

# Designing Student Projects in Finance: Structure, Technology, and Assessment

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*Student projects are a typical part of finance courses, but little has been written about their design. This article describes a five-year process of developing a web-based, semester-long, project in financial statement analysis and provides a road map for faculty members seeking to enhance learning. A key for any instructor is how to manage the trade off the benefits of individual projects and significant formative feedback with the time demands involved.*

## INTRODUCTION

Student projects have long been required in many university courses and are particularly common in business disciplines. They provide students with opportunities for evidence-based learning and help to reinforce classroom activities and enhance learning. However, they also create challenges for the instructor in even modest sized classes. To maximize student learning, an ideal project might span the semester, involve several rounds of creation by each student, with each round followed by formative assessment (i.e., feedback) from the instructor and culminating in a final product subject to detailed summative assessment (i.e., grading). Even for classes with as few as two or three dozen students, the time demands for assessment can quickly overwhelm an instructor.

An instructor faces many choices when designing a student project. Should the project be done individually or in teams? Should the project be an end-of-semester capstone to the course or ongoing throughout the semester? If the project is ongoing, should students be expected (or required) to update and improve their project based on instructor feedback? If so, how often should the instructor provide feedback, and will that feedback be formative or summative? What mechanisms should be in place to monitor student progress?

Technology introduces an additional set of choices. Should the project be paper-based or electronic? If it is electronic, what software should be used? Will that software be user-friendly, both to students who may be using it for the first time, and for the instructor who will need to monitor progress and provide feedback? What software is available and what is supported by the university? Will there be an additional cost and, if so, will it be paid by the student or the university (or even the instructor)?

This article reports on a nearly five-year search to address these challenges in the design and implementation of a student project in an upper-level undergraduate course in finance. We will detail how we transitioned from paper-based group term projects to individual web-based projects. Our search has involved much experimentation. We have had students prepare traditional paper-based projects and tested electronic alternatives. We have also experimented with individual and team-based projects. We have observed problems ranging

from technological to interpersonal. We have endured semesters where we were overwhelmed with assessment and others with students' technical issues. In the end, we have developed a semester-long project that is required of each individual student, created using an inexpensive commercially available web site builder that is relatively easy to assess by the instructor. It is our hope that other instructors will learn from our journey and that this paper will provide a roadmap for those seeking to implement similar projects in their courses.

The paper is organized as follows. In the next sections, we summarize the literature on student projects, the use of technology in these projects, and on assessment. Next, we provide background about our institution and specifics on the project that we have developed. We next describe the evolution of the project as we moved from team-based paper deliverables to individually prepared web sites along with the motivations for making changes. We then discuss how we dealt with technology, assessment, and other considerations along the way. We conclude with a discussion of the impact of the change both from the perspective of the faculty member and the students involved, and end with reflections on this five-year process.

## THE LITERATURE

While student projects are ubiquitous in business education, it can be difficult to locate literature about their design, particularly in courses in finance. Trading room simulation projects did have a footprint in the research including several articles that detail how students leverage the information and technology in the institutions' trading rooms or similar scenarios to gain real-world experience analyzing financial data from public companies (Blosick, 2011; Lottridge Anderson, 2013-2014; Rauterkus, 2011). Additionally, an article by Etling et al., described several experiential learning initiatives at a single institution, providing general best practices for finance projects (2013-2014). Outside of finance but still in the business school, Kendrick and Goldstone (2019) discuss the benefits of practicum projects in marketing involving real-world clients. Also in marketing, Rand (2018) supervises student projects with outside clients in her buyer behavior and market research course and discusses key success factors and challenges she

has faced. There are many citations relating to the use of projects in secondary school. For example, Larmer and Mergendoller (2010), discuss seven steps they use to enhance learning in their high school projects. There are also many citations discussing the use of projects outside of the business school. For example, Nayak, Mishra, George and Kumar (2016) detail a student project in which a group of students who scored highest on anatomy exams were asked to undertake a project to design creative ways to aid other students in mastering the subject.

Student teams often present challenges to instructors and this is reflected in the literature. Aggarwal and O'Brien (2008) document that social loafing (i.e., the free rider problem) increased as the scope (complexity) of the projects increased and as the size of the student teams increased. Interestingly, they did not find that allowing students to self-select teams results in lower incidences of social loafing. The use of more frequent peer review reduced but did not eliminate the problem. Ainsworth, J. (2016) delved into the factors that drive team success and argues that students' self-regulatory strategies drive the success of the overall teams. Students with high self-regulatory skills not only completed their share of the team project but were involved in the overall design and in critiquing and adapting others' work. In comparison, students with lower self-regulatory skills waited for direction from others and worked solely on their assigned parts. Teams with students with low self-regulatory skills were found to be lower performing and more likely to experience incidences of social loafing.

There is a substantial literature on the use of technology in student projects but much of it is focused on the use of electronic portfolios (ePortfolios). Electronic portfolios have been used in higher education for the past twenty years with an uptick in implementation during the last ten years as it is embraced by many in education as a "high-impact practice...in which students create, integrate, and apply knowledge together" (Kahn, 2014). The ePortfolio is, at its core, an online version of a traditional creative portfolio, where an artist or author will include samples of their best representative work, often with some explanation of the artifacts, for review by others. The transition of portfolio to an online interface has made it easy to create, edit, and incorporate disparate works, or artifacts, into a single easily accessible location (Bryant and Chittum, 2013). Additionally, the variety of subscription and non-subscription tools available for this purpose allows ePortfolio owners the ability to easily share their work with specific individuals or groups of people for review.

The online process has also made it easier to review and provide assessment as the student works on the ePortfolio over the course of a semester or program. The use of ePortfolios makes it logistically easier for students to provide regularly scheduled submissions and receive formative feedback from their instructor, without impact on their grades. Prior research suggests that providing this formative assessment, along with summative assessment, is instrumental to the successful implementation of an ePortfolio

component for projects or coursework (Reynolds and Rice, 2006; Barrett, 2007). Barrett describes the strength of formative assessment as a way that the student is able to provide "information that is of use for identifying gaps in one's knowledge, transforming those gaps into new objectives, selecting appropriate learning activities, and developing self-assessment strategies for continuing growth." As a result, the quality of the final, end-of-semester project that will be subject to summative assessment (i.e., grading) is likely to be higher with ePortfolios.

Faculty making use of ePortfolios in business and finance coursework have found benefits for their students that are similar to those reported in much of the literature coming from other disciplines within higher education. Dominguez, Morales, and Tarkovska (2014) conducted a cross-country study regarding ePortfolios in finance courses and found that "students...become more aware of their learning processes while remaining independent and taking ownership of the progress of their work" (pg. 24). While the reflection on learning processes is something that benefits a student of any subject area, the "transversal skill" of self-regulation and in turn entrepreneurial work completion and reflection is particularly beneficial to students of business and finance as they prepare for their future careers (Morales, Soler-Dominguez & Tarkovska, 2014; Dominguez, Morales & Tarkovska, 2014).

While the use of ePortfolios may help many students to become more independent and in-charge of their own learning, their use may exacerbate the challenges faced by students with low levels of self-regulated learning (SRL) ability. Cheng and Chau (2013) found that students with low SRL levels were less able to successfully participate and benefit from ePortfolio-based learning. While we did not have measures of SRL ability for our students, we observed a significant number of students whose performance seems to be the result of their inability to perform without externally enforced deadlines.

The other tack that business, finance, as well as other discipline-focused ePortfolios take is toward employment exploration and marketing for career building. The ability to demonstrate one's skills through project or problem-based learning helps students to showcase their capabilities to future employers. Additionally, students who expand their ePortfolios to become more showcase versus developmental ePortfolio can focus on their strengths and weaknesses for employability. "EPortfolios are a tool that can function much like LinkedIn, whereby job seekers can better portray their accomplishments and other qualifications by providing extensive information and references" (Okoro, Washington, and Cardon, 2011, pg. 347).

The literature on assessment in business schools is dominated by discussion of how assessment tools are used to satisfy the "assurance of learning (AOL)" accreditation requirements of The Association to Advance Collegiate Schools of Business (AACSB International). Good examples of this are provided by Lakhal and Sévigny (2015), who discuss various assessment tools within the AOL framework,

and Santos, Hu, and Jordan (2014) who provide an example of how to tailor multiple choice exam questions in a finance course to test whether students are meeting the AACSB learning goals of that course.

The topic most absent from the literature is the use of formative assessment in business schools. A search of EBSCO's Academic Search Premier and Business Source Complete databases provided a single result for the search terms "formative assessment" and "Business," a review by Parry (2005) of Hall and Burke's (2003) book on formative assessment in British public schools.

Two additional articles that are relevant for our work are Sherman, Martin, and An (2012) as well as Sherman and Martin (2011) who document how librarians can add value to an upper-level financial management class. They noted an increase in the depth of analysis with more frequent exposure to librarians who provided guidance on resources for research relevant to the course material being covered.

## **BACKGROUND**

Our university is a private institution located in the northeastern United States. Our business school is mid-sized (about 2600 students) and focuses largely on undergraduate education. The course in which the transition was made is financial statement analysis. While financial statement analysis courses are sometimes offered in accounting departments, in our institution, this is an offering of the finance department, albeit taught by a faculty member with a background in accounting in addition to a Ph.D. in finance. Class sizes are relatively small. Over the eight semesters since we began experimenting with the project, enrollments have averaged 51 students per semester (typically in two sections) and ranged from a high of 93 (three sections) to a low of 27 students (one section).

As part of the finance curriculum, the financial statement analysis course in our university is designed to both help students understand how to find and use financial information from an accounting perspective and to use that information to make financial decisions, including how to value a firm. The course heavily relies on cases, mostly drawn from the case libraries of Harvard, Darden, and Ivey business schools. The course is typically taught in twice a week, 75-minute classes, on Tuesdays and Thursdays. The instructor seldom lectures but instead uses the "flipped classroom" approach where students are expected to watch prerecorded lectures before coming to class. New material is introduced on Thursdays, typically with a team-based activity and discussion to reinforce that week's lecture and reading assignment. On the following Tuesday, the class is focused on a case, based on the topic covered in the prior class. Case discussions are led by the instructor using the Socratic method. Students are expected to prepare for each week's case discussion and are also required to write-up a minimum of four cases in memo format supported by exhibits containing their financial analysis. Throughout the course, students utilize Microsoft Excel to perform most of their quantitative analysis.

## ***The Project Today***

A substantial portion (35 percent) of each student's grade is based on the semester-long project that includes the detailed analysis of a company's financial statements followed by its valuation and investment recommendation. The purpose of the project is to provide students the opportunity to apply what they are learning in class each week to a real firm. The weekly assignments for the project follow the topics of the course with students conducting their analysis and updating their projects about 10 days after each topic is covered in class. Project posting begins at the end of the second week of classes and continues for 12 weeks.

The project is designed to guide students through a comprehensive analysis of their firm's performance and value. While the course, and the project, require much quantitative analysis, we stress that analysts must also understand the company's business, markets and strategy. As detailed in Appendix A, the weekly topics are:

**Post 1:** Analyst's Bio

**Post 2:** The Company

**Post 3:** Competitive Landscape

**Post 4:** Strategic Analysis

**Post 5:** Profitability Analysis

**Post 6:** Revenue Recognition and Operating Income

**Post 7:** Assets and Working Capital

**Post 8:** Liabilities and Off-Balance Sheet Financing

**Post 9:** Cost of Capital

**Post 10:** Free-Cash Flow Valuation

**Post 11:** Multiples-based and Alternate Valuation Models

**Post 12:** Overall Recommendation

## ***Evolution of the Project***

This instructor has taught this course over more than 20 years at two institutions and until we began experimenting five years ago, these projects were prepared by teams of three to five students and the deliverables were paper based, supported by a presentation near the end of the semester. In the fall of 2014, we first experimented with having students prepare electronic projects, using the University's ePortfolio software. Along with the move from paper-based deliverables, the projects were changed to individual assignments. The move to individually based projects was motivated by two observations. First, several students each year were asking for copies of their final project to be used as examples of a professional work-product to show potential employers. The team-based paper projects made it difficult for an individual student to highlight their specific contribution when others contributed to the same document. The final document also contained the instructor's markups from the grading process. Second, the perennial free-rider (social loafing) problem always seemed to occur with at least a subset of the groups and the instructor invariably had to mediate team problems relating to alleged lack of effort by one or more team members. The individual projects solve these problems and provide motivated students the opportunity to create impressive work products that can be

easily shared with potential employers and others as they desire.

There remains a small team component to the project. While each student analyzes their own company, students are asked to select companies in “sector groups.” Initially, we restricted their choices to three sectors: consumer discretionary, consumer staples and technology. We have since increased the number of sectors to include all non-financial sectors listed by Bloomberg. Students are encouraged to select firms that are close competitors of each other and invited to share their analysis with their peers for use as comparable data. To reduce students sharing their completed projects with the next semester’s class, we also restrict students from selecting companies analyzed in the course during the preceding two years (four semesters). At the end of the semester, students are required to make a team presentation highlighting their analysis and investment recommendations for each company. To increase the real-life applicability of the presentations, alumni who work in finance are invited back to campus to question the teams and provide feedback.

The transition from team-based paper projects to individual electronic ones was, in retrospect, a challenging one. Our biggest challenges fall into two categories: Technology issues (and related student satisfaction) and assessment. In the following section, we will detail our challenges and remedies in these areas and discuss some other considerations as well.

## TECHNOLOGY

We have used four different software systems since we began this process. In our initial selection, we considered both Google Sites and Blackboard’s ePortfolio (Blackboard is a market leading provider of course management software). We decided upon the Blackboard system largely because our instructional technologists had developed experience using it in the university’s first year core. A year later, we adopted an updated version of Blackboard’s product. In that version, the company made significant changes to its ePortfolio product, and the resulting version was even less user-friendly, created many problems and significant student dissatisfaction. The following student comment was typical.

*“The formatting was frustrating. Some were better than others, but even with the librarian’s help it felt like a hack job. I love the online portfolio idea, I loved the project, but the formatting difficulties were a nightmare. I could never be proud of the work and would have created a better offline document to show an employer.”*

After two years, we were facing two challenges. First, the technology was creating significant student dissatisfaction (and the need for technical support). Second, as we will detail later, the assessment demands were overwhelming. To address both of these issues, we adopted a hybrid model using

Microsoft OneNote. While the project requirements did not change, we asked the “sector teams” to prepare a single electronic portfolio including the analysis of each student’s chosen company. Since OneNote allows simultaneous editing by multiple users, the hope was that its use would result in one, more concise project yet still allow the instructor and other viewers to evaluate the relative contribution of each student. While this approach did reduce the time required to assess the projects, OneNote proved unwieldy. While the results might be different if students had come into the course as regular users of the software, almost none of our students had experience with OneNote. The biggest single flaw in using OneNote is that anyone can edit the entire document, and anyone can delete any part of the document, not just their own contributions. On multiple occasions, students complained of material being lost and in one case, a team’s entire project disappeared, without backup, near the end of the semester.

We abandoned OneNote after a single semester and in the Spring of 2017, reverted to paper-based projects as we reevaluated our options. We did this because we did not have an available software solution and because our class enrollments had exceeded ninety students, a number that promised unassailable assessment demands. Students were still required to analyze individual companies, but the teams prepared one document on their sector. The only formative assessment was an offer by the instructor to read and comment on a rough draft ten days before the final submission date. While we see this semester as a setback, it does provide some interesting data in comparison to our current approach.

In the fall of 2017, we adopted Weebly, a commercial web site building software with a cost-effective education program (\$2 per student for their enhanced offering). While not completely free of technical issues, the software is much more intuitive to use and is based on easy to use drag and drop modules. It contains a wide array of templates that students can customize to prepare professional-looking products. Appendix B provides a brief tutorial on using Weebly for Education.

## ASSESSMENT

As noted earlier, there is substantial evidence that projects such as ours provide opportunities for evidence-based learning. The biggest personal challenge for faculty is the time required for assessment and how to balance student learning needs with other time demands. It was with this challenge where we have struggled most. End-of-semester summative assessment (i.e., assigning of final grades) was straight-forward and, while requiring significant time, not materially different from the evaluation of paper-based projects.

Formative assessment (i.e., non-graded feedback) has been the major challenge we have had to overcome. The complete lack of literature on formative assessment in finance courses and business schools suggests that formative assessment may be rare in our discipline. However, there is



substantial evidence from other disciplines that formative assessment has a significant positive impact on student learning. For example, Bhagat and Spector (2017) note that one of the “three major findings from research on learning in the last 50 or more years” is that “formative feedback tends to improve learning.” As they define it, “Formative assessment is feedback provided to the learner during an instructional sequence or learning activity that is aimed at helping the learner succeed.”

Convinced that formative assessment was critical for student success, we committed to providing non-graded feedback on the project. Initially in the first semester, we promised students that the instructor would provide feedback to each weekly post within a few days of each post. This proved to be unworkable as the time required to open each project, review that week’s addition, and send a short email to each student with feedback was very time consuming. In the second semester, this commitment was modified to promise a review at a “couple of times” during the semester. This too was problematic. Some students, particularly those with lower levels of self-regulated learning abilities, tended to not complete weekly assignments on a regular basis without the implied threat of instructor oversight, while other, more diligent students regularly asked for more immediate feedback to their weekly posts. The key became how to strike a balance between providing meaningful formative assessment without swamping the instructor.

Following the adoption of the Weebly software, we have adopted a compromise solution. Detailed formative assessment is provided twice each semester, following weeks five and ten. Students who seek additional feedback are welcome to come to office hours to discuss their weekly contributions. Only a few take advantage of this opportunity. Each round of formative assessment takes several hours, and students receive a rubric with each section rated on a three-point (Poor, Good, Excellent) scale accompanied by short written suggestions for improvement.

On other weeks, every student project is scanned for progress. The Weebly software is sufficiently user-friendly that, in 60 to 90 seconds per student, the instructor can load a student’s project, click on the assignment for the week and observe whether appropriate progress has been made. While this is not enough time to read and provide detailed feedback, it is adequate to be able determine if the week’s assigned work has been reasonably attempted. To motivate those students with lower self-regulated learning abilities, a weekly grade penalty is recorded for those with no or insufficient contributions. While we have not experimented with using a graduate assistant for these weekly checks, one could easily be employed as the only judgement required is whether a reasonable attempt has been made by each student. Doing this would free up an hour or two of instructor time each week.

Over the 12 weeks of the project, the total time for formative assessment is approximately 25 hours. While this is a significant amount of time, it averages to a bit more than two hours a week, a doable amount for many instructors. We have found that formative assessment has resulted in better

projects overall and enhances learning. With only summative at the end of the semester, students earned a grade but had no opportunity to learn from their mistake. We have also found that the final summative assessment of the projects was made easier by the increased quality of many projects due to the formative assessment that occurred throughout the semester.

## **OTHER CONSIDERATIONS**

While the technology platform choice and the time demands of assessment are the two biggest challenges, there are other issues to consider. We have found that initial training, providing templates for standardization, and selling the benefits of the project were consequential success components.

Unless students come into your course with recent experience with the software, training will be critical. Initially, a key factor in adopting Blackboard’s ePortfolio system was that it was already in use in our first-year core courses. However, we found little advantage in the prior experience as students had forgotten what they learned two years prior. As noted earlier, students had no experience with OneNote or Weebly.

We conduct training sessions during class time in the second week of classes, led by a librarian who is a trained instructional technologist and supported by the instructor. During these sessions, students learn the basics of using the software and are given a survey of key library resources for financial analysis. As we will discuss more fully later, the role of the dedicated instructional technologist was critical. Beginning with this training session, students learned that the course really had two instructors, one a specialist in financial statement analysis and the other a specialist in research and technology.

We also learned to standardize the project so that the final products have a consistent look and are easier to evaluate. This process was more complicated than might be expected as we wanted to allow students as much opportunity to be creative as possible while still having sufficient standardization to allow the instructor to easily see weekly changes and compare performance across the class. In the end, we decided on the creation of a project template with each weekly posting assigned to a separate web page linked to the project’s home page. This results in each student’s project having the same number of pages, in the same order, and with the same titles but allows for substantial student creativity beyond these restrictions. For example, students still have ample opportunity to change formats, to include graphics and tables of financial information, and to alter colors to personalize their projects. The template was developed by the instructional technologist.

Finally, we needed to consider how to “sell” the project to the students. We made sure to communicate that the course was one that would build on previous concepts and that the formatting of the project would help the students to clearly see the scaffolding in their learning. Additionally, we described the ability to easily share the projects with potential

employers. We stressed the evidence of knowledge and skill that are demonstrated at the completion of the project and that efforts put into the project and the work included could be mined for employability marketing.

### **RESULTS AND FEEDBACK**

Evaluation of the work as compared to the original team-based paper projects is a difficult task as there are large differences between the requirements, implementation, and student training and support in relation to the projects. Many things have changed over the five years since we began this process. As with many others who take on such projects, we did not have “a control group; as a result, it is difficult to determine whether learning or positive growth occurred because of the ePortfolios or because of the general structure of the course” (Bryant and Chittum, 2013 p. 195). However, we did retreat to paper projects for one semester in the spring of 2017 and that does allow us to compare grades between the two formats. We also have a body of qualitative student and instructor assessment to provide evidence that is an encouraging look at how the project has increased student engagement, learning, and accountability.

The result of student feedback suggests that many students generally liked and saw the benefits of the use of web-based project. To gather this feedback, we surveyed students, at the end of each semester, about their experiences in the class and specifically about their projects. These surveys were in addition to the university-mandated student evaluations and were conducted on a voluntary basis after the semester was over and the grading process complete. Over the semesters, we have received many positive comments including:

- I thought about it differently because it was more interactive than just doing any old regular report
- It made it feel like it was being presented to the world. It made us be concise and show visualizations much more than a paper.
- Everything was more concise and had a nice layout. It was easy to refer back to other sections to compare results. The website allows us to be creative and it was very interactive. There was no fluff in the website like a paper submission might have.
- The project pushed me to be more creative and interactive in the process. I was able to use interactive links and charts that would otherwise not be able to be shown effectively in a paper submission. Also, with the possibility of sending it to potential employers, which in itself was a great bonus, it pushed me to work harder on the project.
- The [web-based software] helped me think about the project differently than I would have if it had been a paper submission turned in at the end of the semester because it organized the project better than I would have to able to, so it was easy to refer to other parts of my project when necessary.

- It was easier to look back at the previous sections and make adjustments as needed when you learned more. It was also easy to share with group mates and the professor and get feedback instead of passing it in all at once.
- It was interesting to see the culmination of your efforts over the semester displayed on Weebly.
- It was a lot of work, but overall, I learned a lot about analyzing a company with each post. It was also very rewarding to look back and review my work. Seeing the final product was an awesome feeling, more than an essay would have been.
- In the survey, we asked whether students had used or planned to use their online projects in their job searches. In the survey of students from the Spring 2019 class, 6 of 28 respondents reported using their project in their job search and 5 of these believed that using it helped.

We also received negative comments, many relating to difficulties with the software:

- It took away more time to analyze my company as I had to devote significant time to designing the website.
- It makes the project look cooler, but Weebly was a pain to use at times.
- It may not be worth the hassle it takes to actually build things and make it look pretty.
- Project was a LOT of work. Very informative and relevant but very hard to fit in with four to five other classes on schedule

Our self-assessment is that the use of web-based projects was indeed a high-impact practice in our class and made a positive addition to student learning. Much of this is because the regularly scheduled postings, that would have been logistically challenging with weekly paper submissions, kept students focused on the project throughout the entire semester and reduced the last-minute work so common in undergraduate courses. Students were allowed and encouraged to edit and improve prior postings based on formative feedback from the instructor and, as a result, many students created much more impressive final products than they might have with one large paper submission near the end of the semester, evidence that students were truly taking ownership of their learning and could see the real-world benefits of the project.

Our one semester reversion to group projects in Spring 2017 does provide an interesting comparison of group versus individual projects. Table 1 shows the details about student project grades in the Spring of 2017 (with team-based paper projects) and the Fall of 2017 (with individual electronic projects). In each semester, students were each responsible for their own company but in the spring submitted a single paper document with the combined analysis of the sector group and in the fall, prepared individual web sites. Grades were higher and the standard deviation lower with the team-based paper projects. While it is impossible to be fully sure if the differences are related to the media or the team versus

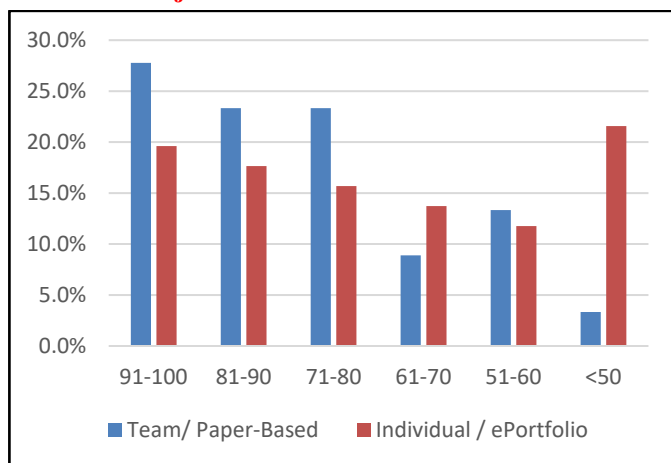
individual nature of the assignments, we believe that the move to fully individual projects is the bigger driver.

As discussed earlier, one of the motivations to move to individual projects was the free rider problem and, independent of the decision to adopt web-based projects, the impact of this change can be seen in both the table and histogram of project grades shown in Figure 1. The move to individual projects eliminated the free-rider problem with students who likely would have unfairly benefited from the work of their teammates now receiving grades that reflected their individual efforts. With the team-based projects in Spring 2017, five students (6 percent of the class) received failing project grades. In the fall semester, this percentage soared to over 21 percent (11 students)<sup>1</sup>.

**Table 1: Project Grades with Team versus Individual Projects**

|                                     | <b>Team-based Projects<br/>Spring 2017</b> | <b>Individual Projects<br/>Fall 2017</b> |
|-------------------------------------|--|--|
| Number of Students receiving grades | 90   | 51                                       |
| Average Project Grade               | 78.5                                       | 66.2                                     |
| Lowest Project Grade                | 45.5                                       | 0  |
| Standard Deviation of Grades        | 15.9                                       | 27.4                                     |

**Figure 1: Grade Distributions with Team versus Individual Projects**



## REFLECTIONS

Having gained five years' experience in our transition to web-based projects, we have developed some strong opinions about their use and learned some lessons that we think will be

valuable to others who adopt similar approaches in their classes.

First, we are convinced that the use of electronic media is an improvement over paper-based projects. As noted, a primary motivator for the switch was the desire to make it easy for students to share evidence of their abilities with potential employers and others. While only a minority of students have chosen to do so, those that have seem truly excited and appreciative of the ability to do so. At the end of each semester, alumni are invited to participate as judges of the course's final presentations; we share the projects with them and receive many positive comments.

Second, the use of web-based software is particularly effective with a semester-long project. Students are required to regularly post to their project sites and can make corrections and additions to earlier posts, based on formative feedback, before being graded on their final product at the end of the semester. Doing this with paper projects would be unwieldy at best.

While we are convinced of the benefits to our approach, there are some significant challenges that a faculty member who is considering adoption must be aware. First, a very important lesson that we learned is that transitioning to a system like ours can only be done if the faculty member is willing to devote substantial extra time to the process, particularly in the early semesters. There is much to learn about the technology and the time commitment for the ongoing formative assessment of student progress is substantial, even in classes of modest size. Perhaps, individual web-based projects could be scaled up to larger classes if qualified graduate assistants were available to monitor the weekly posts and give feedback but, even then, a faculty member is likely to see an increase in the time commitment required to successfully implement them. In this case, the instructor is a tenured, senior professor with a well-established research stream. Undertaking this transition would be ill-advised for an early-career, untenured faculty member at an institution with a tenure process heavily weighted towards research.

A second critical need for anyone considering this move is the level of technical support available. At our institution, a dedicated instructional technologist (the co-author of this article) spent countless hours preparing the template, training the students and then providing one-on-one support to students throughout the semester. During each semester, we worked as partners in the delivery of the course. Without this level of support, the move to the online projects would have been near impossible. The availability of this level of support was enhanced by the fact that relatively few other instructors are doing similar things at our institution. The need for dedicated support is one of the key issues in the scalability of these projects.

<sup>1</sup> There is another factor at play in these grades. In the first three semesters after moving to individual projects, the failure rate was 6 percent, identical to the percentage in Fall 2017. However, beginning in the Fall of 2017, this course was reclassified from being an open elective to being one of two courses that satisfied the "modeling intensive" requirement of the curriculum. The change has resulted in more students taking the course as a requirement to graduate and not because of interest in the subject.

A third challenge is the availability of a suitable software package. As noted, we began by using Blackboard's system for three semesters but found that the changes made during the "upgrade" in summer 2015 actually made the system more difficult to use. We also experimented with OneNote and are currently using Weebly. For instructors considering the move, we recommend that they consider the following criteria. First, how easy is the software to learn and use? We found that Blackboard's system was fairly easy to learn but also contained a number of annoying traits that frustrated students and required additional support time. For example, in some cases graphics (e.g., photos, charts, and logos) would appear visible in a student's portfolio but show up as an empty box when shared with the instructor. Second, can the software handle the degree of complexity of the material in the project? In some disciplines, students are writing narratives with the occasional photo or chart but, in this course, students were posting large spreadsheets and even attempting to link to real time stock tickers. Finally, how stable will the system be over time? One major disappointment in the use of Blackboard was that changes made in the upgrade of summer 2015 destroyed the formatting of work prepared under the earlier version of the software. Since we had sold students on the potential benefits of using their portfolios in their job search, this was a major setback. We know of one student who rebuilt their project in Google Sites, but other students simply abandoned them.

### SUMMARY

Web-based projects offer the opportunity to enhance student-learning and are particularly useful in semester-long projects such as the one in financial statement analysis that we detail in this article. As we complete our fifth year of this experiment, we remain excited about their use. We have also learned a great deal about how to implement their use and hope that this article will shorten the learning curve and reduce the number of challenges for others attempting the move from paper-based projects.

As we discussed, there are both benefits and costs to instructors making this transition. The software makes it easier for students to work on longer-term, multi-step projects and give faculty the ability to monitor their progress without the need for multiple submissions of paper projects. Electronic projects also make it much easier for students to share their work with potential employers. However, the ongoing monitoring of this progress is time consuming to the instructor.

The implementation process should not be taken lightly by anyone considering the move. The resolution of basic issues such as which software system to use, how to train students and how handle technical issues that will arise are critical determinants of the successfulness of the implementation process. Directly related to this is the degree of support that is available from the institution's instructional services.

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**APPENDIX A: Weekly Assignments for the Financial Analysis Project<sup>2</sup>**

**Post 1:** Analyst's Bio – Write a brief professional bio introducing yourself. You may choose to discuss your background, interests and/or career plans. Include a photo appropriate for a professional setting.

**Post 2:** The Companies – Introduce your company and its business. Discuss their products and services. Read the Bloomberg Intelligence on the company (BICO). What is their business model? Who is their target market? In which sector and subsector do they operate? Include a table of key metrics (sales, total assets, number of employees, etc.) to help the reader understand your company better.

**Post 3:** Competitive Landscape – Who are your company's key competitors, suppliers, and customers (SPLC)? Competitors should include your teammates' companies but may include others as well. How are these companies similar and how do they differ from your company? Consider both direct competitors and indirect competitors (substitutes for your companies' products/services). Are their disruptive forces at play or looming in the industry? What are these forces and how do they threaten or provide opportunities for your company and those in your subsector?

**Post 4:** Strategic Analysis – What is your company's strategy and how does it compare to that of its competitors? What is your company's source of competitive advantage? Do an environmental scan and/or a SWOT analysis. Consider the industry and what it takes to succeed. Consider Porter's five forces. Look into the future. How are the businesses and industry changing?

**Post 5:** Profitability Analysis – Examine each firm's profitability over the past five years in comparison to its overall industry and to your selected competitors (FA Ratios Profitability). Look at multiple metrics for profitability including gross profit margin, net profit margin, return on assets, return on equity and return on net operating assets. Use the DuPont equation to disaggregate the firms' ROE and explain changes in the firms' ROE over the past five years. Include one or line more charts that show your company's performance compared to at least three competitors over the most recent five years.

**Post 6:** Revenue Recognition and Operating Income – What are the components of your company's revenue (FA IS Segments)? How does your firm recognize revenue and how does its revenue recognition policies compare to its competitors? Is there evidence of aggressive revenue recognition? Consider the firm's operating income and how it has been affected by "above the line" items including research and development expenses, restructuring costs, income taxes and foreign currency translation. Consider "below the line" components to income including

discontinued operations and extraordinary items. Finally, consider the "quality of earnings" of your firm.

**Post 7:** Assets and Working Capital – Examine each of the major assets and working capital accounts. How does your company account for these items and does the accounting method differ from the firm's competitors? Examine your firm's receivables and compare your allowance for doubtful accounts to its competitors. Is there any evidence of aggressive revenue recognition or earnings management through manipulation of the allowance for doubtful accounts? Compare inventory methods and policies across the subsector. If a firm uses a different inventory accounting method (e.g., FIFO versus LIFO) than its competitors, calculate the impact on net earnings. Is there any evidence of excess or obsolete inventory? Examine your company's cash collection cycle and components (FA WC). How do these metrics compare to competitors and how have they changed over time? Examine your company's liquidity (FA LIQ) in comparison to competitors and over time.

**Post 8:** Liabilities and Off-Balance Sheet Financing – Examine your company's use of leverage and compare its use of leverage with its competitors (FA Credit). Prepare a line chart that compares your company's use of leverage over the most recent five years with its competitors. Make a judgment about your firm's financial risk compared to its competition. Does your company utilize off-balance sheet financing? If so, estimate the value of this off-balance sheet financing and prepare a revised balance sheet recognizing this debt. Calculate the impact of this off-balance sheet debt on the leverage ratios and on your overall assessment of each firm's financial risk. Do the firms have any pension obligations? Is any portion of these obligations unfunded? How has this obligation changed over the past five years?

**Post 9:** Cost of Capital – Determine your company's cost of capital. Compare sources of Beta (Bloomberg (BETA), Value Line and Factset) and do a sensitivity analysis of the effect of different betas on the overall WACC. Compare your independent calculations with Bloomberg's estimates (WACC) and adjust its calculations to reflect the appropriate market risk premium and risk-free rate. Be sure to include the impact of any off-balance sheet financing in the calculation of your firm's capital structure weights.

**Post 10:** Free-Cash Flow Valuation – Estimate the value of your company using the McKinsey Free Cash Flow model. Be sure to discuss your key assumptions and sources and justify your growth rates, key inputs (e.g., COGS percent, SG&A percent, CapEx percent, etc.) and your choice of time horizon. Compare your estimates to Bloomberg's (FA CF).

**Post 11:** Multiples-based and Alternate Valuation Models – Estimate the value of your company using market multiples, the Residual Operating Income (ROPI) model and the

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<sup>2</sup> Beginning in 2017, students have access to Bloomberg Terminals for their research. In this appendix, references in parenthesis are to Bloomberg commands.

Dividend Discount Model. Be sure to use a consistent source of multiples (Value Line or Bloomberg (FA PRA)).

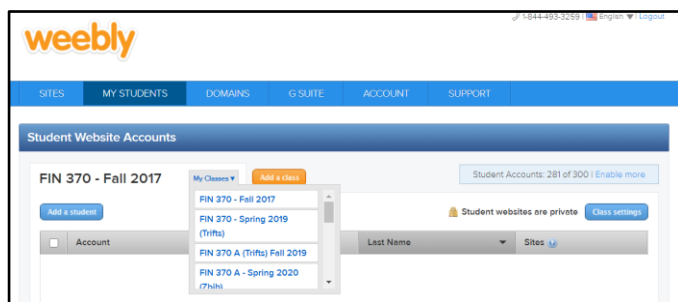
**Post 12:** Examine your entire project and make a final judgment about the company as a potential investment. What do you believe is the “true value” of your company? Make an

investment recommendation that is consistent with your analysis. Include a table that shows the value estimates from each of the models and your overall estimate of the firm’s true value. Compare your recommendation with that of other analysts (ANR).

## APPENDIX B: A Brief Tutorial on Using Weebly for Education

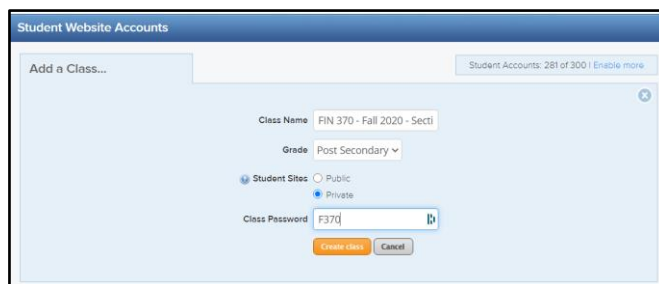
Weebly is primarily used by small businesses to create and manage their web sites, without the need for a professional web designer. It is designed to be easy to use but also offers many advanced features should a user wish to employ them. The company also makes the product available to educators via their “Weebly for Education” portal. In the material below, we provide a brief introduction to setting up and getting started with Weebly.

**Initial Setup:** From the login page at education.weebly.com, new users may create an account and select a password. In that process, the instructor will be asked to choose the number of student accounts. While Weebly offers a very limited free edition, most instructors will want to select the full paid version, currently priced at \$2 per student, paid via credit card. After this brief process is complete, all subsequent tasks are initiated from the main launch page, shown below.



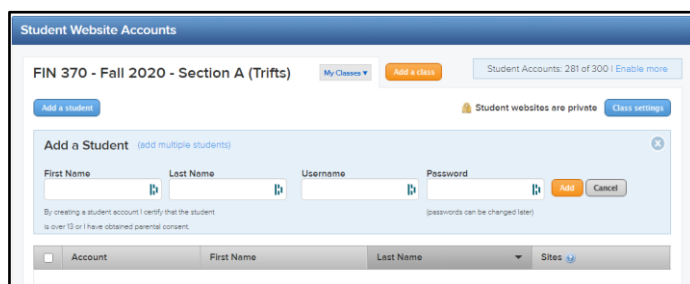
**Setting up and Accessing Student Accounts:** The most used segment of this page is the “my students” tab, as shown. In the above example, we have selected the “My Classes” drop down menu showing multiple sections over several terms. We maintain student sites for several semesters to allow students to use them in their job searches, but instructors have the choice to delete the accounts at the end of each semester and reuse the licenses, reducing the need to pay for additional student accounts.

To set up a new section, click on “Add a Class,” which takes the instructor to the page shown at the top of the next column.

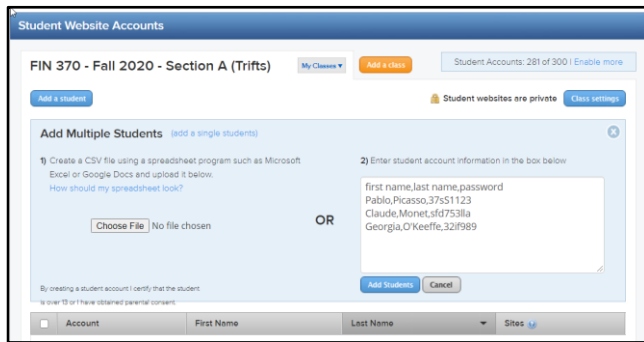


The process is straight forward. Since we use Weebly for multiple sections over multiple semesters, we use a naming convention that includes the course, semester, and section. The only other choice on this screen is whether to make the student sites public or private. Public sites are accessible by anyone who knows the site URL where private sites require the class password, selected by the instructor. We choose to make our student accounts private but use a very simple and easily remembered password. This password is changeable later should there be a need.

The only remaining task is to set up the individual student accounts and this process is accomplished beginning with the screen below, which appears following the click on “Create Class.”

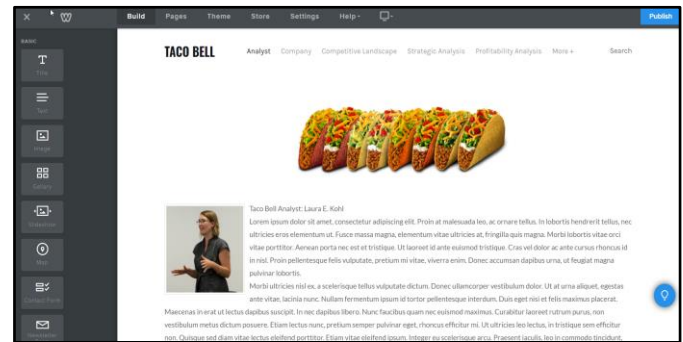


There are two ways to add students; individually or by importing a list. For classes with a small number of students or when there is a late addition to an already setup class, the page above provides an easy way to create student accounts one by one. For larger classes, most instructors will want to click on the “add multiple students” link to the right of the “Add a Student” title above the “First Name” box. That option takes the instructor to the following page.



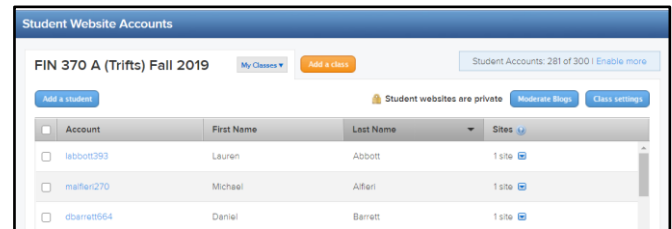
We have found that the easiest way to set up larger classes is to cut and paste the names and passwords into the textbox shown on the right above (after removing the famous artists names, unless you wish to pay for them to have accounts in your class). While the software will create a unique username for each student, the instructor must create unique passwords for each student. We create this list by importing our class roles into Excel and using it to create the passwords. While this can be done in many ways, we create the eight character passwords by selecting the last three letters of the students last name (using the Excel text formula @right), generating a five digit number between 11111 and 99999 (@randbetween(11111,99999)) and joining the two parts together with the @Concat formula. Once the passwords are created, they need to be made permanent by using the copy, paste values routine. The same @concat formula can then be used to combine each student's first name, last name and password into a single text string matching the format shown in the above example. The list is then copied into the text box and the "Add Students" button clicked to complete the task.

**Building Student Web Pages:** We have found that Weebly is very intuitive to use, and most students have no problem figuring out how to use it, often much more creatively that we might have expected. We do, however, do an in-class demonstration of the basics. Shown below is the sample site we show on that day.



This screen shows a sample site for Taco Bell and shows the use of photos, graphics, text, and the display of the site navigation menu to the right of the Taco Bell name. The darker links at the top (Build, Pages, etc.) and on the left side (Title, Text, Image, etc.) allow the user to create and edit the pages. Elements on the left operate on a “drag and drop” basis and selections on the top row result in new menus and options. Several tutorials are available on YouTube, but most users will find the software intuitive and easy to use.

**Accessing Student Web Sites:** The only remaining task is for the instructor to access each student’s site for feedback and evaluation. From the “My Students” tab on the initial launch page, select your class from the “My Classes” drop down menu. The resulting screen will appear as follows.



There are two active links for each student. Clicking on the username will take you to a screen showing the students password (useful when one is forgotten or lost) and allows the instructor to stop students' ability to edit (e.g., after the project deadline). The actual website for each student is accessed by clicking on the small drop-down menu to the right of "sites." You would need the class password if you chose that option.