, faculty members are responsible for developing their own online courses, either on their own or with technical assistance from instructional designers, specialists in adapting course material to online Learning Management Systems (LMS). Faculty members are often limited, however, in online course development by time constraints, heavy workloads, and an unfamiliarity with the capabilities of online learning technologies. Additionally, not all educational programs can afford to hire professional instructional designers

to assist faculty members in developing online classes. These course creators and developers must also consider that they are creating courses for students with varying levels of familiarity with learning technology and courses' subjects, a challenge made more difficult because of the often remote nature of the class.

The University of Texas at Austin School of Information's (iSchool) undergraduate minor in Information Studies offers a selection of face-to-face and online courses, many of which may be taught by different instructors each semester. In what has been described as a "standard" or "canned course" approach (Puzziferro and Shelton, 2008, p. 130), the content and structure of the online classes varies little from semester to semester, with the goal that each instructor will essentially teach the same course. The iSchool has experimented with collaborative course development by asking the instructors to develop new content for the courses each semester, but recently a team of eight master's students attempted a new instructor-graduate TA approach, working as a collaborative group under one instructor to redesign an online undergraduate course. While the students improved, re-structured, and designed new course modules and content, the instructor offered guidance based on years of teaching and subject matter expertise, provided the team with a body of content and resources to adapt and improve, and worked with the team to revise the final drafts of the course.

This paper suggests that teams should approach online course creation and development with the intent to create an adaptable kind of educational experience rather than attempting to simply transfer existing material from a face-to-face course to an online format. The paper will explain the School of Information's (iSchool) collaborative course development project and how it relates to other research on collaborative course development, reflect on challenges the iSchool development team encountered, and offer suggestions for other teams who plan to take a similar

approach to online course development. Finally, the paper will discuss the manifold benefits of the instructor-graduate TA approach to collaborative course development, discussing benefits to the instructor and graduate students on the development team, future students of the undergraduate course, and the undergraduate program itself.

A Transformational Approach to Online Course Development

Instructors planning to develop an online class will find an abundance of materials on how to shift a face-to-face class to an LMS, from practical instructions on learning how to use the software or work with instructional technologists to guidance on assembling content and developing assignments. Most guidance materials speak of developing an online course as though such development was "transitional"—the conversion of material from one medium to another. However, many educators also recognize that shifting to an online setting can cause a number of difficulties for instructors; removing the face-to-face component of the class means withdrawing opportunities for students to communicate, interact, and learn collaboratively with each other and the instructor.

Many times, these opportunities (such as class discussions or group projects) may be recreated with online discussion forums or online group projects, but Casey (2008) suggests that an additional challenge of online education is the lack of social cues and the resulting cold, task-oriented communication which can pose difficulties for students. Reeves et al. (2004) agree that the central problem with online course development is the tendency of faculty members to simply convert existing classes into online formats rather than evaluate how digital technologies may be used to create better learning environments for students. Rather than a transitional approach to online course development, instructors should take a "transformational approach" to online classes (Torrisi and Davis, 2000), looking for ways to present materials and encourage

students' involvement with the material and each other in innovative ways. As Casey explains, instructors could create audio or visual materials such as podcasts or video lectures, or assign projects such as blogs or video presentations, and Reeves suggests creating assignments that require students to learn and use "cognitive tools" such as spreadsheets, databases, and "online collaborative knowledge construction environments" (p. 12).

Collaborative course development is another transformational approach to creating online classes. In the usual academic setting, instructors are typically responsible for developing and teaching their own classes, which usually involves gathering texts, preparing lectures, and creating assignments. Some instructors create their own online courses without outside help, using what we would term the transitional approach to course development. Many resources for online course development suggest, however, that instructors should collaborate with other faculty members or instructional technologists to create online courses (Brown et al., 2013; Chao and Hamilton, 2010; Koehler et al., 2004; Luck, 2001; Swan et al., 2014; Xu and Morris, 2007). Developing courses collaboratively allows faculty members to overcome obstacles such as the time constraints, large workloads, and potential problems adapting content to learning management systems which they might face if attempting to create an online class without the assistance of colleagues or instructional technologists (Johnston and Karafotias, 2016; Stewart et al., 2006). Studies also show that developing courses collaboratively leads to richer content (Chao and Hamilton, 2010) and more diverse material and perspectives (Koehler et al., 2004).

Little research exists, however, on the process by which instructors, designers, or students may engage in collaboration, or insight into the qualifications and specific contributions of people involved in the collaboration. This paper will outline best practices and offer suggestions

for a transformational approach to course development using the example of a collaborative project from the University of Texas at Austin's School of Information.

The iSchool's 15-hour undergraduate minor in Information Studies features both face-to-face and online courses taught by assistant instructors (PhD students) and adjunct and tenure-track faculty members in the iSchool. INF 304D, Introduction to Information Studies, is the only required course for the minor, contains a significant writing component, and enrolls students from a wide range of university programs. It has been part of the iSchool undergraduate course offerings for more than a decade and is currently taught in both online and face-to face formats. While the course has been updated over the years as it is passed from instructor to instructor, most of it has not changed substantially, and consists of thirteen weekly modules hosted on Canvas, the University of Texas at Austin's LMS. The IT Lab Coordinator, a full-time IT staff member and instructor responsible for managing undergraduate course development, selected this class for collaborative development because its online format would simplify collaboration and because of its importance as the only core class in the undergraduate minor in Information Studies. The development team, supervised by the IT Lab Coordinator, comprised one instructor and a TA Pool of eight master's students, who planned to reevaluate the course's learning objectives, update the structure and content of the class, and produce transformational projects and videos to create a better learning environment for students.

The TA Pool: A Collaborative Instructional Support Team

In order to better understand the process and structure of the development team, it is necessary to explain the concept of the TA Pool, another example of collaboration within the iSchool. While many iSchool teaching assistants (TAs) work directly with individual faculty members to grade assignments for specific classes, the IT Lab TA Pool comprises eight master's

students appointed to TA positions. These students combine their efforts to grade assignments for as many as twelve undergraduate classes in a given semester. Additionally, they function as staff of the iSchool IT Lab, assisting faculty members and students with printing and offering technical support and instruction for classroom and Lab computers as well as other media equipment. The TA Pool works under the supervision of the IT Lab Coordinator, who oversees the functions of the IT Lab and facilitates communication between the TA Pool and the instructors they support, as well as managing important facets of undergraduate course development as previously mentioned. The IT Lab Coordinator and course instructors report directly to the Associate Dean of the iSchool, as shown in Figure 1.

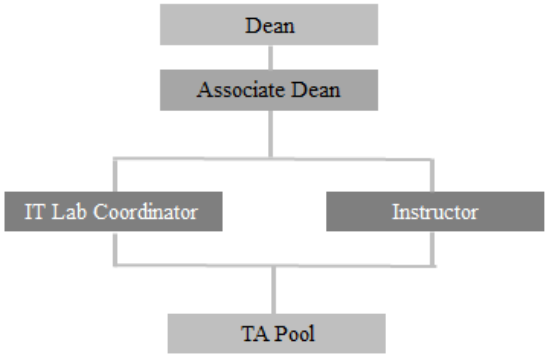

Figure 1. iSchool Organizational Chart Surrounding TA Pool

The TA Pool itself is divided into two teams of four students, with one team supporting instructors of undergraduate Children's and Young Adult Literature classes (Team CYA) and the other team supporting instructors teaching more general information studies and Internet-focused classes (Team Cyberspace). By sharing assignment grading, exam proctoring, and other instructional responsibilities across a larger number of people, the TA Pool members are able to simultaneously support IT Lab operations and offer technology instruction and support to benefit iSchool faculty members and students. TA Pool members also create instructional materials such as video tutorials and design and teach on-site workshops teaching other iSchool students how to

use various software and equipment. Often TA Pool members create these tutorials and workshops at the request of faculty members in order to supplement material taught in the faculty members' classes. The TA Pool members are also responsible for updating undergraduate course material, but in the past have typically undertaken only minor updates and revisions such as correcting typographical errors, updating links, and adding new questions to quizzes.

Because many development teams consist of faculty members only, or faculty members and instructional technology professionals, it may seem surprising that master's students joined the development team for this project. The iSchool's policies and eligibility requirements for teaching assistants, however, reveal a high standard for master's students appointed to these positions. Teaching Assistant (TA) positions in the University of Texas at Austin iSchool are academic appointments awarded to eligible master's and doctoral students. Requirements for eligibility include full-time enrollment during the appointment period (9 semester credit hours for fall or spring and 3 semester credit hours for summer session), academic merit (a minimum 3.5 GPA), and specialized knowledge or skills particularly teaching experience. Appointments officially last for one semester, but can be renewed based on funding availability, faculty members' evaluations, and the student's GPA.

The IT Lab Coordinator also believed the TA Pool would be valuable members of the course development team due to their close proximity in age to undergraduate students. As Hicks et al. (2010) write, "teaching is not just structured around the content (for example, logic, sequence of presentation, relationships between topics) but also must take into account the personal dimensions students bring to the learning experience (for example, previous experience in the topic, gender, culture, age)" (p. 2). While the instructor may have some insight into the nature of the intended audience, the TA Pool shared a closer connection with the digital natives

who would be taking the class, and were encouraged to provide observations or suggestions for tailoring the content to a wide range of undergraduates, some of whom are intimately familiar with digital technologies as well as others who are self-conscious about their lack of expertise with digital tools.

The TA Pool worked directly with an adjunct faculty member who provided them guidance based on his expertise in teaching undergraduate online classes, and specifically in teaching INF 304D. As a member of the TA Pool, I functioned as the project leader, crafting a vision for the development of the class, coordinating collaboration within the development team, and facilitating communication between the TA Pool, the IT Lab Coordinator, and the instructor.

Reevaluating Learning Objectives

In order to craft a vision and plan for the development of the course, I began by evaluating the learning objectives of the course, and more specifically, assessing the class's organization and content in relation to the learning objectives. According to the University of Texas *Undergraduate Catalog*, INF 304D is an:

> Overview of the information field as it relates to the technology-based world culture. Topics may include the idea of information, information in relation to technology and culture, human-computer interaction, information technology in education, information literacy and the "digital divide," information and communication technology, information and gender, public information policy, and information organization and preservation.

While class descriptions are intentionally broad to give instructors freedom to customize their iterations of classes, the paragraph above specifically mentions both professions (human-computer interaction, information organization and preservation) and more overarching themes or challenges encountered within information studies (information literacy, information and

gender). It seems clear that any iteration of the class should include a focus on the fundamental ideas and history of information studies, an introduction to professions and different areas of interest and research within the field with an emphasis on its interdisciplinary nature, and a discussion of the ethical themes and challenges that information professionals encounter in their professional practice. The development team instructor outlines the following learning objectives in his most recent online section of the class. According to those learning objectives, students will be expected to:

1. Demonstrate an understanding of major topics in information studies, identify key issues, and discuss important terms
2. Examine numerous perspectives related to professions and issues in information studies and formulate independent arguments based on these perspectives
3. Relate perspectives and issues in information studies to their lives, both personally and professionally
4. Fulfill the requirements of a substantial writing component course by writing weekly discussions and between 16 and 20 pages in at least four essays.

While the instructor and I agreed that the learning objectives should not change, we agreed to modify the organization of the class's content in order to better help students achieve those objectives.

Before our modifications, the class's thirteen modules varied in scope and topic. While some focused on specific jobs and professions within information studies, other modules discussed the history and complexities of overarching themes within the field. In other words, each module seemed to cover only one of the learning objectives—either the topic was a key issue in information studies (such as the Copyright and Intellectual Property module) or it was a

specific perspective related to a profession (Librarianship). While many modules featured some overlap between learning objectives, the instructor and I decided to pursue a structure for each module that focused on an information studies profession; it would contain sections about the history of the profession and key terms relating to its practice as well as a discussion of important issues and themes relating to that profession. Rather than having a divide in the course, where some modules focused on professions and others on themes, each module would take a profession-focused approach to examining those themes and challenges within the context of the profession.

Table 1 includes a side-by-side list of module chapters to show our transition from a mix of profession-focused and theme-focused modules to only profession-focused modules. While many of the new module topics focused on professions mentioned or discussed in the original modules, the TA Pool team selected the rest of the topics based on their own interests or the interests of instructors at the iSchool to demonstrate the wide range of professions related to information studies.

Original List of Module Chapters	**New List of Module Chapters**
1. Information, Information Studies, and History of Information 2. Literacy, Information Evaluation, and Digital Literacy 3. Classification of Information 4. Librarianship 5. Archives & Museums 6. Preservation & Conservation 7. Information Architecture 8. Barriers to Information Access: Geography, Language, Disability	1. Overview of Information Studies 2. Information Retrieval 3. Records Management 4. Librarianship 5. Digital Libraries & Digital Humanities 6. Archives and Preservation 7. Museums and Conservation 8. Data Security and Privacy 9. Collaborative Technology and Crowdsourcing

9. Barriers to Information Access: Gender, Ethnicity/Culture, Socioeconomic Status 10. Security and Privacy 11. Filtering and Censorship 12. Copyright and Intellectual Property 13. Ecommerce and Entertainment	10. News and Social Media 11. Entertainment and Policy 12. Human-Computer Interaction 13. User Experience and Design

Table 1. Comparison of Module Chapter Lists

As we continued to refine our vision for the class, the instructor and I discovered many benefits to redesigning the class to feature profession-focused modules. As an introduction to the field, the class would socialize undergraduate students to the broad range of topics and professions that fall under the wider umbrella of information studies. Students would have the chance to become familiar with professions they might not know existed but might be interested in pursuing after learning about them in the class. Most importantly, the new focus allowed us to reveal the complexities of information studies' challenges and themes by discussing the ways in which they intersect with students' and professionals' lives. For instance, the topic of censorship might appear in multiple modules such as librarianship, news and social media, and archives. Rather than learning about censorship in only one module, as in the original course design, the profession-focused modules would allow students to identify and examine censorship as it relates to specific areas of study and work.

This method of presenting these key issues and challenges would enable students to identify recurring issues as they appear in different settings and contexts. It would give them experience looking at issues from many different perspectives and help them understand how information studies' principles and themes interact with one another. For example, while greater public access to information may be desirable from a librarian or archivist's standpoint, professionals in data security in privacy or records management often seek greater restrictions on

access to sources. Are these conflicts of interest, or do the themes and principles in information studies change based on the context in which they are presented?

Because the intended audience of the class includes students from a variety of majors ranging from computer science to sports management to English literature and beyond, it was also important to emphasize the interdisciplinary nature of information studies and connections between areas of study in order to explain how an action in one area might have consequences in another. Additionally, because the class is intended to appeal to students with varying degrees of familiarity with technological topics, it should encourage those familiar with digital technology to question the depth of their knowledge and understanding of the topics, and reveal to those unfamiliar with technology that they may know more than they originally thought. Throughout the course, students should develop an understanding of the challenges and conflicts present in information studies as well as how these areas and conflicts may overlap and affect one another. Understanding the challenges present in these areas of study will help them identify and understand how the same conflicts or challenges intersect with their lives in professional, academic, and personal settings. With the implementation of this new approach, perhaps a fifth learning objective for the class may be extrapolated from a phrase from the first learning objective:

5. Identify key issues and recurring challenges in a wide range of information studies professions and understand how these challenges are perceived and addressed dependent on context.

Updating the Structure and Content of the Course

Once the instructor and I agreed on the new approach for the content within modules, we looked at other features of the class that might be redesigned. The iSchool, like many schools

with online offerings, views its web-based offerings as independent classes, governed by the rules and preferences of their respective instructors, rather than as part of a unified online curriculum. Instructors who create classes are given no prescriptive guidelines for design features or recommended structure of modules. As a result, classes vary dramatically. While some undergraduate online classes require students to complete one module per week, others feature larger modules that must be completed over two weeks. Students will likely not notice structural or formatting differences from class to class, and it is uncertain whether such elements will affect their learning outcomes.

A style guide for online classes, however, would provide instructors or graduate students developing new classes a set of recommendations for organizing their content, allowing for a more uniform appearance and development of courses (Talbott et al., 2002). Additionally, instructors should assume standard organizational techniques within their individual courses in order to make navigation of the material easier for students, much in the same way that authors of textbooks employ standard organizational techniques. For example, if each module contains an overview, several more detailed sections of content, and an application portion, students will anticipate coming material and be able to navigate and understand the modules more easily.

As the TA Pool began redesigning INF 304D, a doctoral student in the iSchool was concurrently developing a style guide for another undergraduate class, INF 335C, Information in Cyberspace, intended to serve as a set of formatting rules and recommendations to create standardized formatting and structure across different sections of online undergraduate classes.

I also hoped to create a more standardized structure within each module of INF 304D, with a dual purpose of allowing TAs to organize material more quickly and helping students

navigate more easily through each module. The development team finally agreed on five chapters which would consistently appear in each module:

1. Overview – this chapter would identify learning objectives, summarize assignments, and provide a list of citations referenced in the module content.
2. Career Resources – this page would introduce students to careers in the area the module discussed, providing students with information about job titles and requirements, quantitative information about salaries and job market growth, and specific guidance about competencies and education necessary to pursue such a profession.
3. Introduction to Subject – the first content-heavy chapter of the module, the introduction would explain terms and concepts discussed in the module and give a brief overview of the history of the particular profession.
4. Challenges in Subject – this chapter would introduce conflicts or overarching themes often encountered by professionals in the field and provide students with case studies.
5. Future of Subject – the final chapter would discuss current trends in the field, project possible directions of research or innovation, and conclude the module.

Standardizing the modules' organization was one method the development team used to improve the experiences of instructors, TAs, and students, but they also used the redesign as an opportunity to address problems of academic integrity faced by many instructors of online classes Many instructors struggle with ways to enforce academic integrity and identify plagiarism in students' assignments and submissions. If instructors intend students to be subject to online assessments such as quizzes without accessing notes or course content, they must

incorporate strategies such as real-time proctoring (time-consuming for instructors and their TAs) or imposing time limits on questions (which still does not render cheating entirely impossible). To attempt to inhibit plagiarism, instructors often require students to submit assignments through tools such as Turnitin, which compares students' submissions against other materials found online or submitted through other classes. While none of these methods is perfect, educators agree that attempts to prevent academic dishonesty are preferred to waiting to apply corrective measures after students have been caught cheating.

One method we developed to prevent students from cheating by using material from previous semesters was to create and develop extra modules that could be rotated each semester into the class to replace other modules. Another point in favor of the profession-focused (rather than theme-focused) module approach was that it would make the rotating model easier to manage and sustain than attempting to create extra theme-focused modules. For example, overlapping topics such as user experience (UX) and information architecture (IA) might be split into two separate modules, only one of which is taught each semester. Whichever module is rotated out of the course during a particular semester may be developed and edited by the TAs or instructors so that, when it re-launches with the next iteration of the class, it contains fresh and updated material. The new modules would prevent students from using previous semesters' quiz answers, discussion responses, or other assignment submissions that had been used in the modules replaced.

In order to ensure students were familiar with key terms and important elements of the topic, the instructor asked the TA Pool team to create quizzes for each module to test students about the class material. To avoid the need for proctoring, we decided to define these as open-book assessments, meaning that students were allowed to refer to class material or notes in order

to answer the questions. We also used a Canvas feature (Quiz Banks) to randomize quiz questions with the goal of inhibiting collaboration between students. To use the quiz banks feature, we created twenty questions in a quiz bank for one module and set up the assignment to draw ten questions from the bank for each student's quiz. Randomizing the quizzes would not prevent cheating outright, since some questions would still be repeated, but it would certainly cause confusion if students attempt to collaborate with other students for answers.

Before I brought the course development project to the TA Pool team, I divided the work into 1) written content development and 2) media production. A secondary goal of using a TA Pool to collaborate on developing the course was to widen the range of interests and experiences of the creators in order to create more detailed and diverse content (Koehler et al., 2004). While the instructor had made his own improvements to modules relating to his interests in information architecture and data security and privacy, other modules such as those focused on archives and museums were dated and underdeveloped. For the written content, I asked members of the TA Pool to select a module that focused on a profession or field of study that interested them. An archives student chose to work on the archives module, a student interested in user experience research claimed the user experience and design module, and so forth. The instructor encouraged the TAs to recycle as much of the original course content as possible in light of the goal of developing and refining the material that was originally created for the class.

Creating Transformational Projects and Media

Ultimately, the development team hoped to not only redesign the class in a transitional sense, implementing the usual practices and approaches that might be used in face-to-face classes, but to generate new ideas for using technologies available in the online format to transform learning materials and assignments into videos and projects that would enhance

students' online learning. The first transformational approach the team attempted was to redesign the discussion prompts for each module.

The discussion forum is one assignment many online course instructors use to counteract the absence of face-to-face discussions in an online environment (Boettcher and Conrad, 1999; Johnston and Karafotias, 2016; Lakkala et al., 2015). Studies reveal, however, that many online courses engage students in only low levels of interaction rather than the high-level cognitive engagement instructors would prefer (Kanuka and Anderson, 1998; Thomas, 2002). The original discussion prompts in the class primarily ask students for their opinions about topics. For example, the discussion prompt for the Librarianship module begins with the following instructions and questions: "Discuss librarianship. When was the last time you stepped foot in a library? Can you think of any reason you might need to be physically present in a library during your undergraduate career?"

In order to require a higher level of cognitive engagement from students, the TAs constructed discussion prompts requiring students to find a scholarly article or piece of news and contrast it with information covered in the module. For example, here is the new Librarianship module's discussion prompt:

> Find a recent article about problems librarians currently face that conflict with the Library Bill of Rights that is discussed in the module, for example, banned books and censorship, privacy, or access. Write an analysis of the problem, including questions you might have about why the problem exists or how it might be addressed. Be sure to point out which part of the Library Bill of Rights this problem violates or calls into question.

Our team also decided to produce a series of videos for the class in order to simulate the effect of face-to-face lectures and guest speakers. The videos we planned to create would help introduce

students to a broad range of perspectives on careers and areas of study, enhance text-heavy modules, and increase students' understanding of the identity of the iSchool. After some consultation with the instructor, we arrived at the following two types of video we wanted to include in the course:

1. Professional Experience Videos - We interviewed iSchool instructors and asked them to describe their path to Information Studies, introduce their field(s) of study, and explain what they thought was most interesting about their research or work. We planned to include these videos in the introduction chapters to give students a more personal introduction to the area of study from a professional interested in that line of work.
2. Career Resources Videos – These videos featured the iSchool Career Development Coordinator who provided students with an introduction to specific jobs within the field of study, as well as information about the job market, salary ranges, and competencies needed to pursue work in each particular area.

One TA assumed leadership of the media production team and worked with others in the TA Pool to script, schedule, film, and edit both kinds of video. With two videos per module, the media team planned to produce about 26 videos that would be spread over the thirteen course modules.

Collaborative Challenges

Bringing a team of eight graduate students together to work with an instructor to redesign a class is not without its challenges. While some of our efforts, such as developing workflows, led to eventual success, others revealed weaknesses in our team and processes that eventually caused setbacks and unnecessary stress. As scholars of collaborative course development often observe, the hardest part of collaboration is communication. As the project progressed, our team

developed two workflow processes with different approaches for communicating and interacting with the instructor. I worked with the TA Pool to coordinate the efforts of both media and written-content teams and establish floating milestones for handoffs that would occur during the timeline of module development. Our initial workflow, titled the Concurrent Workflow Process, began with Student A integrating content from the course creator's original modules and introducing new sources, case studies, and media to supplement the original material. During the drafting, Student A would write a script for the Career Development Coordinator and alert the media team they could begin filming.

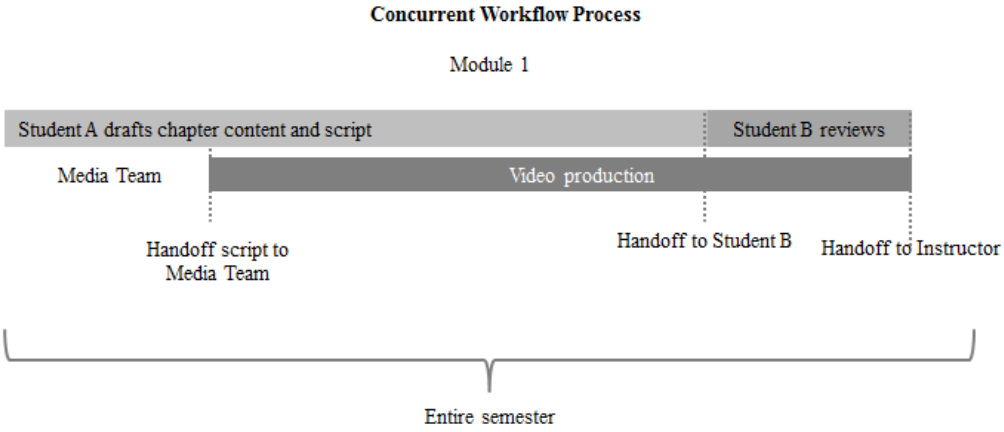

Figure 2. Timeline View of Concurrent Workflow Process

While the media team worked on filming and producing the career development and instructor videos, Student A would continue to revise the content of the course, adding external graphic aids and videos to enhance the text-heavy modules and developing discussion questions asking students to contrast internal class material with external sources and current events. When Student A finished developing content, she would hand the module off to Student B for peer review, editing, and formatting the module to match the guidelines listed in the undergraduate course style guide. Once the TAs completed peer review, editing, and video production, they would submit the module to the instructor for final review.

As I assessed our progress during the semester, I noticed a number of problems emerging with the Concurrent Workflow Process. Because the TAs were working on each of their modules concurrently, they progressed at similar speeds and had the same deadlines for floating milestones and completion of their modules. Due to the instructor's busy teaching schedule, we relied on his initial instructions and guidance to structure modules, create media, and alter content, but planned to turn the entire course over to him for review when it was completed rather than handing over modules in increments so he could review the course progressively. When the instructor finally reviewed and critiqued a finished module, however, his reactions called for a large amount of revision that made me realize we should have made more efforts to communicate during the semester and turn over modules one at a time for review.

Another problem with the first workflow was that, while some TAs enjoyed the autonomy that came from having an entire module to develop on their own, others felt overwhelmed by the work or lacked the time or motivation to meet deadlines. The first workflow provided us with a good selection of first drafts of modules, but with the help of the other TAs I designed a second workflow to make the best use of each member of the team's time and competencies.

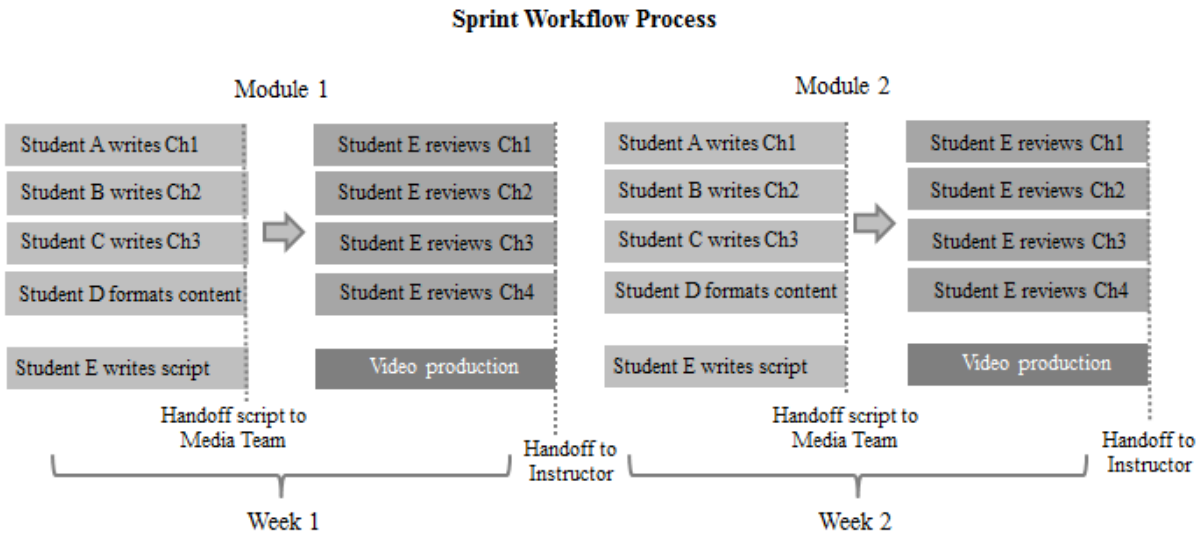

Figure 3. Timeline View of Sprint Workflow Process

In the new workflow, named the Sprint Workflow Process to reflect the focus placed on finishing a module in a shorter amount of time, Student A was responsible for one consistent piece of work across every module, rather than responsible for all content development for a single module. Instead of assigning modules to particular people, I created a set of tasks, including:

- Develop the content of one chapter of the module.
- Compile a selection of career development information and resources for the Career Resources chapter in each module.
- Write scripts for career development videos using information and resources compiled on the Career Resources chapter in each module.
- Format the text and media of every module to match the requirements of the undergraduate course style guide.
- Edit discussion post prompts across modules to ensure they follow the same structure and meet the instructor's guidelines for discussion post prompts.

The task-focused approach was more successful during the last few weeks of the course development because the TAs were able to learn how to carry out a task, then apply the same steps to the same part of every other module. Giving individual TAs responsibility for specific parts of the class (such as discussion prompts) meant that we could focus on one module at any one time, thus shortening the time to completion of a module and allowing us to pass individual modules to the instructor for review.

Our development team encountered another setback resulting from a lack of oversight and organization of our media assets. Because a large part of the project involved video production, we quickly learned we needed a central place to store raw footage, edited videos, and final versions before they were uploaded to the course. Rather than keeping footage and videos on the IT Lab computers we used to edit them, we began storing all the footage on an external hard drive which the IT Lab Coordinator provided. Because we lacked experience in dealing with large amounts of video, we did not think to back the video files up on another system. During the last week of production, the external hard drive crashed, and we spent the next two days attempting to recover what we could from emails, various computers we had used to edit material, and the memory cards on which we had stored the raw footage. The overall lesson we learned from this catastrophe was to include disaster-recovery planning in project preparation stages but, even more than that, to ensure that all media are constantly backed up in more than one location.

The largest lesson we learned was that communication, both within the TA Pool, and between the TA Pool and the instructor, is essential at all parts in the process, a concept which is reflected repeatedly in existing literature on collaborative course development (Tucker, 2012, p. 30). As mentioned previously in the discussion about workflows, we learned that regular

meetings with the instructor would have helped us identify earlier which areas in our modules we needed to change. Additionally, turning over the modules one at a time would generate a constant stream of advice and suggestions for improvement from the instructor, making the task of revising the content after receiving his suggestions more manageable.

Benefits of Instructor-Graduate TA Course Development

In an article about a Michigan State University course development project involving faculty members and graduate students, Koehler et al. (2004) explain the benefits of engaging in collaborative course development for both faculty members and graduate students. The outcomes of the iSchool's development project are similar. By working with an instructor to create and develop class material, TA Pool members learned valuable skills and lessons about how to research topics, create assessments, and think about topics and issues from an educator's perspective. While our project was not part of a formal graduate class like the Michigan State project, the graduate students on our development team involved achieved many of the same learning outcomes.

Like many educational experiences, this project required students to work as part of a group. Group projects are so prevalent in university classes because they prepare students to work in team situations in the careers they choose after graduation. As a project leader, I learned how, when, and what kinds of tasks to delegate to other team members, the importance of giving team members ownership of specific parts of the project, and why communication is key to success. As part of the collaborative course redesign team, each member of the TA Pool gained experience in curriculum development, and many learned how to produce videos as members of the media team. TA appointments are intended to serve as a sort of graduate teaching apprenticeship between the instructor and teaching assistant; just so, this project has served as an

apprenticeship in course creation, and has sparked an interest in teaching for several members of the team who plan to create their own undergraduate online classes to teach after graduation as adjunct faculty members.

The instructor also benefited from the arrangement. Instead of planning and executing a redesign of the class on his own, he was able to serve as an advisor, mentor, and eventual editor for the final version of each module. The resulting profession-focused modules will include a set of extra modules to be rotated into the course in order to prevent attempts at academic dishonesty, and which may be revised and edited or replaced by new modules when they are temporarily removed from the active class.

Undergraduate students have the benefit of taking a class that provides them with a media-driven, consistently structured class which introduces them to professions and areas of study they may not have known about prior to taking the class. Open book quizzes remove the temptation of cheating but ensure students read through the module. Discussion prompts require students to contrast the modules' contents with current events and provide their own analyses of similarities and distances between the two. If the class serves its intended purpose, students will end the semester with a better understanding of the interdisciplinary nature of the field of information studies, the complex relationship and overlap between the different areas of study, and insight into how to identify the recurring themes and challenges discussed in the class.

Finally, the iSchool itself benefits from collaborative course development. Many of the steps the development team enacted were intended to make maintaining the course easier and more efficient, such as standardizing the structure of the modules and creating extra modules to rotate into the class. This development method is time- and cost-effective because the work was spread over the development team and came at no extra cost to the school. Additionally, it fulfills

the iSchool's responsibility to the graduate students involved on the team by allowing them to gain teaching and curriculum development experience working under the mentorship of a faculty member. Perhaps the instructor-graduate TA approach to online collaborative course development is best understood as a new branch of the transformational, collaborative approach to online class creation—approaching course design problems with innovative solutions to make the best use of all available resources and contributors.

Conclusion

The iSchool's instructor-graduate TA collaborative online course development is a good example of how educators have learned to adapt to new learning environments. Distance education (from early correspondence courses to radio or television courses) has always carried with it the problem of detachment on the part of the learner, but the online environment presents instructors and course designers an opportunity to create the framework for a collaborative learning community. Collaborative assignments such as discussion forums or online group projects provide students with an opportunity to feel connected to a community of learners, rather than feeling as if they are learning remotely on their own. In fact, the online environment may encourage greater involvement from students who may not often interact in classroom discussions.

Similarly, the team's efforts to create "guest speaker" videos connected students to the larger network of information professionals, as they provided students with a variety of perspectives on the different areas of study in information studies. Including graduate TAs on the development team meant the team was more familiar with the audience than just the instructor would have been and included students with diverse experiences, allowing them to create

materials that challenged undergraduates both familiar and unfamiliar with digital technologies and the course's topics to question the depth of their understanding of the material.

Other schools may find the instructor-graduate TA approach to be useful when creating or developing online undergraduate courses. Because of the high number of students enrolled in online courses, it is likely that "canned courses," which contain the same material in each section and may be taught by a variety of instructors, will continue to grow in popularity with programs. While instructors may find online course development a tedious or cumbersome process, graduate students interested in teaching or education may have the research and technological or design skills as well as the motivation to contribute to online course development projects. Even a canned course is not a static course. As information about the topic of the class changes over time, the course must evolve to include more relevant examples and readings, updated graphics or videos, and new approaches to discussing content. Implementing an instructor-graduate TA team approach can make this continual development more sustainable and manageable over time. Additionally, teams may decide to experiment with methods for preventing academic dishonesty or making the course easier to update and maintain, such as creating extra modules to rotate in each semester.

We hope other teams can learn valuable lessons from the challenges and mistakes we encountered in our process of developing INF 304D. As much of the published research indicates, constant, clear communication between team members is the most important aspect of collaborative projects such as this. Project leaders should identify potential problems in workflows before encountering problems and work to resolve them, whether the problems are related to asset storage or transitioning from one stage of the project to the next. Leaders should also strive to delegate tasks or pieces of the project to team members based on those members'

skills and interests, and maintain constant communication with the team to streamline the creative process.

Perhaps the next step of "transformation" for online courses is creating content that challenges each student uniquely, providing them with a learning experience intended for a diverse audience rather than simply the average student enrolled in the class. Approaching such a task with a collaborative team will naturally lead to more diverse content, and will result in a course that appeals to students with a broad range of experiences and interests. Furthermore, online courses present opportunities for collaborative knowledge sharing, where students may offer their perspectives on topics and ideas in discussion forums. With the help of these assignments and the diverse perspectives represented in course material, students will learn to reflect on their own experiences and knowledge, understand the information they learn in the context of new principles, and examine conflicts that arise from contrasting their experience with the material they learn. Educators still have much research and experimentation to do regarding the best methods for creating such versatile online experiences, but, as digital technologies and LMS continue to grow in sophistication, online course designers will find themselves with an increasingly broad and innovative array of tools they may use to satisfy the learning objectives of online courses and enhance students' online educations.

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