

chapter 16*

Flipping Out(ward):

Changing the Instructional Model for Large-Enrollment Courses

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Introduction

For years, Kansas State University Libraries taught face-to-face library instruction sessions for the general education courses, Expository Writing and Public Speaking. We called these Library Days, as they were scheduled daily over week-long periods due to the large number of sections. Expository Writing Library Days were four days of back-to-back, lecture-style sessions for around 1,100 students. It took two weeks to schedule the fifty sections of the course and the eleven librarians needed to lead the instruction and separately operate the computer for each section. The sessions needed to be organized to cover each different research paper assignment and required additional PowerPoint presentations in case the Internet crashed during a session. This was in addition to creating the instruction outlines for all the librarians to follow so each and every student saw the same material, no matter which session

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they attended. Each session was fifty minutes with approximately seventy students. By the end of the week, we could only hope that the students retained at least ten minutes of our material.

This is how we spent a significant amount of library staff time prior to embarking on wide-scale, flipped-classroom implementation that not only transformed how we taught large-enrollment classes, but provided an avenue for improved student learning and self-service. This chapter will cover the design iterations of the online component and discuss the rapid prototyping process utilized to design and implement the program. Assessment and logistics will also be discussed, as will lessons learned and design specifications to consider when embarking on a project of this scale. In essence, we'll describe how K-State Libraries went from flipping out during Library Days to flipping out(ward) using an effective flipped-classroom model.

Institutional Setting

Kansas State University is a Midwestern land-grant institution that focuses on instruction, research, and extension activities. The K-State Libraries consist of the main library, in addition to branch libraries focusing specific subject areas. Both authors work in the main library, as part of the Academic Services department within the Research, Education, and Engagement Division.

The Expository Writing and Public Speaking programs at Kansas State University are similar to other introductory composition and speech courses at the university level; both are part of the university core curriculum and both require a research-based paper or speech. The COMM 105/106 (Public Speaking) and ENGL 100 (Expository Writing 1) are required courses, though students are allowed to transfer in the credit from approved institutions or through AP credit. One distinct difference in the Expository Writing program from other institutions, however, is that the first-year course (ENGL 100) is a diversity-based curriculum, where students learn not only composition skills but also about systemic oppression, racism, sexism, homophobia, and classism.

Within an academic year (including fall, summer, and spring semesters), approximately 3,400 students enroll in these courses. The semester before we flipped the library instruction model, spring 2013, we taught approximately 1,800 of those students in our library. Although the Public Speaking assignment has remained relatively unchanged in recent years, the research paper assignment for Expository Writing has been modified multiple times and was once completely revamped within the last five years, each change requiring additional modifications and updates to our library instruction.

We have a large lecture-style room within Hale Library that holds 100 people and includes a lectern and full projector/laptop setup. The English

and Communication departments capped each section at around twenty students, and we scheduled four sections to come at a time. The process and preparation for these sessions, described above, was far beyond reasonable expectations for the instruction librarian to coordinate and for the librarians in the department to teach. Additionally, the students were not engaged, even though we tried multiple activities throughout the sessions, including the use of clickers and worksheets. The style of instruction was not reaching our students. We knew after semesters of doing the library instruction in this manner that it was time for a change.

Problem to Be Addressed

The impetus to flip our large enrollment courses was born from the combination of three problems.

Problem 1: Sustainability

Our large-enrollment one-shots required an unsustainable amount of staff and resources. The coordination of this effort required many hours, room reservations, and scheduling work for public services staff, who also shouldered numerous other responsibilities. Once the sessions were scheduled, two librarians were needed for each session, as the computer used to demonstrate the resources was not in the front of the room where the lead librarian lectured. On average, this required twelve different librarians to teach around fifty-five sections each of ENGL 100 and COMM 105. The amount of work and number of hours were just not sustainable for the small group of librarians we had at that time to teach, nor for the Library Help Desk staff, who were then bombarded with reference questions within a couple of days.

Problem 2: Effectiveness

The one-shot sessions we offered, though revised over the years, were not effective, as evidenced by the large number of students who required additional help afterward. Our reference transactions increased significantly after each course we taught (averaging a 70 percent increase in questions from the week prior the Library Days), and often included questions about the basic information we covered during the class sessions. Formative assessment also revealed that students possessed wildly varying information literacy skills coming into these sessions, and the format did not allow for differentiated instruction to help bring low-skill students up to speed or engage high-level students in a meaningful way. At the end of each semester,

in addition to evaluating students' works cited pages from their research papers, we gave them a copy of the same worksheet they completed during the Library Days session. Almost half of the students were unable to fill out the answers correctly, only four weeks after the session and three weeks after they had submitted their research paper assignment. The students were not retaining the information given to them in the lecture-style instruction sessions.

Problem 3: Pedagogy

A review of recent library literature pointing to the ineffectiveness of library one-shot sessions¹ combined with a goal of creating a personalized experiential learning environment for students (as opposed to fifty-minute lecture-style sessions) led to the adoption of the flipped model. Allowing students to move through basic content on their own and then applying that content in a step-by-step search process on their own topics would provide a personalized, self-paced learning environment with the same help and resources available for those who need additional assistance.

The next several sections will describe the process we used to flip our large enrollment courses in order to provide a more sustainable, effective, and pedagogically sound instruction program.

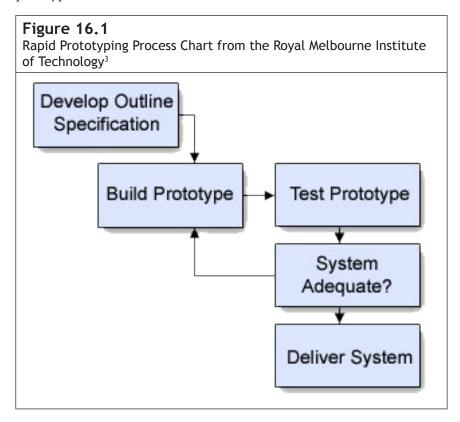
Description of the Project

Outcomes

We ventured into flipped classroom design with several discussions about goals and outcomes for the flipped-class experience. Our Public Speaking program was the first to be flipped. We worked with the coordinator of the program and with librarians and staff invested in the coordination of the face-to-face sessions to determine what content already existed and what was required to flip. These discussions revealed the two most important factors as: first, the ability to both deliver content and collect assessment in the online assignment; and second, we needed to facilitate each student conducting a live search for articles on their topic in order to personalize the experience and make it more meaningful. In doing so, we hoped that this model would provide for the longer-term transfer and retention of the information that would undoubtedly be applicable to other assignments, classes, and other future information-seeking behavior. The program coordinators also wanted a way to ensure that all students in the program had completed the assignment, which became a technical parameter incorporated into the development process.

Prototyping 101

Rapid prototyping is defined as "a technology design process that quickly facilitates high-quality, responsive implementation of resource creation."2 This is similar in nature to some of the more recent evolutions of the AD-DIE instructional design model, but rapid prototyping comes to us from the software engineering world and has been adapted to the instructional design process. The basic tenement of rapid prototyping is to start small and progressively work toward a final product, testing each iteration throughout the process. You can start with low-fidelity prototypes, something as simple as a sketch or storyboard, and work your way to a higher-fidelity, fully-functional prototype.



After meeting with the program coordinators and project group, we looked for current videos, images, and other content that we could use until something better could be produced in-house. For content that required new videos, we first created rough-cut Jing videos of librarians covering content as they might deliver to a face-to-face audience. This compilation of pre-existing materials represented our first prototype for the project—a collection of learning objects that generally helped students move toward achievement of the student learning objectives. We knew we would eventually create new materials more specifically geared toward the class assignment, using language aligned with the textbook and curriculum, but we wanted to get an alpha version up and field-tested in order to make those revisions based on system data and feedback from the instructors.

Technology

We followed the preliminary design discussions with a technology analysis to determine what would work best to host the online component of the learning experience. The technology needed for flipped environments varies depending on the audience, the learning goals, and the scope of the project. At K-State, we started with what was immediately available and accessible to us as relatively non-technical staff, the Drupal content management system we use to host our library website. Drupal offers webform functionality through which content can be delivered and student input gathered. We worked hastily with our Drupal developers to create a webform to both host the content and gather assessment data, and then uploaded and embedded the content. We made sure our prototype met the needs of the Public Speaking faculty and deployed it during the spring semester.

One nice feature of these early iterations was their ability to send an automatic email summary of an individual student's responses to both the student and the instructor upon submission of the form. These email receipts served as a record of completion for the instructor, and provided the students with a summary of the research they completed during the assignment. Because we did not yet trust the capacity of Drupal to collect data and distribute emails at scale, we also set the system to deliver a copy of each submission directly to one of the design team members. The emails served as a record of each completion in addition to the data stored by the Drupal system itself. This fear was substantiated as we learned during the deployment of the assignment in the first few semesters that Drupal was not designed to handle the volume of form submissions we anticipated. Technical quirks, such as dropped forms, repeated submissions, and email receipt problems, prompted us from very early in our endeavor to look for other technological solutions.

Happily for us, the solution was made available shortly after we embarked on the flipped-classroom activities in the form of the Qualtrics survey system. Qualtrics offered a robust and stable content delivery and assessment platform. We were able to retain the content (which had been revised and

tweaked after each iteration of the assignment) and the ability to deliver email receipts of each submission to the students and to their instructors. Because the students were performing live searches on their own topics and submitting their answers in the form of keywords they used, citations for articles they found, etc., the email receipts served as a record of their search process and the beginnings of their actual assignment research.

Face-to-Face Components

Early in our flipped-classroom endeavors we presented a hybrid model where we paired the online assignments with "Research Rescues," scheduled three-hour sessions for students to get additional help with their research after going through the online assignment. We promoted these with the faculty coordinators and graduate TAs for the flipped courses. We felt these opportunities would allow for multi-modal learning options aimed at students who might feel uncomfortable or confused by the online content. We quickly learned, however, that the research rescues were unnecessary. Very few students took advantage of the sessions, and those who did were encouraged by instructors offering extra credit for attending. After several semesters, we dropped the Research Rescues altogether and promoted the use of our Ask-a-Librarian service for further assistance.

Assessment

Each semester brought hundreds of students to the library assignment, with hundreds of data points to assess. The assignment in Qualtrics was built in a way that allowed us to do a complete download of the data. The data was formatted into a large spreadsheet of more than 1,000 records per course for every semester's assignment. In order to accurately assess the data, we created a rubric that was built upon the student-learning outcomes for the assignment. The rubric (Figure 16.2) was created by first listing each of the learning objectives and then the members of the instruction team discussed how best to assess each objective, creating three tiers of scores. The rubric for the Expository Writing 1 (ENGL 100) course is shown in detail below.

We then assessed a sample set from the data to calibrate their interpretations of the rubric. In order to calibrate, they each evaluated and scored the same twenty records from the dataset, using the student learning outcomes created for the assignment. After the teams scored the records, they compared their scores and discussed their evaluations, ensuring that all scoring was normalized and the records from the larger dataset would be evaluated accurately and fairly. Once the scores were calibrated, we moved forward with the sampling of each dataset and each member was assigned a portion of the

Figure 16.2			
Rapid Prototyping Process Chart from the Royal Melbourne Institute of Technology ⁴			
ENGL100: Rubric			
Objective	1	2	3
At the end of this online library assignment, students will be able to generate appropriate keywords for their selected topic.	Does not select keywords or selects three inappropriate keywords	Identifies one to two workable keywords	All keywords are appropriate
Comments			
At the end of this online library assignment, students will be able to identify and select two appropriate sources.	Student fails to identify an appropriate source	Student identifies at least one appropriate source	Student identifies two appropriate sources
Comments			
At the end of this online library assignment, students will be able to evaluate sources that will best support their topic according to the "CRAAP Test" principles.	Student fails to or incorrectly applies the "CRAAP Test"	Student correctly applies at least one element of the "CRAAP Test" to each of his/her sources	Student correctly applies two or more elements of the "CRAAP Test" to each of his/her sources
Comments			
At the end of this online library assignment, students will be able to use one of the many online citation tools listed in the class guide to create an accurate citation for one of the articles they found.	Student does not enter a complete citation or enters a citation with several missing pieces of information	Student enters the citation, but may includes errors or be in the wrong order	Student enters all components in the correct order (may have a few puncutation errors)
Comments			

dataset to evaluate. For one fall semester, there were 1,300 records to evaluate. In order to reach a 95 percent confidence level (5 percent margin of error) in the sampling, the team scored 300 records.

After the dataset was assessed and compiled into a report, project team members met to revise any question from or portions of the library assignment. For example, after one year of assessment, it became clear that a question regarding evaluation of sources needed to be reworded to encourage students to write more in their answers. Up to that point, students were not writing more than a word or two, and therefore, we were unable to assess if they had fully mastered that skill. The ability to use the data to make decisions regarding revision, and conversely to know which of the questions were working well, became the foundation for ensuring assignment objectives are met.

Flipping Out(ward)

We used the data we gathered that first spring to revise and update the Public Speaking assignment for the fall semester and again the following spring, finally arriving at a stable iteration once we migrated to Qualtrics. We followed a similar rapid prototyping process to create the Expository Writing online

assignment.5 The term "rapid" in this context is obviously relative to a given situation and environment. For example, we used a much faster series of iterations to revamp the Expository Writing flipped-classroom assignment when we learned that the main research assignment for the class had changed. Whereas it took three semesters to reach stability in Public Speaking, the Expository Writing flip only took one semester. After the program changed their research assignment, we needed to revise the online assignment but were able to again reach stability within one semester.

After the initial flip, we found more resistance to the idea of flipped-classroom environments when visiting with other departments on campus. We had to "pitch" the flipped environments for library instruction using the existing assignments and data as proof of concept. We arrived at meetings armed with pedagogical theory, statistics, and testimonials, such as those in Figure 16.3. The first iterations of subsequent assignments were also built using this process, created quickly by using videos and content we already had and reusing materials from other institutions to shore up what we did not. After meeting with the faculty, we were able to flip our instruction for the English Language Program, and library staff is currently in discussion with the University Experience program (primarily for first-generation first-year students) and in early discussions with the ENGL 200 (Expository Writing 2) faculty. The Libraries plan to continue to meet with departments and programs to flip large-enrollment lower-level courses leveraging our past success with other courses.

Figure 16.3 Testimonials from Expository Writing Class Coordinators and Instructors on the Effectiveness of the Flipped Library Assignment

"The new online module makes it impossible -- or at least really difficult -- for students to be passive learners in this process. They have to actually work with their topics, search using keywords, and cite a source. They're not simply shown how to do this, but are asked to use what they just learned in a very immediate and practical way."

"I think the assignment helped them to narrow their focus, and forced them to seriously consider the types of research they would incorporate into their papers, resulting in more epic papers."

Lessons Learned

Target Programs and Pitch the Idea

Occasionally, a faculty member or program coordinator will approach you about the potential for changing the delivery model for library instruction sections. In the case of a willing spirit, the job of the instructional designer or instruction librarian is made much easier: agree on objectives, create a prototype, and launch.

Far more often, however, librarians are the flipped classroom instigators, and in addition to the design and delivery of said model, they also have to pitch the potential gains and process to busy academics who have a status quo bias. New delivery models can seem overwhelming and time-consuming. This is why it's very important to strategically target programs or departments for flipped efforts, especially brand new ventures where you don't have anything to show yet. Talk with the faculty or instructors who have historically proved to be library champions and who have shown an interest in innovation around library instruction in the past. Target those who are connected with the campus teaching and learning center or who publish and present on learning theory. Junior faculty can also be favorable partners for experimentation because they are encouraged to write about their experiences and the lessons learned for promotion and tenure purposes. Sometimes just hinting at the possibility of publishing on the effort is enough to pique interest.

It's also helpful to come prepared with examples and materials at hand when you pitch the flipped model to your prospective faculty member or program. Attend meetings armed with examples (you can use examples from other institutions if you don't have any internal projects to show yet), the learning theory behind flipped-classroom models, and perhaps the ACRL Framework for Information Literacy documentation if you are planning to not only flip the content you have been delivering, but also plan to shift your focus to teach the knowledge practices and dispositions highlighted therein. Talk about the online material as a personalized research initiation, where the students are embarking on the process at their time of need, making library time less theoretical and more practical.

Use Robust Software

Get the best software you can possibly afford or gain access to for your project. This is especially important when you're trying to flip a large-enrollment course; you will have to troubleshoot less and have a reasonable expectation for success. We went through several iterations of Drupal assignments be-

fore we had access to Qualtrics. Trying to troubleshoot connectivity issues or dropped assignments for a population of more than 1,500 students in three weeks' time was untenable. If you've been using a mediocre product and something better comes along, take the time to migrate—it's worth the upfront effort to save yourself hours down the road.

Expect Delays and Changes

Any instructional design project is vulnerable to delays, simply by the nature of the creative process and the glacial pace in which new projects progress in higher education. Flipped classrooms are no different and even more prone to delay when the classrooms you hope to flip are high-enrollment or entry-level courses with relatively rigid content schedules. In our experience, faculty collaborators often consider the library/research component of their courses as an add-on, making response time, content/process reviews, or other feedback difficult to plan for. Regular design project management woes also come into play when building flipped-classroom environments: videos and images take longer than expected to produce, team members do not engage with content editing at the same time, and software hiccups delay implementation. It's important to set project completion deadlines, but expect delays, especially if it's your first attempt.

Also be aware that as you tie instructional experiences to course assignments, those assignments and parameters can change. Library interfaces, such as web pages and databases, also change periodically. Sometimes you complete a flipped-classroom experience just in time for the assignment or database interface to change, necessitating new videos, images, or other content. Stay organized and keep track of your learning objects so when changes do occur, you can modify rather than build from scratch.

One consequence of flipped environments can be a large drop in the number of reference questions, especially through online chat services. At K-State prior to the flips, the number of reference questions asked during the week of face-to-face instruction increased from the week prior. During one semester, for example, the week after the face-to-face session, the number of online library chats increased 70 percent. By comparison, the week after students completed the online library assignment in a more recent semester, the number of online chat questions increased by only 12 percent. The change in the number of questions asked was not necessarily an unexpected change but rather one that we had not planned for in the way of adjusting the staffing of the service in accordance with it. In later semesters, we worked with the Reference Team to ensure that they were not overstaffed unnecessarily as they no longer had to have extra people to cover the influx of the Library Days students. When you embark on a flipped-classroom experience, remember that several service points might be affected and plan accordingly.

Prototyping

Rapid prototyping can be a great way to quickly produce a quality flipped-classroom environment. This process relies on the reuse of existing materials, especially for early prototypes, and encourages teams to get something up to gather initial reactions. You can also use the rapid prototyping model to reduce risk during the design process. Through multiple tests with end-users, you can identify the major design flaws, sticking points, and other problems before the objects are put into production, saving yourselves and your organization time and resources.

Iterative processes can save design time and energy when implemented effectively and can be used at scale. You can also pace your prototypes over varying time periods (e.g., within a single semester, or over multiple semesters). But keep in mind if you determine that rapid prototyping is the path for you:

- Pick a firm deadline and stick to it. Tell all of your stakeholders to help keep the whole group accountable.
- Reuse as much content as you can: videos, parts of videos, scripts, graphics, LibGuides, etc.
- Don't spend tons of time on the first prototype or testing. Get something up, get some initial reactions. Look for big problems and deal-breakers early on, and finesse later.
- Don't fall in love with early content. Often, the early videos, graphics, and other content are cut, repurposed, or otherwise altered from the original.
- Keep your files highly organized. Rapid prototyping can be intense, especially if you have multiple projects going at once. It's easy to lose track of files saved in multiple locations or those without a clear organizational structure. For this project, we organized our files by project (i.e., Expository Writing Flip 2012), by learning object (i.e., Video 1), and by source file type (i.e., images, scripts, or, recordings). We also always identified versions and creation dates, saving only the final versions after the project was complete. It doesn't matter which organization method you choose as long as you and your project team can all agree and actually use it.
- Accept imperfection. Refrain from endlessly prototyping by finding a common standard and meeting it, especially knowing how quickly assignments, interfaces, and technology change.

Adapting or Customizing this Idea

No two flipped environments look the same. The design process and specifications will look different depending on the audience, the intended learning outcomes, and the scope of content covered. It may also depend on your relationship with teaching faculty in the program area and what they hope to achieve in the face-to-face session, if there is one. But two factors remain constant across flipped environments and can be applied in almost any situation at any institution: design process and specifications.

Design Process

Prior to embarking on the design and creation of a flipped-classroom environment, all designers and stakeholders should agree on an instructional design process led by learning outcomes. Whether ADDIE, rapid prototyping, or any other design model, everyone on the team should agree on how the design process will look and their roles and expectations therein. Timelines, outcomes, and feedback mechanisms should be determined up front, even if your team strays from these goals as the project progresses.

The learning outcomes, content, and assessments should also be based on some form of needs analysis. At K-State, we do not employ the intensive and time-consuming needs analysis proscribed by the ADDIE model, but we take time to meet with instructors or program coordinators to get a deep sense of what their students are missing, what they need, and what bottom-line messages they hope their students transfer into long-term memory. These kinds of discussions inform the design of both the online and face-to-face components.

It is also important to approach the design process knowing what your institution already has available or what you might borrow from other institutions. In many cases, there are already tutorials, videos, LibGuides, or at least parts of those learning objects that can be repurposed to fit in new flipped-classroom environments. Libraries without instructional designers or the capacity to create high-quality learning objects can use learning objects created by academic library consortial groups like the New Literacies Alliance⁶ or use learning objects from ACRL's Peer-reviewed Instructional Materials Online⁷ database. In early iterations of your flipped environment, don't recreate the wheel. Use what is already available and fill in the gaps over time.

Specifications

Technology requirements for flipped environments will vary, but you can still embark on this kind of project, even if you can't afford the latest and greatest software. It's also foreseeable that you will start with one software and move to another over time, as we did with Drupal and Qualtrics. Consider conducting a software analysis once you know the scope of the project and specifications of the technology that you will need to do what you want. Find out what you have available to you at the library and university level, even if you haven't used those products personally. Even if your library or institution does not currently subscribe to the kind of technology you need to create the environment you want, you can build initial prototypes using a patchwork of programs and platforms. For instance, if you don't have access to Qualtrics, you can still create a survey environment using Google forms, Survey Monkey, or even the survey features of the LibGuides CMS system. If you don't have Camtasia or another robust video creation tool, use Jing or Windows Movie Maker to create a rough-cut video that will serve for the time being. Most teaching faculty and instructors will understand budget and technology constraints.

Whatever you choose, make sure you have considered how your chosen product or collection of products will allow you to:

- Deliver your videos, text, or other media content in an accessible and user-friendly way.
- Assess student learning, even if it's just a collection of right or wrong answers, so you know what to focus on in class.
- Provide feedback to participants in some form. Students probably won't appreciate taking what they'll consider a "quiz" without knowing how they did on it.

It is also important to collect as much assessment data as possible from whatever platforms and tools you do use so you can begin building a case for your library administration to purchase the software you want to use. Library staff time is often the most expensive budget line item after journal subscriptions, so being able to communicate that your flipped-classroom environments are helping students learn more with less face-to-face time might convince your administration to use the savings to improve the technology to which you have access. It will also help make the case for continuing software subscriptions in budget environments where administrators are looking for places to cut.

Conclusion

Flipped-classroom environments can transform library instruction for large-enrollment courses. Flip projects require many hours of up-front design and development time, but become low-maintenance and scalable when complete. The past five years of flipped-classroom work at K-State Libraries has paved the way for us to strategically focus our limited staff and resources toward engaging and effective classroom experiences. The design process

and logistics took many hours to plan, communicate, and implement, and we still encountered barriers and hurdles while moving toward our current iterations. Even now we see the need to conduct further qualitative research with our student audience to get feedback beyond what the assessments and instructors tell us. But most important, these environments have proved a more effective means of imparting library basics to students in large-enrollment courses and beyond as we flip out(ward) and promote this model to more and more programs on campus. The libraries win, but so do the students, and it shows in their research paper citations and in our decreased reference transactions following the flips.

Notes

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