iFlip Project: Flipping the classroom in adult education

Adult Learners Needs Analysis Report, Section D
Flipped Classroom Methods in Use

Reporting partner/country: LUV/Andragoški zavod Ljudska univerza Velenje, SI

Origin of the method description: Flipping with a MOOC - The DUKE Center for Instructional Technology, USA

Context: Class of Introduction to Genetics and Evolution – integration of the FC method in combining on campus class with online class, by Mohamed Noor

1. General setting: Prior to every class period, Duke students were expected to watch 3 videos (average ~15 minutes each) in Coursera bearing 80-90% of the primary "raw information content" that they were expected to learn from the course. Following the videos, the students had to take a graded preclass quiz, formatted similarly to their in-class tests and of comparable difficulty. The purpose was two-fold: for them to identify areas of misunderstanding or gaps in their knowledge, and for Noor to see what students struggled with from his lectures.
The first few minutes of the class period were used to collaborate in completing the preclass quiz. After that, Noor spent ~10 minutes going over areas of misunderstanding based on the preclass quiz performance and free responses. The bulk of the class period was devoted to students working in self-selected small groups on ~7 ungraded practice problems designed to help them integrate and apply the concepts from the lectures. The teaching assistants (TAs) and Noor would walk around the room and engage the students to see what problems they were stuck on.
In addition the students had a weekly problem set to complete, weekly laboratory sections, a few other online practice problems, and three open-book, in-class tests. The class period activities were also recorded and made available to any students who couldn't make it due to illness, travel, etc. (again, just like before).

2. Reactions and outcomes: Most of the class's students indicated they were pleased (and often pleasantly surprised) with how well the flipped class format worked. Students could work at whatever time of day was optimal for them. They could also easily pause at any time, or immediately replay anything they missed. Most reported that the inclass reinforcements were helpful for them to really understand the material and to perform better on assessments (see figures below). Most appreciated the "reactive" and "interactive" nature of the class, where the class period content responded directly to their areas of interest or confusion. Some students said that the format forced them to study as they went along, such that they noticed they barely had to study right before the tests since they'd already done so much along the way. A handful said they liked the online discussion forums, and found the elaborations by either Duke or online students on some of the material helpful.

3. Lessons learned and conclusions drawn by the trainers:
WHAT WAS LESS-THAN-IDEAL

- Some of the students were unhappy with the added workload of having to watch ~1.5 hours of video each week

- "While the flipped class format benefits many of my fellow students, this format hinders my learning. In a normal class, I would go to lecture and take notes and such, and then do whatever work was required of me, but no more; I normally take a minimalistic learning approach, does as little as possible to succeed. As such, I do not normally watch the online lectures because I find that doing so is more time consuming than just glancing over the lecture slides to find the information needed".
- A fraction of the students fell far behind (especially between test 1 and test 2) and did not really catch up in a timely manner to do well on the later tests. If one fails to watch the lecture videos before class, there really is no point to coming to class since the student would be just lost on the material. At that point, it can become self-reinforcing-- a student falls behind, and the work needed to "catch up" is greater than in a traditional class, possibly making them more likely to further procrastinate and fall further behind.
- A possibly related negative was a drop in class attendance... attendance probably was consistently at or below 50% after the third week. They often had 50-70% attendance in the traditional classes, unlike the <50% with the flipped class.

A few students cited two reasons:
    1) the increase in overall amount of outside-class work (the fact they already had to spend 90+ minutes a week on the material made some students less likely to spend even more by coming to class), and relatedly,
    2) some simply felt confident with the material from the video, and would thus skip the reinforcement and application in-class.

- The one class format element that "flopped" was the few minutes at the beginning of class for completing the class to skip that piece.

OTHER SURPRISES
The biggest surprise was the absence of correlation between class attendance and grade. The three test grades were very highly correlated with each other despite the differences in mean, but there was no clear association between which students came to class and student test performance

The other surprise was the general absence of engagement of the on-campus students in the online Discussion Forums associated with the online class. Many of Duke students said they looked in the forums, but even though they were offered the Duke students extra credit for posting in the forums, 80% of the Duke students never posted in the forums, and most of those who did post made 5 or fewer short comments or questions. A handful really engaged with others in the forums, but <10 students total.

SYNOPSIS
Although requiring a TON of upfront work, this experience has definitely changed Noor's view of teaching. He feels now that, as faculty become less "lecturers" and more "facilitators" in the classroom, they work with the humanity of students rather than treating students as consumers of prepackaged products. Teaching this class was very, very enjoyable. Further, these students are interesting and talented people, many of whom are spending tens of thousands of dollars to be at an elite university, and are receiving some classes in a format of not much greater value than what could be found online. His statement is not to suggest that the total college experience is what happens in the classroom (clearly untrue), nor that the students themselves are incapable of obtaining more from traditional lecture classes by taking the initiative to engage professors directly. However, his goal was to add as much value as possible to the in-class experience by making it visibly dramatically more than what is available freely online-- far more opportunities for interaction, extensive reinforcement, "going further" with the material, etc. (in addition to the laboratory sections, of course).

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Sources and further reading:
http://science-and-food.blogspot.si/2013/05/flipping-with-mooc-very-new-approach-to.html

Reporting partner/country: University College Artevelde Ghent, BE

Origin of the method description: Nursing education - University College Artevelde Ghent

Context: introduction to First Aid techniques through an online course

1. General setting:
The course First Aid techniques confronts first year students with the techniques and application, depending on the target audience (baby, child, adult) and diverse environmental parameters.

2. Reactions and outcomes: The idea of using blended learning for this course came out of the fact that the group of students was increasing year after year without an similar increasement of teachers or scheduled lesson sessions. The used method was demonstration, and due to the big amount of students this had become impossible to handle

Therefore, First Aid techniques that were normally demonstrated in practical sessions, are now demonstrated via online instructional videos and pictures. The students can learn the techniques online and attend the faceto-face practical sessions well prepared.
The practical sessions are focusing on practicing the First Aid techniques. Students are challenged by using realistic case studies to find the correct First Aid technique, keeping the target audience and parameters in mind. The teacher gives feedback where and when necessary.

Used tool:

De instruction movies are made with camera, light set and tripod. The movies are integrated in PowerPoint with a program called Articulate Storyline.

Result:
http://chamilo.arteveldehs.be/chamilo/leerpaden/EHBO/story.html

Necessary infrastructure: Articulate Storyline account

Tutorial for using the tool: https://www.articulate.com/

3. Lessons learned:

Average preparation time: Articulate Storyline is a very user friendly package to make attractive and professional e-courses. This is realised inserting diverse elements into a Powerpoint presentation.
The videos have to be very well prepared, with a strict scenario containing tasks, actions to be filmed and explanations to be told. The videos have been made with two teachers: one who performed the actions, and one who explained what's happening. Another person was operating the camera, and yet another person showed the scenario to the actors by using big card boards.

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Sources and further reading:
https://www.facebook.com/Screencast-O-Matic-158210234220889/ (interesting page with tools, tricks and useful information)

Reporting partner/country: University College Artevelde Ghent, BE

Origin of the method description: Teacher training for primary teaching education - University College Artevelde Ghent

Context: Online instructions regarding internships for teacher education students

1. General setting:

This is a good practice for online instructions and online learning activity as preparation of the teaching practice in primary schools. The videos are made using a 'screen-cast-o-matic', with YouTube as platform. There's no particular software to be installed.

Function:
> 1. online learning activity as preparation program for the teaching practice;
> 2. the online instruction has been developed as particular screencasts used in every year of the program, including all necessary information to start the internship;
> 4. during the internship weeks teacher training students can get guidance to attempt the basic competences required to succeed;
> 3. the function of the flipped classroom is information and guidance

2. Reactions and outcomes:

Outcome: Online instruction enables internship instructions to run more smoothly and easily. In the past, the instructions regarding the teacher training internship, including goals, tasks, necessary documents… were taught during a face-to-face session. But it was always very difficult to plan these sessions and to reach all students, because many of them have personalized trajectories, and very different schedules. Online instruction in a flipped classroom setting, enables students to access all information, documents and tools whenever they want.
Furthermore, reading through all the information, viewing the screencasts and preparing the questions they have, allows the students to really have a better insight in the organization of the internship program.

Used tools: The videos were made using a 'screen-cast-o-matic'. This software records your voice and computer screen simultaneously. The videos can be uploaded on YouTube afterwards. To upload videos, a free account is necessary.

Results:
https://www.youtube.com/watch?v=zM2qPuKaE9g
https://www.youtube.com/watch?v=vbApANpjeFg
https://www.youtube.com/watch?v=pgqmmsH5rRI

3. Lessons learned:

Necessary infrastructure: PC and internet connection, an account for the screen-cast-o-matic and an account for YouTube.

Average preparation time: Making the screencast doesn't take a lot of time, if you've prepared well. It's important to know what you're going to say and show to your viewers. Keep in mind that videos should take maximum fifteen minutes.

Technical tutorial for using the tool:
http://www.screencast-o-matic.com/u/h/start-recording
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Sources and further reading:
https://www.facebook.com/Screencast-O-Matic-158210234220889/ (interesting page with tools, tricks and useful information)

Reporting partner/country: NTC/Adam Smith College of Management, BG

Origin of the method description: Zurich University of Applied Sciences

Context: FC used in a Computer Science course on "Algorithms and Data Structures" taught in 2014 at Zurich University of Applied Sciences

1. General setting:

In the setting of this example, the semester runs for 14 weeks, and every week targets a specific topic such as "Basic Sorting Algorithms". This allows the trainers to work using closed and independent teaching units. Every week is divided into four phases:

      1. Preparation, where the students get to know the topic;
      2. Quizzies, where the students answer simple online questions about the topic;
      3. Plenum, where students and teacher delve deep into the topic; and
      4. Exercises, which the students solve alone.

2. Reactions and outcomes:

Initial student reaction was rather reluctant (it will take too much time), over time it changes to almost entirely positive evaluation (over 78% agreed FC suits them better than the classical method). Here's a summary of individual feedback (free-text):

Advantages (perceived)	Disadvantages (perceived)
"The material can be covered more intensively." *"I left every lecture with the feeling that I really understood it; unfortunately, this is often not the case for classic lectures."* *"I am forced to get in touch with the topic before the lecture. This allows me to build an own opinion of the topic first."* *"The lectures are much more efficient; this way, there is much time for real-world examples."* *"I like the quizzies!"*	*"Preparation takes very much time."* *"I don't think it should be used for every course; this would not be possible."* *"This only works with very motivated students."* *"For me as a beginner, flipped classroom does not work."* *"Whoever visits the plenum without preparation will understand little to nothing."*

The trainers commissioned a research study to determine the effects of FC, in which three classes of computer science students were compared, one of which taught with FC, the other two with classical lectures. The main findings of the study were very positive for FC:

      1. Students in flipped classrooms use much more time for preparing the lectures.
      2. Both groups of students perform equally well in the exams, with Flipped Classroom students slightly better.
      3. Students with flipped classroom improved their non-technical competences (communication, organization, etc.) much more than those with classical lectures.

3. Lessons learned and conclusions drawn by the trainers:

High effort for introducing flipped classrooms
The switch of an existing course from classic teaching to FC usually takes 6-8 hrs per 90-min-lecture for preparing the material. Within this time, we select the learning material, write the web page in our learning management system, and develop quizzies, tasks for the plenum, and exercises. We usually do this before semester starts, for each week. If we produce introductory videos for a lecture, this takes additional 3-5 hours per video. During the semester, each teacher needs additional 60-90 minutes to evaluate the quizzies and select tasks for the plenum.

Support and resistance from other teachers

When we started using FC, many other teachers were very interested in the concept, and some even started using it already. However, there were also teachers who were very skeptical, and still are. One of the possible reasons: FC challenges the basic principles of classic teaching. Therefore, one has to be prepared to handle some amount of opposition. In addition, we found it important that those who use FC really advocate for the method: there is no use in forcing anybody not convinced of its usefulness to use the method.

Good teaching material is important, but difficult to find
Students have to study the learning material alone, without previous knowledge. For this reason, appropriate learning material is very important. In our setting, we use a textbook, accompanied with summary and additional explanations in the learning management system, plus some short introductory videos (2-3 minutes each). A normal course script is in our opinion not sufficient as learning material, since this was usually written for post-class reading. The same applies to most textbooks, which often rely on the fact that the topic was first introduced, motivated and explained in a lecture. Finding good, self-contained textbooks that are suitable for FC is not an easy task.

Students fulfil their preparation tasks
Students usually studied the learning material thoroughly before they come into the plenum. Each week more than 80% of all students complete the quizzies before the lecture. One of the reasons is, probably, that solving quizzies contributes to the final grades.

Quizzies are useful for preparing the lectures
Since quizzies are completed before each lecture starts, the teacher can see which sub-topics did the students not yet understand. This helps very much, since the teacher knows exactly what he/she has to explain in more detail.

Quizzy question "What did you not understand?" is very helpful
With this question, the students can point out which topics they are most interested in, and they can ask specific questions. In many cases, the teacher can pose these questions directly in the plenum, and all students search together for an appropriate answer. This has several positive effects: open and interesting discussions take place; students see that others might have the same or similar questions; and even students that do not talk/ask much in the plenum can pose their questions. Experience shows that students pose only few useful questions in the first weeks; however, once they see that these questions are taken seriously and answered in the plenum, the amount of questions increases massively.

Introductory videos are helpful, but lots of work
We produced small introductory videos (2-3 minutes each) for most topics. In these videos, we motivated the topic and explained the main concepts and ideas. Students appreciated these videos very much, since it simplified the process of starting with a new topic from scratch. However, producing these videos is very time-consuming (3-5 hours per video). Whenever possible, we now use existing videos from the internet.

Activation in plenum is very high
In the plenum, students discuss open questions and solve small exercises. Often very vivid discussions arise, where most to all students participate actively. Nevertheless, even silent students, who do not talk too much, appreciate the concept, since they can solve exercises on their own and immediately get feedback from the teacher.

There is time for in-depth discussions
In FC all learning content is defined and known beforehand. The teacher does not have to present any mandatory stuff. So it is possible to use time in the plenum very flexibly: if there is an interesting discussion, one can let it go until all arguments are exchanged and solutions have evolved. If no such discussions arise, one can just go through all open questions and exercises.

Teachers have to be highly competent and flexible
When teaching in a FC, you do not know beforehand which topics will be discussed in which depth. Often there are questions in the plenum that emerge to educators' total surprise, and which go far beyond the pure learning material. For this reason, teachers using the method have to be able to react spontaneously and appropriately to such topics, which requires a very high degree of expert knowledge – probably more than in classic teaching settings.

Not too many courses should be switched
Students are very excited about the method, and they usually wish for more courses with FC. But we found that not all courses should be switched: FC requires more preparation time from the students than classic teaching – and switching too many courses might end in an overload.

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Sources and further reading:
http://www.elmmagazine.eu/articles/flip-your-classroom-but-be-aware

Reporting partner/country: AHE/ University of Humanities and Economics in Lodz, PL

Origin of the method description: Department of Teacher Education – Shippensburg University

Context: Flipped Lesson Plan Template, 2012

Authors: Melissa Bersano

Lesson Title: Standard Form, Word Form, and Expanded Form (Expanded Notation) of numbers less than 10 million and decimals through the hundredths place value.

Subject Area(s): Math

Grade Level: 5

Time Needed: 60-80 mins at home, 60-70 mins. in class

PA Academic Standards (1-3 entries)

M5.A.1.1.1: Use expanded notation to represent whole numbers or decimals (whole numbers less than 10,000,000 and decimals through hundredths).
M5.A.1.2.1: Match the standard form to the word form of decimal numbers through the hundredths.

Learning Objectives (including cognitive and behavioral objectives)
Students will be able to represent whole numbers less than ten million through the hundredths place value in expanded notation.
Students will be able to represent whole numbers less than ten million through the hundredths place value in word form.
 Students will demonstrate understanding of the 3 forms of numbers through the completion of an online quiz.

Student Learning Resources at Home

   • Instructional Videos:
Place Value- Expanded form and Word Form of Numbers: https://youtu.be/uBuofv6Bbn0
Standard and Expanded Form of Decimals: https://youtu.be/nt2aov1t3Js

   • Games:
QUIA- Match the standard form and expanded form of numbers http://www.quia.com/mc/279741.html
AAA Math- Using expanded notation to write standard form (http://www.aaamath.com/g31d_px1.html#section

   • Matching the standard form to the word form.
 (http://www.math-play.com/math-racing-place-value-game/math-racing-place-value-game.html
(http://www.free-training-tutorial.com/place-value/airplanes.html)

Quiz- http://www.proprofs.com/quiz-school/story.php?title=standard-form-word-and-expanded-notation

Student Learning Activities at Home

Complete a 3-2-1

   3- Define standard form, word form, and expanded notation (cite resources used)
   2- Provide two examples of each form
   1- Which form do you feel is harder to write?: Word or expanded?

Prepare 2 questions for the teacher and post on class blog. Complete 5 practice problems of choice on each of the (4) worksheets attached. (Used attached number word table to assist with word form)

Classroom Activities (pick what applies in the lesson)

Students share 3-2-1 note card in cooperative groups
   ○ look for common themes
   ○ look for differences
   ○ see if peers can answer question
- Whole Group: Address common problems & facilitate whole group discussion. (record notes that answer common problems in math journal (notebook)
- Extension/Remediation stations (based on exercises completed at home on worksheets).

Assessment
- Response cards:
Part 1
   ○ Students are given 3 note cards that read as follows: word form, standard form, expanded form.
   ○ Teacher presents different forms of numbers on Smartboard and students are to hold up the correct form card. Teacher records on grid those who respond incorrectly for each prompt/question.
Part 2
   ○ Students use whiteboards to respond to teacher prompts/questions.
   ○ Ex. Teacher writes 26,546,000 on the Smartboard. Students write the expanded form on their whiteboard and hold up. Teacher records on grid those who respond incorrectly for each prompt/question.

Differentiated assessment strategies for Part 2 above:
   ○ Aide scribes on whiteboard for low achieving and/or special education students. (reduced written load completely, while still assessing concept knowledge)

Low achieving and/or special education students work with an aide separately and are provided note cards that can be arranged to make word form, standard form, and expanded form for each example. (reduced written load, while still assessing concept knowledge)

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Sources and further reading:
https://tch4902012mb7393.wikispaces.com/Flipped+Classroom+Lesson+Plan

Reporting partner/country: AHE/ University of Humanities and Economics in Lodz, PL

Origin of the method description: New York University

Context: Flipped Lesson Plan Template

Lesson Title:

Subject:

Level:

Prerequisite skills or knowledge (connect to prior lesson):

Time Requirements for First Exposure & Incentive:

 Time Requirement for In-Class Activity:

Time Requirement for Post-Class Activity:

Worksheet for preparing what students will do before, during, and after the lesson

The success of your flipped class depends on the alignment of the what you want your students to accomplish before, during, and after the class.

Step 1: Define Content Scope, Learning Objectives, & Instructional Strategies

What is the scope of your topic? Defining scope is important in terms of providing your students relevant and connected content that is not too granular or wide in terms of scope, otherwise students will have difficulty building a mental model and connecting content. Concept maps are useful exercises to help define scope.

How will students use or apply the material? Clearly write the learning objectives and outcomes that align with the activities students will do before, during, and after the class. It is not enough to for students to just read, listen, watch, and take notes. They need to use it to really learn it. Creating and communicating the learning objectives will help you to align your lesson and clearly define what you want your students to accomplish before, during, and after the class. When writing the learning objective including cognitive, affective, interpersonal, psychomotor domains. Describe what students will need to be able to know and do using active verbs from Boom's revised taxonomy. Use the chart below to fill out each goal.

Goal 1:

Content Type	Learning Objective	Task, Question, or Activity

Which instructional approach fits best for the main learning activity? Choose the evidence based instructional approach will fit the main learning activity (i.e.: direct or indirect instruction, peer-instruction, team-based learning, case-based learning, process-oriented guided inquiry learning)

Step 2: Student's gain familiarity with new material before class

What instructional materials and resources will you use for students to familiarize themselves with the content prior to class? The pre-class work should set the scene for the in-class activity. Plan through how you will communicate the new instructional ideas. Would students benefit more from watching a video demonstration outside of class at their own pace and as often as needed or would some other media type (i.e.: text, animation, graphic) serve the presentation of instructional content more effectively? Review research literature for best uses of media and technology for your audience, topic, and objectives.

Step 3: Activities that motivate students to prepare before class

What kinds of activities will motivate students and prepare them for class? What questions will I ask students? What should students be able to do to prepare? Align & match these activities with the learning objectives. Identify the kinds of incentives or motivations that will engage students in the new instructional material and prepare for the in-class activity. Determine how you can provide feedback to students about what they know and do not know prior to class. NYU Classes has tools that can provide students immediate feedback on their progress, strengths and weaknesses.

Step 4: In-class activities that provide students opportunities to deepen understanding

What kind of in-class activities will focus students to attain higher-level cognitive abilities? Align & match these activities with the learning objectives.

In all these examples prepare clear instructions for distribution to students in-class.

Use a timeline work plan to help you keep manage the activity and keep students on task.

Step 5: Post-class activities that extend student learning

How will students continue the learning experience from the inside class activity to outside of class? Align & match these activities with the learning objectives. Note, we do not retain well what we may learn from just one exposure to the materials but over an extended period of practice.

Describe how you will connect this lesson to the next lesson so that they flow coherently.

Step 6: Ongoing Evaluation and Assessment

How will you evaluate student's learning and progress? Evaluation and assessment are ongoing throughout the process. Plan how you will evaluate the effectiveness of the flipped experience and assess student understanding at all stages.

Plan above to ensure Alignment. Is everything well connected? *Is the lesson coherent? Have a colleague review your plan and give feedback.*

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Sources and further reading:
https://ctl.iupui.edu/media/88c8b954-2e9b-4e8d-b979-15fcd92f8df6/i9LMYw/CTLContent/CTLResources/PlanningALearningSession/FlippedLessonPlanTemplate-website.docx