Trying the "Flipped Classroom":
Practical Tips and Experience

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Summary

This is a "how-to report" on my ongoing teaching experiments that started in the winter quarter 2012/2013, trying some new technology inspired methods commonly known as the "flipped classroom" or "reversed teaching model" to teach a freshman level financial accounting course. The report follows the course of events:

1. Reasons for trying the experiments,
2. Choices I made in what to try (use of videos for teaching, in-class practice sessions, enhanced out-of-classroom student interaction on a *myCourses* discussion forum),
3. Detailed practical report on how I implemented these choices,
4. Results I observed,
5. Final evaluation on what worked and what still needs improvement, on the basis of my own impressions and of specific written student feedback.

The results show that the "flipped classroom" can't solve all pedagogical issues bothering a freshman accounting class situation. Nevertheless, there are good reasons for updating teaching methods to include current technology and worldwide best practice. A list of online resources is provided at the end.

Contents

1 Situation: *"Won't You Please Pay Attention and Do the Work?"*

Boldly assuming that a student has chosen to study business out of interest and inclination, the courses that must be mastered along the way is are a basket of sweet and sour cherries. Financial Accounting is traditionally considered among the tart flavors on the freshmen's palate, except for the occasional *aficionado's* dissenting opinion who happens to like numbers, structured thinking, and an "easy" A, just for practicing some rather logical principles. The broad masses, however, lack motivation, diligence, obtain notoriously low grades, and show unnecessarily high withdrawal or failure rates. This is, regrettably, a huge waste of resources on both sides.

Despite its "bad rep" and lack of popularity, accounting opens a wide door for anyone interested in business and economics. It is about much more than bookkeeping: It is a whole new way of looking at business events. It offers the ability to sort transactions' economic content in categories the student was previously unaware of. While bookkeeping admittedly is an entirely unglamorous activity, accounting goes far beyond that. Taking a month's or year's worth of events, letting the irrelevant aspects evaporate, and condensing the economic essence into a few tables is a brilliant feat. The benefit to the initiate can hardly be overestimated.

So the instructor's acute sense of mission would expect motivated young people with – allegedly – an interest in business, excited to learn how to make sense of such miraculously condensed financial statements by understanding the underlying principles and techniques. Alas, this is hard to get across the wall of indifference surrounding the first year crowds, who are still overwhelmed by the endless options of post-puberty and early adulthood, rather than driven by budding wits to get a head start in one's education or career.

If there were only time to introduce students to more real life situations where accounting data is the key to solving a problem or to make an important decision, then some of the friendly but disconnected minds in the classroom could perhaps be won over – for this debit-credit stuff actually turns out relevant and pertinent after all. But 10 weeks (now 15) or 40 hours (now 44) rush by very quickly, having to cover both conceptual background and the entire beginner's canon of typical bookkeeping transactions. There is not much time left to branch out into the real life showing the relevance of those dull procedures, let alone time left for substantial and regular practicing of those procedures in class. In other words, practice and "play" time could be made only at the expense of thinning out contents. I don't recommend this, as in the given time frame we already operate at the bare minimum of accounting content.

So *How it supposedly is:* We have the professor standing in front of a class. The students sit controlled and quiet. The students believe the story, they write down the information and learn it – and that will result in success in exams. They are engaged and value the experience. Unfortunately, *How it really is:* The teacher stands in front of the class. But these students have completely changed, compared to the traditional assumption of the classroom lecture model. Outside the classroom they are engaged in social media, video games, movies, music. It is difficult for many to sit for 50 minutes and listen to the instructor who stands five rows away. In the best of cases, students will sit quiet, which does not guarantee that any of the presented information actually enters their conscious mind.

After a teaching financial accounting in the winter quarter of 2011/2012, looking at lots of blank faces, and ending with many withdrawals, the question remains: Is there a better way of teaching this? Can more people be reached using a different teaching approach? Or is financial accounting perhaps the one subject doomed to separate the wheat from the chaff among first year business students? Let's go ahead and try something here ...

2 Idea: *What Could be Done Differently?*

One description of the learning process distinguishes the phases of *transmission,* followed by *assimilation.*[1] Transmission refers to the transfer of information and to the explanation of new concepts by the teacher, which leaves the student in a predominantly passive role. Assimilation refers to

[1]The terminology is rather commonplace in pedagogy and probably traces back to Benjamin S. Bloom's days ("Bloom's Taxonomy"). For valuable resources about ideas used in this section see the North Carolina State University's Friday Institute for Educational Innovation on the "Flipped Classroom". You can easily find an – actually overwhelming – wealth of material on the flipped classroom or reversed teaching model through a simple Internet search.

the student's active engaging in the newly learned material, applying the transmitted information to relevant problems or cases. Ideally the assimilation phase follows the transmission phase, intending to consolidate the new information just learned.

Newest studies on efficiency of learning techniques proclaim that "Practice Testing" and "Distributed Practice" proved the two most efficient learning methods.[2] As we know from our teaching experience, however, the biggest challenge for many first year students are poor study habits, lack of discipline, and – too often – a certain "goofy" disinterest. They need guidance in learning how to learn.

The problem is that the short class time is occupied with transmission, so that there is not much room left for assimilation through (guided) practice – except at students' own time out of class, which, as experience shows, is not the most promising strategy, particularly not for freshmen. Another chance to guide students to "Practice Testing" and "Distributed Practice" could be to make time for guided practice *in-class.* More in-class practicing is also a wish often expressed in student evaluations for financial accounting.

The traditional lecture-teaching approach has an inherent flaw: While the cognitive load increases from transmission to assimilation, help for the student is traditionally more readily available for the transmission phase (i.e. classroom lecture), but not for the assimilation work (i.e. own practice, homework). As the class lecture is a one-shot deal, inattentive students lose out and fall by the wayside. While they theoretically could catch up reading the material in the textbook, observing reality indicates that many are neither willing nor able to do that.

At a given course curriculum to be covered in a term, more in-class practice would require outsourcing some of the transmission phase to lecturing on video, which students watch at home. The premise here is that students are more likely to watch a video than to engage in assimilative practice out of class (i.e. classic "homework"). The more ambitious and motivated might even be ready to remove any remaining ambiguities by consulting the textbook on top of the videos.

With a rapidly developing tech infrastructure, the video lecturing has become a feasible option, nowadays further popularized by institutions like the Khan Academy and the booming providers of Massive Open Online Courses (MOOCs) like Udemy, Coursera, edX, and many others. Formal, informal, and "how-to" information regarding video supported teaching models, like the "flipped classroom" and its many implementation variations, is ubiqui-

[2] John Dunlosky et al., *Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology,* Psychological Science in the Public Interest, January 2013, vol. 14, no. 1, 4-58, doi: 10.1177/1529100612453266.

"Practice Testing" is defined as working on *practice problems* concerning new concepts just learned, while "Distributed Practice" is working *steadily* but on *low intensity* over a *longer time period* on newly learned concepts, using various sources.

tous on the internet and is easily found with some simple searches.

3 Execution: *What I Did and How I Did It*

This very detailed section presents my personal approach and experiences in setting up a video supported course in beginning financial accounting. I am very specific here, so that those interested in trying can get started right away. Skip this section if you are not interested in the technical details.

Textbook. I found it useful to use a regular textbook as the backbone of the course, providing structure and practice material. Given the high prices of traditional textbooks, I had been looking around for a free or low-cost yet legitimate alternative, which ruled out excessive photocopying or uploading extensive textbook scans onto *myCourses*.

The online textbooks of `FlatWorldKnowledge.com` seemed an excellent alternative as of mid-2012. At the time, Flat World allowed free online reading of their textbooks and charged only for downloading e-book versions or buying a print version[3]. Another advantage I found intriguing is that Flat World allows the instructor to complete customize an available textbook, which is called MIYO ("Make it your own"). So you can cut text, take out chapters, put in your own material and produce a custom product, which then is available in all formats (online, e-book, print) to your students. I was disappointed to find out that Flat World would discontinue free online reading in 2013.[4] Since I was looking for a free or low-cost alternative for my students, this ruled out the Flat World Financial Accounting textbook and I had to quickly look for an alternative, as the winter quarter was near.

I found a second online textbook provider with a different business model. `Bookboon.com` offers free PDF downloads of a very wide range of subjects.[5] Their business model is different from Flat World's in that Bookboon books contain advertisements which pay for the distribution. While this is unusual in textbooks, I find the ads tolerable and unobtrusive. They are mostly related to education or job search.

Because of the ads, however, the textbooks have a somewhat less valuable and formal "feel" to them, more like a magazine. Bookboon textbooks seem not as carefully edited as Flat World's, but they are current and the selection is huge. This may be of interest for non-business and non-economics

[3]Unfortunately, printed copies are still not delivered to addresses outside the US or Canada.

[4]In the meantime I found out that the Saylor Foundation still offers free PDF downloads of Flat World textbooks (see 6).

[5]The Wikipedia article on Bookboon gives some background about the company's history and business model: `http://en.wikipedia.org/wiki/Bookboon`. See `http://publishingperspectives.com/2012/03/is-denmarks-bookboon-the-biggest-e-publisher-on-earth/` for a more comprehensive article.

disciplines that generally have more difficulties in finding free online textbooks. While the quality and scope varies widely from book to book, the Bookboon material is certainly useable as a basic textbook to structure a course that can be supplemented by the instructor's own material, be it in form of videos or more traditional supplements, additional reading etc.

In accounting, fortunately, the Bookboon choice was far above average, because they offer the PDF version of a free online textbook, Larry W. Walther's *Principle of Accounting* from Utah State University.[6] The Bookboon PDFs and the web site can be used side by side. Besides the usual textbook features like chapter summaries, review questions and other verbal exercises, and practice problems there are even separate Bookboon PDFs available with extra practice problems along with solutions.

I adopted *Principles of Accounting* as the course textbook and made it available to students via the online textbook URL and links to the Bookboon PDFs in *myCourses,* so students had a choice of printing their own textbook or reading online, for example on their tablet computers or smartphones.

Making Videos – Contents and Form. Even though I chose the simplest possible solution for videos, this centerpiece of my experiment turned out far more complex and time consuming than I had anticipated. I made unpretentious one-take screencast type videos which are recordings of your voice over contents that you display on the monitor. Regarding video production options available nowadays, the sky is the limit – and indeed the video recording and studio facilities that would have been available at the RIT Academic Technology department in Rochester must be impressive. You could, for example, record your picture as you studio teach and overlay various visual materials in the same video. But for a shoestring budget on your home laptop with yourself as screenwriter, set designer, main actor, and sole producer the simple screencast version is demanding enough for starts.

First step is to lay down a structure for the whole term. Previous teaching experience in this course will help a great deal, and a textbook structure backbone helps, too. I structured the course as usual in the syllabus outline and then recorded videos as I the term progressed.

The videos should not be too long, so that the student's curiosity about the new media is not curbed by a daunting 45 minute video. Videos can be as short as 5-7 minutes. A few of mine actually grew up to 30 minutes, but the average length in the end was 15 minutes. Notice that watching a video takes the student at least twice or three times the video's net playing time, because students will (hopefully) want to take notes, try out some calculations or procedures explained in the video, or will simply have to

[6] Available online for free to anyone at `http://www.principlesofaccounting.com`, or free on PDF via the Bookboon site.

rewind to listen to some of the contents more than once.[7]

Initially I prepared full production scripts for my videos,[8] which then got shorter and sketchier as my experience grew, until I was able to record offhand without script, just using the screencast material alone. Once you developed your online teaching "persona" you finally become efficient at cranking out the clips. It takes some time to overcome the awkward feeling of teaching to your laptop, but after some videos, it'll become second nature.

The whole financial accounting course finally consisted of 65 video clips with a net playing time of 17 full hours. At the beginning, one hour of video easily took 10 hours to produce, not even counting the hours previously spent in trial and error concerning software/hardware choices and equipment setup. Towards the end of the course the video production ratio shrunk to about 4 to 1, meaning 4 hours production time for one hour of video playing time, which would include preparing the screen material, post-production steps and hosting of the video.

Remember that video clips are much denser than class time instruction: You save all the time needed in class to manage the classroom. There are no time-consuming attempts to elicit student participation, and you can leave out most instructional repetition because students can rewind as needed.

Making Videos – The Technology. Possible with a shoestring budget. My equipment was an aged Windows XP laptop and an Office package to generate screencast material, mostly PowerPoint slides, but also some Excel worksheets.

Additional hardware needed was a Waco Bamboo tablet, which is an electronic drawing board which simulates the white board in the classroom. You can use a stylus to write or draw in different colors. I bought this drawing board locally for ca. 650 HRK or 85 EUR. To use this tablet device as a white board you will need suitable drawing software. I used SmoothDraw 4 available as freeware.[9] This is a simple drawing program which supports layers, so that prepared drawings can be overlaid as the recording proceeds.

[7] In fact, taking a MOOC myself in a subject familiar to me proved extremely useful in preparing my own video supported course. I strongly recommend you gather some experience yourself on the receiving end of video teaching to get a feel for your students' situation. I certainly gained some surprising insights taking this MOOC. Even if you sit undisturbed at your computer and "just" need to focus on a 15-minute video, it is inevitable that at some point your mind wanders, lapses, and you need to rewind the clip to pick up the professor's thread.

Or you might find yourself listening to an explanation several times because your mind headlong rushed into wrong assumptions or conclusions about what you were being taught, which prevented you from understanding the instructor's point. So you have to go back, listen again and fix your thinking.

[8] I found a lot of helpful advice in the tutorials on `http://www.techsmith.com/tutorial.html` (see there under SnagIt or Camtasia Studio).

[9] See `www.smoothdraw.com`.

Sketches can be prepared for the video recording and they can be completed as the explanations are recorded, much like you would develop material on a whiteboard in a class lecture.[10]

As for sound, it is advisable to use a separate microphone rather than using the built-in microphone of your computer. A built-in microphone picks up more noise, if only the computer's own ventilation. Good sound quality is very important for your contents to come across. Some tutorials claim sound is more important than the visual quality of a teaching clip. Therefore tutorials suggest an external microphone, and even better if it comes with its own sound card, which means a USB connection to your computer. I suggest you try out various options and play them back to experience the difference yourself. I happened to have a wireless Logitech USB headset microphone available which worked very well.

When you record make sure to prevent any ambient noise (sound from the heating system, air conditioning, turn off phone ringers, loud clocks ticking, squeaking chairs, doorbell, any noise from outside – so close the window). Your computer's inevitable ventilation already supplies enough background noise.

You do not need a camera for screencast recording – unless you want to overlay the screencast with your face in a small window, which I did not bother to do (the advantage is you can do a screencast in your pajamas). The face window would also occupy precious screen space and certainly it would sooner or later complicate the recording process, resulting in wasted production time.

The screencast recording is done with simple screen capture software. RIT tech support recommended purchasing SnagIt, a simple commercial screen capure program.[11] It records in mp4 video format, which is what RIT video hosting requires. SnagIt does not allow editing of the video, so your videos must be one-takes.[12]

At first sight, not being able to edit seems a limitation. On the other hand,

[10] A helpful video explaining how to make simple educational videos using exactly this setup with SmoothDraw can be found on YouTube by searching for "How to Make a Khan Academy Video" by Parker Bourassa. The Khan Academy, established by Salman Khan, is the institution that popularized flipped classroom teaching by providing a large collection of short and simple educational videos.

[11] Available currently in version 11 from `www.techsmith.com` priced for educational institutions at ca. 35 USD.

[12] If you feel you must have editing capabilities, you can use the more powerful software Camtasia Studio, currently in version 8, from the same company. It is priced at ca. 180 USD.

A word of caution: Do consider the trade-off between living with slight imperfections in your videos using one-takes under SnagIt versus spending countless more hours finetuning and editing your videos under Camtasia Studio. When I recorded my videos I decided that the marginal enhancement of student learning by editing would not be worth my extra editing hours and the extra money. The only – very simple – editing I did is merging two clips into one by using the free Avidemux video editor available from `http://avidemux.sourceforge.net/`.

think about that you never get to edit anything you say in the classroom. Be kind to yourself as far as your perfectionist standards go. Your videos don't have to be 100% perfect and polished to be good teaching tools. Get over it and forgive yourself for the occasional slip of tongue or an abandoned unsuccessful explanation attempt. Your students will still get your point just fine, and, if anything, you probably even sound more "natural" to them. You will find that the time you would spend learning video editing would make the video production process even more time consuming. Given the already excessive production time, I learned to live with some imperfection in my clips.

There are many other options for recording software, even some free online screencast recording software that requires no installation on your computer.[13] I personally recommend SnagIt. Besides recording screencasts it comes in handy when you prepare your visual screencast material: Originally, SnagIt was a capture tool for still images, a function I often use to capture some images from the online textbook to copy-paste them into a PowerPoint slide or on a SmoothDraw layer for use in a screencast.

Making the Videos Available to Students (Video Hosting). When you successfully produced an mp4 video file, the next step is to make it available to students. The video hosting is where RIT support comes in, offering RIT server space. The academic media support staff (see `http://wallacecenter.rit.edu/tls/media-services`) is very friendly and eager to help and will probably be delighted if you contact them with your innovating teaching ideas. Contact person at RIT for video hosting at the time was James Foley at `jlfetc@rit.edu`.

You will get access to a video server using your usual RIT login and password. They will set up a destination on that server for your course, in my case simply called "Financial Accounting", to which you then upload the videos. You can copy-paste some HTML code from the video server "destination" and post it on *myCourses* content so that your students see a list of all videos available. This video list is generated by the video server and needs no manual updating from your side: Whenever you recorded new videos, you only need to upload them to the server and you're done. The video list in *myCourses* updates automatically.

The RIT video server comes with some simple statistics, so you can always monitor how many times each video was viewed. Since the videos are closed access for your course only, all views are from your students only. Unfortunately you do not get individualized student statistics like the viewing stats for material directly hosted on *myCourses,* so you cannot track which student watched which video.

[13] For helpful advice on screencast recording software and their features see `http://en.wikipedia.org/wiki/Comparison_of_screencasting_software`.

Hosting on the RIT video server proved easy and hassle-free, if a bit "no-frills". While it would be possible to post the videos on sites with fancy user interaction possibilities like Vimeo or YouTube, I found their playing quality not satisfactory. Apparently videos are downsized at expense of quality. But the viewing quality does make a difference when you present small print in your video, like in a financial statement. While comment features on such public sites might be nice to have, you can try to imitate that with *myCourses* discussion forums. Furthermore, I think the – intentionally provided – distraction on these commercial sites would be enormously detrimental to the fragile student attention span. The competition from the latest "funniest videos ever" would prove irresistible, compared to financial accounting videos.

Finally, I liked the fact that the videos on the RIT server were closed access. I did not offer downloads to students, because I wanted to remain in control over content as much as possible.[14]

In-Class Practice – Contents and Timing. This is the core of the "reverse teaching" or "flipped classroom" model. It proved quite challenging for me for several reasons. First of all, finding, selecting or adapting suitable material again takes a lot of time. Practice material should closely match the videos assigned, so that the application ("assimilation") of new knowledge doesn't require too much transfer, at least initially. A well-equipped textbook including a wide choice of practice problems comes in handy. But the challenge remains how to use the provided textbook practice material if you cut out parts of a chapter. Often you will find that cutting chapter contents circumvents using chapter problems because they inevitably require some details of the content you chose to cut.

Secondly the timing of video posting and in-class practice session proved difficult because I was producing them as the term progressed. Particularly at the beginning the video production was so time consuming that I simply could not post the videos sufficiently beforehand for students to have enough time to watch them and to reasonably be expected to apply the newly learned contents to some practice problems.

The quality of an in-class practice session hinges on the level of student preparation. I considered means to encourage steady learning, like weekly online quizzes on *myCourses*. However, after considering the options, I decided that an electronic quizzing solution I would have found satisfactory was too complex to implement along with all the other challenges I was already juggling.

[14]The more resourceful students will figure out how to capture streamed video content anyway. Don't expect retaining full control over the content.

In-Class Practice – The Organization. My approach was to split the class in groups of three students, and combining "good" and "weak" students in one group. This would typically also break up the usual social ties, making it a bit more likely that accounting and not the last weekend were the topic of conversation in the group. The intention was that at least one or two students per group would be able solve the practice problems, the better students reinforce their knowledge by explaining to the weaker students, and the weaker students have an additional chance at receiving explanations, using a different and informal "peer" approach rather than the official "professor" approach. If nothing else, the weaker students should see that their peers are easily able to solve the problems that they themselves didn't understand because they did not care to prepare. In the ideal case of a weak student who at least prepared to the best of his or her abilities, my hope was that peer instruction might open an alternative door for understanding accounting concepts.

During the in-class practice session I would move from group to group, checking on progress and answering questions. Witnessing the occasional *eureka* during an in-class practice session makes this format a very rewarding part of teaching.

Forming groups of three results in 6 to 11 groups per section. Making group arrangements is tricky, though. First of all, group assignment made the day before at your desk never work smoothly in class because inevitably some students are not showing up in class. So groups must be rearranged on the spot, combining whoever is available. I find groups of four too big. Groups of two may be ok, but the size of three seems the middle ground with ideal potential for peer instruction and student interaction. Secondly, it is impossible to anticipate group dynamics. Unfortunately some groups will turn out to have no serious interest in solving practice problems. Other groups will split in subgroups: Two people work, one person is so far behind in his or her knowledge that the others decide it's not worth their time to try to include their colleague. Or two people chat, while the third ignores them and solves his or her problems alone. Finally, personal likes or dislikes obviously play a role in group efficiency.

These group logistics proved very time consuming. It was most time efficient to seat students in intended groups before class starts. Second best is reseating them using the break time between two class periods. Even if only a portion of a two hour session was to be used for in-class practice, breaking out in groups is much easier if students already sit in groups. Students are notoriously inert when asked to rearrange chairs into communicative seating arrangements. I found myself almost directing each group individually in such basic logistics as how to move their chairs in some suitable circular arrangement.

I chose to always distribute the practice material on the spot, knowing that if I required the students to download practice problems beforehand

from *myCourses* and bring them to class this would be an additional time consuming hurdle, because inevitable many would forget (after all, some students notoriously show up to class even without pen and paper, let alone pocket calculator or prepared printouts . . .)

Discussion Forum and Chat on *myCourses*. I figured that the discussion forums on *myCourses* could serve as a logical continuation of in-class practice sessions. Students could continue to interact after an in-class practice session, or any other time, to ask about new content, solutions, and ways to solve specific problems. Questions can be asked and the answers either by peers or by the instructor would be available to all – unlike a reply to an email question, which would be available to the recipient only.

I made a separate forum for each chapter, hence 16 such forums were available, plus some general forums for video related questions, and questions related to quizzes or exams. This is important to make the forums more user-friendly and problems easier to locate. I spent considerable time on educating the students about how to post by supplying and advocating clear rules on user etiquette; for example to always use very specific subject lines, to always quote the exact problem number and possibly a pointer to the specific question raised in the posting, in order to make the postings easily accessible for later use. Fortunately, the forum allows the instructor to move misplaced messages or edit poor subject lines.

Obtaining a common discussion platform for all sections is one of the strongest arguments for merging several sections into a common course shell on *myCourses*. The disadvantage of giving up separate control over the individual sections can be made up for by setting up group features within the single course shells that mimic the sections. Such section mergers must be requested online in the first days of the term. While they can be effected later, any data already entered (like grades or attendance data) would have to be re-entered in the merged shell. Since I learned about this only as the term progressed, I chose not to merge the three sections I taught – with the corresponding disadvantage of a diminished discussion forum utility.

I also set up the *myCourses* chat feature. Unlike discussion forums, chat rooms can be set up for all students of one course, even if they are enrolled in different not merged sections. Being a synchronous medium, chat requires a much higher participation level than asynchronous discussion boards. The chat room feature definitely did not reach this critical level of student interest and was not used by the students at all during the term.

4 Results: *What Works – And What Doesn't (Yet)?*

For each choice made in the previous section, this section describes the results of my first term of flipped classroom teaching, always distinguishing

between my personal impressions and the collected student feedback. Student feedback was solicited in an anonymous course-specific evaluation on paper, which students filled out in their last class session. There were 64 responses collected.

4.1 Videos

My Observations Viewing statistics were high and stable from the beginning on. There were 5,269 views for 65 videos, which corresponds to an average of 81 views per video. On average, each student watched each video more than once, which is a successful student engagement. The number of views per video declines for the videos posted later in the term, in line with the strongly declining number of students still engaged in the course towards the end.

Putting this course on a video basis turned out an enormously time consuming feat. On the positive side, the invested time may amortize if the videos can be re-used over several semesters. Even if some single clips must be rerecorded or updated, the existence of a course structure and existing screencast material to update for the rerecording will be time saving.

Student Response Reactions on the videos were overwhelmingly positive, and acceptance was very high. Only 3% of students were critical and did not like using videos. Students praise the self-paced transmission process. Many indicate that they stop videos, take notes, or rewind regularly. Many emphasize the advantage of having access to the learning material from anywhere, whether at home, in the student lab (with earphones), or at their families' homes over weekends or during vacation.

Students were shocked by how quickly video time builds up if not watched regularly. Many students indicated that they had to watch several hours of video material at once before a test as a result to previous slacking. The consequence is unsurprisingly traditional: First, if students don't keep up, they're just as lost as they would have been lost in conventional book-only courses. Secondly, if students watch several hours of video on the day before, most likely not much will "stick". And finally I tried to make it clear that they fall for a delusion if they go into an exam *only* having watched videos but not done any hands-on practicing by themselves – likening this to attempting a tennis tournament after watching an instructional tennis video, or to going on stage for a piano recital after reading a book on piano pedagogy. Accounting is a skill and needs the practice just like tennis or playing an instrument.

Access to technology was not a problem for the students. After a couple initial hiccups reported by two or three students, no one mentioned any difficulties accessing online material during the course or in the student feedback sheets.

4.2 In-Class Practice

My Observations An effective in-class practice session requires good coordination with previous video posting. Even if posted timely, student preparation is only mediocre, and even though they should have had ample time to watch assigned videos, many still come unprepared. If students simply don't know what to do with the practice problems in front of them, the teacher's best intention to provide a guided "assimilation" session is thwarted.

Logistics of in-class practice, as described in the previous section, are more time consuming than I thought. In-class practice sessions of less than one full class period are not efficient.

Students will need guidance in what problem to exactly start with. Giving them the chapter package of practice problems and letting them get started on a problem of their own choice presents another time consuming hurdle before efficient work finally starts.

Two kinds of groups emerge: The groups working well, constantly raising hands calling me to check interim results or ask for cues how to tackle a problem, and the ones that need to be pushed constantly because they are either not motivated or they don't know the material sufficiently well to get started on their own. As you divide your attention between 6 to 11 groups, there is unfortunately plenty of idle running going on in the unprepared or disinterested groups.

Since student interaction is a part of successful group work, simply preventing students from talking is obviously no solution. A certain amount of inefficiency in group work sessions is probably inevitable collateral damage of the method. Making "good" group assignments is the only way I can think of to prevent such idling – which requires that you know your students well, both regarding their academic capability as well as their social propensities.

Finally juggling videos, practice sessions, and the course's planned contents I found it hard to give up the habit of "active teaching" and to actually surrender active classroom control to practice sessions. I always felt obliged to push forward with content to make sure we don't run out of time. In the end I wished I had made room for more practice sessions during the term. I noticed that it takes considerable willingness to "let go". Implementing a "flipped classroom" is not just like flipping a switch – it is more likely something the instructor will have to learn and get used to.

Student Response 70% of the students indicated that they liked in-class practice, and 23% even considered it an outstanding feature of the course. Many mention that they would like to see more of it. On the other side, even though they may have basically liked the idea, many also admit that in-class practice was not useful for them because they were simply unprepared and not ready to practice.

The group model received some criticism. Only few students agreed with

the concept. 15% of students suggest changing to individual in-class practice, with the teacher guiding through the process of problem solving. While this may be a way to quickly cover a lot of practice material, certainly much more than in group sessions, I nevertheless chose not to use this approach, because it puts the student again in the passive, consuming role. The single most important goal I pursued in those practice sessions, however, was to overcome student inertia and make them do something by themselves.

Some students expressed annoyance at their groupmates being completely ignorant to the tasks at hand. They said they would have liked the group work if they had worked with peers at a similar level of knowledge and motivation. Creating homogeneous practice groups is a valid alternative to the "peer teaching" approach of mixing different levels of ability and hoping for a trickle-down effect. But those groups made up of "weak" and therefore most likely unprepared students can almost for sure be counted on wasting their practice time.

Finally some students wanted to choose their own groupmates. This could be problematic, if it results in the "best friends" hanging out in the same group. In the best case it might result in reproducing the homogeneous-level groups. But I personally believe it will not improve overall student learning outcomes. Below the "good" students, the self-selected groups will most likely be socially motivated and facilitate chatting.

4.3 Textbook

My Observations Larry M. Walther's *Principles of Accounting* proved a very good selection. The text is reasonably well edited and up to date to serve the purpose, and as a textbook it is well equipped with the usual support material, except any kind of online teaching supplies like PowerPoint slides. Despite being more concise than a classic 600-700 page intro-to-accounting textbook, the material is still ample for a 10 week quarter or now 15 week semester. Practice problems, review questions and verbal exercises are useable and sufficient, but there is not a big choice available. Nevertheless it is a privilege to be able to use this material free of charge and the author and publisher deserve our gratitude.

Student Response The Bookboon approach to supplying textbooks received overwhelming acclaim: 92% of all students favor a free & online version, while only 6% would have favored a traditional (expensive) print textbook.

More specifically for this textbook, many students praised the good explanations and the succinct no-frills style. The online availability was seen as an advantage when traveling "home" during weekends. The compact format was perceived as an advantage, compared to wordy colorful image-loaded

traditional textbooks with all sorts of bells and whistles, supposedly attracting students' attention – while probably distracting nonnative speakers, not connecting to the Americana presented as bait for student attention. This "less is more" attitude is easily understandable from the perspective of a nonnative speaker's perspective, who might struggle with vocabulary and reading speed at least in the first year, and who is burdened rather than intrigued by the many alluring "real life stories" in traditional textbooks. Finally, oral comprehension is easier for non-native beginners than reading comprehension.

Discipline in student learning, even when using videos, is absolutely crucial in accounting, because it is by nature a very front-loaded course. If students slack in the first three or four weeks when basic concepts are taught, the remaining weeks of the term are impossible for them to handle. Students simply can't follow the logic of the advanced chapters and are notoriously frustrated. Even if they finally do become diligent and invest many hours studying the advanced chapters, the efforts will be largely futile until they go back to square one and learn the concepts of bookkeeping and accrual accounting. Unfortunately I cannot determine if the video approach improved discipline or consistency in student learning.

4.4 Discussion Forum

My Observations To my surprise, participation on the forums varied extremely among the three sections I taught. The slowest section had only about 42 student postings by the end of the term, with hardly any interaction among the students. The most agile section had 207 student postings, and students replied to one another, rather than waiting for the instructor to react. I have no explanation for this discrepancy in user participation.

It does not come as a surprise that the most active section also had the best grades. The arithmetic mean of the final grade was 78.0% for the most active section, as opposed to 74.4% in the second most active and 72.7% for the least active section. Of course there is no basis to conclude a causal relationship between participation rate and grade.

Participation is highly concentrated and driven by very few individuals. Almost 100% of all postings are authored by only 20% of students in a section. The remaining 80% of students are largely passive, perhaps posting an occasional message. Regarding the consumption (reading) of postings, however, the relations are opposite: Between half and two thirds of the students had read all postings, and only very few students stayed entirely out of the discussion forum, not even reading available postings.

A surprising confirmation of student disinterest was the massive ignorance of an opportunity to earn significant extra credit for active participation in the discussion forums. Early on I posted extra credit rules allowing students who authored at least 3 postings to receive between 3 and 5 extra

percentage points towards their final grade, which is a significant amount, comparable to an A in a quiz. While many students passively consumed the posted contents, only 41% managed to post their 3 contributions entitling them to extra credit. Almost 60% did not bother to pick up any extra credit along the way – despite constant reminders during the course.

As usual, discussion forums show hectic activity in the 36 hours before an exam – unfortunately confirming again that many students do not manage to study regularly. Of all three sections there was a core of only 3-5 students who constantly engaged in forum activity, irrespective of exam times.

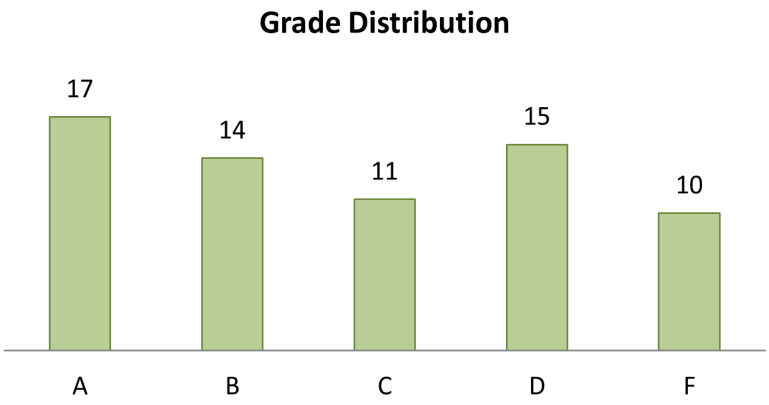
A merged *myCourses* shell for all three sections most likely would have had beneficial effects on forum participation, as more potential participants would have enticed more motivation to participate in a more animated discussion forum.

Student Response The discussion forum did not count very high in students' appreciation, which was to be expected from the feeble participation. Only about 10% perceived it as an outstanding feature of the course.

The layout of the discussion forum in *myCourses* was criticized by some as convoluted and not very user friendly.

4.5 Grades and Withdrawals

From an original 101 students, 30 students withdrew from the course. From the 71 students at the end, one student had never showed up in class and 3 students failed due to cheating on the final exam. So 67 regularly finished the course. Their grade distribution turned out as follows.



The results are well balanced over the whole spectrum of grades. A is the modus of the distribution, while C is the mean (74.4%) and median. Finally 57 of 101 or 56% of the students passed the course.

Unfortunately, the hoped-for "grade explosion" through the use of new experimental teaching methods failed to materialize. Withdrawal rates and failure rates were still high. Students obviously did not overwhelmingly thrive and excel through the use of new media and a new classroom approach (yet).

What are possible explanations? Several reasons come to mind: A quantitative first year course tends to function as a filter, particularly when – as at RIT Croatia's International Business program at the time – after an "easy" fall quarter, several such quantitatively oriented courses coincided in the winter quarter.

High dropout rates at the freshmen level might simply result from the students' choice of their field of study receiving a reality check. From coaching conversations with each freshman in First Year Enrichment courses (now YearOne Seminar) I am aware that many students choose business as a middle-of-the road subject for lack of a better idea, because of presumably "good" job prospects. Only few students mention that they chose business out of inclination or passion.

Furthermore, high dropout rates in quantitative subjects taught in a foreign language are a consequence of admitting students without any particular entrance hurdles, like testing of quantitative skills or of English language competence. For the lack of a rigorous entrance exam, some rectification of student ranks must be expected during the course of study – and preferably sooner rather than later, for the students' own sake.

More specifically, and arguing for this particular course, the majority of students unfortunately have a clearly expressed or at least implicitly discernible dislike for accounting. Only 28% of students comment favorably on the subject, while 72% express some unenthusiastic understanding that accounting is "probably important" in business, albeit not very interesting to them, and some of them make no pretense of their aversion ("good teaching, but horrible course").

The "easier" the teacher portrays the course, the less students feel like they have to make an effort to succeed and the more procrastination they think they can get away with. So trying to "make it easier" by using videos instead of scaring students with dreadfully thick accounting books may lure the unstable into the delusion that a click on the "play" button is all it takes to secure a passing grade in accounting (probably while chatting on facebook or playing a game while the video is playing, as some guileless student feedback revealed). Of course it is not: The practice problems must be solved, too, but by the time the student realizes that, it might be too late in the semester, considering the front-loaded nature of financial accounting.

Most students do not study regularly. This is not only evidenced on feedback sheets or in conversations with students, who mostly readily admit to all-night cramming before the exam, sometimes seasoned with a sense of pride, emphasizing the "good" result given the paltry effort. It is also visi-

ble in the immense increase of video views during the 36 hours before an exam. Students are obviously rather oblivious to the fact that video as a medium does *not* lend itself to last minute cramming because the speed and time needed is predetermined. Indeed, students who intend to rely on cramming do themselves a disservice by video cramming instead of textbook cramming, which would at least allow more control over timing. Fact is that binge learning does not work in skill-oriented courses like accounting. Watching a video simply does not teach the skill. The assimilation of the transmitted information must happen through the student's own work and effort.

Erratic individual results confirm this hypothesis. Occasionally students who seemed settled on low grade level surprised with a peak performance in a single quiz or a mid-term. When I followed up with them, it would turn out that unlike before (no preparation or "all-nighter") this time they did put in several days of preparation. The same unfortunately occurred in two instances of seemingly A-level students, who produced C- or D-level outliers in quizzes because they did not prepare as usually.

A high number of students simply did not study and practice on their own at all. After the first mid-term I requested all students with a D or F to come to an individual meeting, 43% of which actually showed up. In those conversations the overwhelming majority admitted outright that they did not prepare for the exam. My general impression from students behavior was that a very high percentage of all students, perhaps as high as 40%, simply does not care to do any work, stubbornly ignores various offers for support, does not make use of learning resources (like coming to office hours, preparing in-class practice, attending tutoring sessions, using discussion forums to post or discuss solutions) and clearly shows disinterest by occasionally skipping classes.

Surprisingly, some of them are fully conscious of their dire situation, but for rationally inexplicable reasons are unable or unwilling to change their current behavior. Enduring the mantra-like repetition of "I know", "I know", "I know" at the numerous individual occasions of admonition or reminder remained one of my most puzzling teaching challenges.

The first mid-term (of two) proved a strong predictor of where the journey would end several weeks later, confirming the front-loaded nature of the subject. Of all F-students in the first mid-term, 93% finally withdrew or failed, and only 7% barely passed with the lowest possible grade of D. Of the D-students in the first mid-term, only 23% managed to pass, although 15% did manage a turnaround and finished the course with a B. Needless to say that in such a front-loaded course making up for a botched beginning is a great deal harder than getting to work right off the bat in week 1.

5 Conclusions: *How do I Get Better at This?*

So: No grade explosion and no elimination of mass withdrawals and F's. Is it still worth the trouble?

Unfortunately I do not have a solution for the unmotivated student. Students at some point in college have to find out that studying business means dealing with formal concepts, rather than just wearing elegant costumes and high-heels or dapper suits and tie, using slick smartphones and leading important executive meetings. Students resisting this college notion of a business education will simply not bite the hook any engaged teaching will provide – even if the worm on the hook is replaced with candy.

I believe now that there must be the point in a first year class where the true nature of their field of study dawns on them. For some, the consequence of this reality check will be the insight that they are not willing or not able to perform as requested by the curriculum. The sooner this insight is gained, the better, leaving the student the choices to either reconsider, repeat, and improve, or to go seek greener pastures elsewhere. An unmotivated student, that's for sure, will not reached by flipping anything.[15] Other than that, I found that financial accounting is exceptionally well suited for a video supported teaching model, as would be any skill-focused course.

What needs to be improved in my course the next time around, as I see it from my own observations and from the students' feedback, is:

1. Don't stop half way: Further reduce in-class lecture, exploit students' affinity towards new media, accept and work with the students' attention span using several concise, short (10 minutes rather than 20 or 30) one-take video lecture series presenting the course material. From feedback remarks it seems problematic that I didn't resist lecturing some of the basic transmission material. This two-track approach may have discouraged some to engage with the video material under the pretense that they've "already seen" in class what the clips are about.

2. Further increase in-class practice, as desired by the overwhelming majority of students. Experiment further with in-class practice formats (assigned groups or self-selected groups? Or individual practice? Or a mix of several?)

3. Refine coordination between video assignment and in-class practice, and find incentives to increase the number of students showing up "transmission accomplished" and ready to "assimilate" in the in-class practice session. This will be difficult to achieve, but is a prerequisite

[15] Statistics of the North Carolina State University's Friday Institute for Educational Innovation show that for about 10% even a flipped classroom does not work, as stated by researcher Katie Gimbar on her Flipped Classroom FAQ videos at `http://www.youtube.com/playlist?list=PLB632EC24182B4D40`

for the desired learning improvement. Not giving in to students' unpreparedness will make some students mad. But ultimately it is the right approach to a change for the better.

4. Don't make anything "easier." Switching methods from traditional front lecture to video support in order to make learning easier will not work. To the contrary, it will result in more students not taking the work seriously as their selective perception only hears that videos just made everything easier, which translates for them as no longer having to make an effort. Yet experience shows that students thrive on clear structure and on strictly enforcing rules laid down in the beginning. Those that don't thrive have a problem with

   - either their intellectual capabilities (perhaps they're not suited for formal studying),
   - their study habits (they must change those habits following the instructor's guidance),
   - or with their motivation (they had a skewed idea of what studying business means and are not interested in studying business the college way).

The question remains: Do the results justify the effort? I think they do. Even though the change of methods unfortunately was no panacea to a "no-F's" accounting course, nevertheless there are positive effects. Overall the grade scale is more balanced, and there is evidence for method-induced improvements. One student who had withdrawn the course last year because of failing grades finished with an A this year, attributing his success primarily to the video teaching method, which enabled him to understand the concepts this time around.

The second best reason for updating methods is to stay abreast of the advancement of technology and educational methods. Once upon a time, when printed sources of knowledge were rare and photocopying not yet around, lecturing *ex cathedra* was considered state-of-the-art teaching. Since then teaching has undergone many changes and embraced many innovations, and they have invariably altered and updated teaching standards. We can never go back because the old methods no longer serve today's realities and the challenges our students will face in their life. While innovation always seems to make things easier, by the same step the standards and expectations grow right along with the possibilities. So in the long run, there is no escaping modernization of the classroom.

6 Online Resources

Free or Low-Budget Downloadable or Online Textbooks These online publishers offer textbooks in a wide variety of subjects, by no means restricted to business or economics only.

Bookboon Free ad supported college textbooks, `http://bookboon.com/en/textbooks`

Flat World Knowledge Online publisher of original customizable low-budget textbooks, `http://www.flatworldknowledge.com/`

Larry M. Walther, *Principles of Accounting* Complete financial and managerial accounting online textbook available in PDF format on Bookboon or as web version on `http://www.principlesofaccounting.com/`

Merlot Huge multimedia repository of free educational resources for learning and online teaching, maintained by the California State University, `http://merlot.org`

College Open Textbooks Creative commons license textbooks mostly for free download, partly available for purchase as low budget print versions, `http://www.collegeopentextbooks.org/`

Saylor Foundation Virtual bookshelf with Flat World Knowledge textbooks under the creative commons license, `http://www.saylor.org/books/`

Other Online Media and Courses

Open Education Database Aggregates over 10,000 open courses available from many of the below providers and others, `http://oedb.org/open/`

Khan Academy `https://www.khanacademy.org/`

Coursera `https://www.coursera.org/`

edX `https://www.edx.org/`

Udemy `https://www.udemy.com/`

MIT OpenCourseWare `http://ocw.mit.edu/index.htm`

iTunes U `http://www.apple.com/education/itunes-u/`

Software

SmoothDraw 4 Tablet drawing and writing software, http://www.smoothdraw.com/

SnagIt Screen capture software for images and video by TechSmith, http://www.techsmith.com/snagit.html

Camtasia Studio More comprehensive video recording and editing package by TechSmith, http://www.techsmith.com/camtasia.html

Flipped Classroom Model

Friday Institute for Educational Innovation at North Carolina State University, FIZZ Project on "Flipping the Classroom", http://www.fi.ncsu.edu/project/fizz/pd/lecture and https://www.fi.ncsu.edu/project/fizz/resources. (Note: The FIZZ web site is scheduled to go offline due to project expiration in 2014.)

TechSmith Promotional information on using technology in educational innovation, http://www.techsmith.com/flipped-classroom.html