

Evaluation of the FERM project

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This report contains a concise evaluation of the FERM project, introducing flipped classroom in the context of research methods training.

1. Introduction

This document summarizes the results of the formative and summative evaluations conducted for the Flipping Education in Research Methods (FERM) project¹, running from September 2016 till March 2018, financed through the Open and Online Education programme of the Dutch Ministry of Education. The project was applied for and led by Henk van der Kolk. The evaluations were conducted by persons from the university team for Technology Enhanced Learning and Teaching (TELT): Martine ten Voorde, Eduardo Hermsen and Marie-José Verkroost.

Henk van der Kolk and his colleagues teach courses on research methodology to students from different Bachelor programmes, including psychology (PSY), communication sciences (CS), international business administration (IBA), European Public Administration (EPA) and in the pre-Master program connected the masters of the faculty Behavioral, Managerial and Social sciences (BMS). In 2015 Henk took the initiative to reform one of these courses using the flipped classroom method by starting to produce a collection of micro lectures and assignments. The flipped classroom method entails that students are introduced to the learning content at home, and practice working through it in class. In the FERM project, the learning content is made available to the students through micro lectures (short videos in which the teacher explains a number of theoretical concepts) and assignments. The time in class is reserved for applying and discussing the learning content. Because of its success and because of large changes in the composition of the teaching team, as of September 2017 the flipped classroom method and the produced materials are being used by all teachers from his department who teach methodology courses in the different educational programmes.

For the evaluation, the following questions were formulated:

1. How has the flipped classroom method been implemented in education and how did this work?
2. How do the teachers and students perceive the quality of the micro lectures?
3. How do the students perceive their learning using the flipped classroom method?
4. What kind of preparation is given to the teachers working with the flipped classroom method and how is this perceived?

¹ An overview of the conducted evaluations is offered in the Annex.

These questions will be answered in the following sections. Conclusions and ideas for future development are formulated in the final section of this document.

2. The flipped classroom teaching and learning method

Flipped classroom method setup

The flipped classroom method as used in the methodology courses consists of five elements:

- Micro lectures: Short videos in which the teacher explains a number of theoretical concepts;
- Book: A printed book is used as reading material;
- Assignments: Assignments in which students have to apply the theory at home and/or in class;
- Tutorial: Class with about 30 students in which the students (make and) discuss the assignments with each other;
- Lecture: Lecture with all students of one program (between 60 and 300) in which an overview and application of the theory and an assignment are discussed.

The methodology content is split up into 22 units with a standard study load. This makes it possible to compose course content for different education programmes and student groups. Although the course was structured as flipped, about half the number of meetings was still in a lecture format, because of budgetary constraints. All materials, including a teacher manual, are freely available in a Wiki environment: https://wiki.utwente.nl/open-learning/research_methods/start

Project leader view

The reasoning behind reforming the methodology education into a flipped classroom method was threefold:

- The observation that lectures were not effective but cost a lot of time;
- There is a big variation in the level of the students and in the traditional teaching approach there was little time to support the weaker students with extra explanations;
- The repetition of basic theory for each new group of students was not challenging anymore for the teacher.

These issues have been improved within this project according to the project leader:

- Education is more effective now because it is better communicated to the students what they are supposed to learn. The teacher had to re-think what is essential to be learned during the development of the videos and the assignments. The micro lectures can be watched repeatedly, which is better for learning as well.
- During the tutorials there is room to give extra attention to the weaker students.
- There is less repetition now for the teacher, the new teaching and learning method is more challenging.

As a teacher he has learned a lot during the project:

- A mind-switch was needed to create assignments in which the theory is applied instead of a mere repetition of the theory. The assignments had to go further than what is presented in the micro lectures;
- The learning outcomes had to be formulated more specific: what do the students really need to know and what should they be able to do;
- The questions asked to students, the assignments, have to be challenging enough;
- It has advantages to let students work in groups. For shy students it is easier to pose a question in a small group than in plenary and students help each other;
- In the beginning the good answers to the assignments were kept away from the students to ensure that they did the assignments themselves. Nowadays the answers are put online directly after the tutorials. It is the learning process that counts, not the good answers;
- The assignments are in a process of continuous development based on experience.

Teachers' view

Education in this format is more difficult for the students because it requires second-stage comprehension (application instead of learning theory only). Compared with the traditional approach students learn more: they get more opportunity to discuss the topics they don't understand, more opportunities to apply and develop skills which are useful for the rest of their study. You can check if the students really understand what is in the materials by asking them to transfer the knowledge to different cases, more vague situations, and connecting to expert thinking.

Students' view

The majority of the students in 2015 (51.7%) think the flipped classroom approach is nice and 58.3% think that this approach helps you to better understand the content than in a traditional lecture design. They prefer micro lectures over normal lectures (2016: 73.9%). Watching micro lectures isn't more boring than attending a regular lecture (2016: 79.7%). The majority of the students (2016: 58.3%) think that they learn more in the flipped method approach than in a traditional lecture design.

3. Micro lectures

Students' use

The analysis of statistics of use of the 32 micro lectures in 2016 shows that students watch the micro lectures repeatedly. On average, each student starts playing 60.6 micro lectures. Students watch parts of the micro lectures; on average only 10.1 micro lectures are watched fully per student. That seems like a low percentage, but since all video's started with a rather long intro and end with a long 'outro', this is a gross underestimation of the extent to which students actually watched the video's According to the statistics, the videos are watched primarily during the assessment periods.

In the student survey of 2016 85.5% of the students indicated that they watched the micro lectures before the tutorials. As a preparation for the first 4 tutorials, the majority of the students watched all

18 micro lectures (2015: 73.9% and 2016: 85.5%). It seems that the students rate their study behavior differently than what the statistics show.

Quality

The quality of the micro lectures is valued positively by the students. They:

- Are moderately well-structured (2016: median score 3 on a 5 point scale)
- Are not boring (2016: median score 4 on a 5 point scale)
- Clearly explain key terms that have to be learned (2016: median score 4 on a 5 point scale)
- Are moderately interesting (2016: median score 3 on a 5 point scale)

The strong point of the micro lectures as mentioned by the students in the open questions on the survey is that you can watch them in your own time, as many times as you want and pause them for taking notes.

Points of improvement in the quality of the micro lectures mentioned are:

- More explanation of the key terms, theory;
- More (difficult) examples;
- More enthusiasm, less boring;
- Less repeating, more straight to the point;
- The speed is too high;
- Include subtitles, make the spoken text in written format available;
- Offer a variation in the types of micro lectures.

Learning

The students are very positive about the value of the micro lectures for their learning. The micro lectures helped to understand the content of the course (2015: 98.9%) and they are considered useful (2017: 93.3%).

The strong points of the micro lectures for learning are:

- They explain key terms clearly in a short amount of time and in a structured manner which makes learning easier;
- The examples help understanding the micro lectures/ theory;
- The micro lectures are helpful for preparing the tutorials (2016: 69.6%).

4. Assignments and Tutorials

Students' participation

The majority of the students indicate that they prepare the tutorials at home by doing the assignments to some extent (2016: 64%) or extensively (2016: 32%). However, the student assistants who nowadays guide the tutorials indicate that only few students prepare the assignments at home. This is caused by a small group of students who do not prepare in the beginning and other students joining in because they feel that they are doing all the work for the others. Also, the scheduled time for the

tutorials is sufficient for both going through the micro lectures and conducting the assignment in the group. They propose that the assignments are split up in two parts: a small at home part and a bigger part for the tutorial.

The student assistants notice that there is a difference in doing the assignments between the pre-Master and Bachelor students. Pre-Master students are more motivated and have a higher level than the Bachelor students.

In 2016 the majority of the students (75.4%) attended most (3-4) of the first four tutorials.

Quality

Strong points mentioned on the quality of the tutorials and assignments by the students are:

- Clarity and structure;
- The discussions, time for questions;
- Connection between micro lectures and assignments;
- Work with other students (compare, discuss).

Points of improvement mentioned by the students:

- Clearer explanations in the assignments;
- Post the right answers on the assignments (which was done after the 2016 experiences);
- Offer a bigger variety in examples used;
- In some cases, clarify the connection between the micro lectures and the assignments.

Learning

The tutorials are considered helpful by a majority of the students (2015: 62.7%). Sometimes the tutorials made the students more confused about the key terms and the content of the micro lectures (2016: 31.8%). The topics of the assignments related well to the topics covered in the micro lectures and key terms (2016: 53.9%).

The strong points of the assignments and the tutorials for learning are:

- The assignments help the students to understand the topics from the book and the lectures through the application of and practice with the theory (2016: 36.2%);
- The discussions with fellow students and the possibility to ask questions during the tutorials are good for understanding the micro lectures and the key terms (2016: 46.3%);
- The assignments and tutorials help to connect things and remember better;
- The possibility to ask questions to the teacher.

5. Teaching and development

When the FERM project started, all the teaching was done by the teacher. Nowadays, the teaching task is divided amongst a team of teachers and a team of student assistants. The teachers give the plenary lecture at the beginning of the week and guide the tutorials from a distance. The tutorials in most programs were conducted by student assistants. The student assistants receive the necessary materials before the tutorial, they just have to execute what has been developed for their tutorial.

As noted before, the team of teachers working with the flipped classroom method and the developed materials has expanded. The teacher team develops the lectures and assignments together. The micro lectures are still produced by the project leader. This expansion has led to a change of task of the project leader. He has to coordinate a lot and has a role in preparing new teachers for teaching in the flipped classroom method. With the new hired staff this is going well, but with the older colleagues he has had a hard time convincing them of the advantages of this new teaching and learning method. It is difficult for a teacher to give up his/her autonomy, to use the materials and approach another teacher has developed. To overcome this, it is important that the other teachers are involved in the development as well and that decisions are taken collectively.

Student assistants' involvement and preparation

The student assistants are involved in the tutorials. They give an introduction and then help the students with the assignments when necessary. They are prepared for this task by the weekly team meetings in which is reflected on the last week's experiences and preparations are made for the coming week.

They all have the same assignments and sheets for the introduction (prepared by a teacher). However, they vary in the way they let the students work on the assignment (in groups or individually). They try not to repeat the theory in the micro lectures, but only explain misunderstandings. For repetition they refer to the micro lectures themselves.

The structure, the slides and the assignments offer sufficient support for the student assistants. The weekly meetings are also helpful.

The points they have come across in their work are:

- One teacher made a PowerPoint which had too many slides; this was not workable;
- The assignments were new and came in late;
- The slides were made by different persons with a different layout. The slides should be coordinated by one person;
- The meetings were a bit chaotic;
- The reflections were good, the teachers were really interested in the experiences of the student assistants.

Sometimes the teacher comes in during the tutorials; the frequency differs per teacher. Next to the micro lectures you have to explain things, it is not possible to only refer to the micro lectures. The tutorials also are scheduled before the lectures, which makes explaining necessary.

The student assistants have not felt lost. Sometimes the topics were new and there was a new book. They prepare themselves by watching the micro lectures and reading the book.

Teachers' involvement and preparation'

The teachers give the lecture on Monday and some of the tutorials. They are available at the tutorials in the background. The tutorials are led by the student assistants. Each program (PSY, CS, EPA, IBA and Premaster) had its own responsible teacher.

The two interviewed teachers are new at the University of Twente (UT) and especially hired to offer this type of education. They are enthusiastic about it, but needed time to get familiar with a lot of things at UT.

They feel well prepared by the project leader to do their tasks. They had some meetings in the first week to get started and after that weekly meetings with the team. In these weekly meetings they prepared the assignments together. You can use things of each other. The structure in the 22 units is helpful to make a plan for your course.

They thought it would be heavy, but the material available was helpful. The role of the teacher is still there in the flipped classroom method. You remain the source of knowledge who has to "connect the dots for the students" and give feedback to the students on their learning.

They prepare their own lectures and they develop materials. Some lectures and assignments were not there at the beginning of the course. They also prepared the student assistants. Next run, this will be easier because everything is ready.

6. Conclusion and future developments

In this project a lot of experience has been collected regarding the flipped classroom teaching and learning method. Considering all of the above, the outcomes of the project are very positive for the quality of education and learning in the methodology courses at the faculty. The most valued aspects of the flipped classroom approach are the micro lectures, the application of theory in the assignments and peer learning in the tutorials. The materials developed in this project are freely available for others to use. Since methodology is a topic taught at all universities, the possibilities for use elsewhere are vast.

A recurrent and remaining issue is the question "how to get the students active in their preparation of the tutorials"? How can we motivate them to watch the micro lectures and do the assignments before the tutorials? Are we going to enforce this by excluding students who did not prepare from the tutorials (teacher perspective) or do we allow the students to do less at home and more during the tutorials (student perspective)?

Future developments that are envisaged at the moment are:

- Develop more exercise material because the students learn most from doing it themselves. This could be online exercises with programmed feedback.
- More variation in the assignments in the tutorials;
- Develop a system of monitoring student preparation which stimulates peer pressure on being prepared for the tutorials;

- More connections with the project students have to do at the same time as the methods course;
- Split up the assignments in a home and an in-class part;
- Develop more micro lectures;
- Adding office hours for questions from shy, introvert students
- Add online questions: "did you understand?" as a preparation for the Monday lecture

Annex: Overview of evaluations conducted for the FERM project

The following evaluations have been conducted which results are summarized in this document:

- Analysis of the statistics of use of 32 micro lectures in 2016;
- Course evaluations through a digital survey;
 - o 2015: 98 students from the IBA and EPA programmes;
 - o 2016: 69 students from the IBA and EPA programmes;
 - o 2017: 45 students from the Communication programme;
 - o 2017: 50 students from the pre-master EST programme;
- Interview with 2 students from the EPA programme in 2016;
- Interview with 2 teachers involved in teaching in 2016 and 2018;
- Interview with 3 student assistants involved in teaching in 2018;
- Interview with the project leader in 2018.