Transitioning to Flipped Classroom - an experience report

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Abstract

It is easy to find motivation for flipping a classroom within existing research. Most importantly the students will reportedly learn more. But there is a cost involved. The educator will need new course material - likely videos. Without dedicated resources to handle the extra cost involved when flipping the classroom, the incentive to stay with the traditional lectures may be dominant.

But does the transition need to be a 100% flip? In this experience report we look at a gradual flip. In an introductory database course, 9 out of 12 session were flipped. The course resources were a mix of earlier material combined with a limited set of new videos. The exercises were modified, but they were still heavily based on the exercises given the year before.

How do the students experience a gradually flipped course? We interviewed students who did participate in the gradual flip and we conducted a survey. In this study we investigate student satisfaction with different parts of the course delivery and compare the results with surveys from earlier course deliveries - before the flip.

The overall satisfaction with the gradual flip was somewhat positive. The students did not see a problem with the mixed, gradual, approach. The exam results were at the same level as before and the attendance increased slightly. The students found it reasonable to start the flipped sessions late in the day. The late start made it possible for the students to prepare during their normal working hours as a student.

The study provides insight into the transition process from a traditional lecture-based course delivery to Flipped Classroom. Our results suggest that the transition does not have to be immediate. A lecturer may gradually flip a classroom so that the cost of flipping may be spread across multiple years.

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1 Introduction

DB100 - Databases is an introductory course at Westerdals, Oslo ACT. The course is taught in the very first semester for students enrolled in a Bachelor degree in Information Technology. Around 200 students get an introduction to relational databases with modelling, SQL, normalisation and more. The same lecturer (one of the authors of this paper) had taught the course each year from 2013 to 2016. After each course delivery the students evaluated the course with a standardised evaluation form. The results from the evaluations revealed that both the content and the delivery of the course was well accepted by the students. In each of the four years, the course was delivered within a traditional lecture-based approach. Two 45 minute lectures introduced new topics to the students. Later they solved exercises based on the lecture content for two hours in a lab, with teacher assistants (TAs) present. This combination was repeated for twelve weeks. The same lecture-approach was in use for the other three parallel courses in the first semester. A three hour individual written exam was the last activity in this 7.5 credits course. The results at the exams followed, more or less, a Gaussian distribution with a grade C average.

The lecturer himself was also pleased with the delivery of the courses. The question then arises: When a course is well accepted by both students and faculty staff, why make drastic changes in the course delivery? What might be the motivation for trying to flip the classroom? The motivation for change is found within existing research literature.

2 Background

Multiple definitions of Flipped Classroom (FC), or inverted classroom, exist. Lage, et al. [5, p.32] describes it as:

> "*Inverting the classroom means that events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa.*"

The most obvious motivation for a change would be if a change could increase the learning outcome of the students. Increased learning outcome was one of the six benefits Giannakos and Krogstie [4] found regarding the use of the flipped classroom teaching approach when they reviewed the FC research literature in 2014. The other five were *Positive Attitudes*, *Increases Engagement*, *More Discussions*, *Enforces Cooperative Learning* and *Better learning habits*.

O'Flaherty and Phillips [9] also described increased learning outcome in their scoping review of the use of FC in higher education. One of their research questions were *What are the educational outcomes arising from a flipped class?* They found a large number of articles which indicated improved student satisfaction, improved academic outcome and increased attendance. But very few articles used a robust scientific approach to evaluate educational outcomes, especially when educational outcome is viewed as more than exam results.

Foldnes [3] has provided such a scientific approach. Foldnes studied final exam scores in a FC setting relative to exam results in a traditional lecture based delivery. He found that flipping the classroom in itself did not give statistically significant better results. But when cooperative learning activities were introduced in the in-class FC, the students performed significantly better.

Bishop and Verleger [1] provides a comprehensive survey of FC research. Although methods and findings within the 24 studies differed, the general perception of the students were found to be relatively consistent. The students tended to be positive, with a few students strongly disliking the approach. The students did prepare for class, and when preparing, they preferred video resources over text. The performance of the students improved in a FC setting, although shortcomings of these results were highlighted.

It is not hard to find multiple good arguments for flipping the classroom within existing research. We also find certain caveats that might encourage a lecturer to stick with the traditional lecture-based approach. Giannakos and Krogstie [4] found three key challenges with flipping the classroom: *High initial cost and very time consuming for the instructor*, *Students unreceptive with the Structure* and *Decrease of Attendance*. The initial cost is connected to the production of new material needed for the flip. Video lectures is the most common technology used to flip the classroom [4]. The initial cost is high, but once the material for the flip is produced, it is reasonable to believe that at least some of the material can be reused in later deliveries. As an example [2], a total time to prepare videos for a course can be 600 hours.

Are 200 first semester students ready for FC? Lauvås and Styve [6] found different opinions on this when interviewing faculty staff members with FC experience. Some argued that flipping large classes could be problematic. But this statement came from those who did not have any experience in flipping large classes. Teachers *with* such experience did not see any problem flipping with 900 students. One specific teacher in the same study argued that students released from the Norwegian school system were not ready for the FC experience in their first semester. O'Flaherty and Phillips [9] found no evidence to show that FC is best introduced in a specific semester in higher education. Nor did they find any reported differences when flipping small or large cohorts.

The flip

DB1100 was flipped in 2017. The prior 2LE+2LA (2 hour lecture + 2 hour lab) was replaced with a mix of different setups. The twelve weeks of teaching was planned as described in table 1.

1	2	3	4	5	6
2LE+2LA	3LA+1LE	3LA+1LE	3LA+1LE	3LA+1LE	2LE+2LA
7	8	9	10	11	12
3LA+1LE	3LA+1LE	3LA+1LE	3LA+1LE	3LA+1LE	2LE+2LA

Table 1: The 12 sessions in the course. LE=Lecture, LA=Lab

There are multiple reasons behind this mix of combinations. The first session was a standard 2LE+2LA. It was considered a good idea to not require preparation from the students side at the first encounter. The FC concept was explained in the first session so that the student knew that they had to come prepared for the subsequent sessions. In earlier course deliveries (2013-2016), there was a midway lecture with a look back at the course content so far in the course. The lab following the lecture was a 2 hour midway test so the students could self evaluate their learning outcome so far. This midway session setup was kept when planning the flipped delivery.

The final session was similar. It was a recap of what the course had been about, and the students solved an earlier exam in the lab. 3LA+1LE was chosen as the normal setup for the flipped sessions. The idea was to spend more time working on assignments and less time in lectures.

The one hour lecture at the end of the session was not a standard lecture. The lecturer spent his time during the lab to talk to students and TAs. He noticed what was considered the most difficult parts of the exercises. These topics were highlighted in the lecture hall at the end of the session.

The sessions were deliberately placed late in the day, normally starting at 1 or 2 PM. The plan was to make the students consider the whole day as a *Database day*. The first part of the day was preparation time. There were three different sources of preparation material: (1) Dedicated pages to read in the book on the curriculum. (2) A pdf with converted Powerpoint-slides. These slides where modified slides from the lectures the previous year. (3) A few YouTube videos. At the end of the course there were a total of 28 videos combined for the 12 sessions. 4 videos had been produced in earlier course deliveries. 3 videos where public videos produced by other companies. The remaining 21 videos were produced along the way. Of these 21 videos, 9 of them were short 1 minute introductions to the topic of the day with practical information and motivation for why the topic is important. The rest of the videos were low-cost screen-casts with the lecturer solving exercises while thinking out loud and explaining the solution. The total time of producing, finding and publishing the videos for the course was estimated to a total of 15 hours.

The exercises in the labs were based on the ones given in the previous year. Extra assignments were provided as the lab duration was expanded from 2 to 3 hours. Some of these extra exercises were activities from within the lectures the year before.

3 Method

In this study we investigate the outcome of gradually flipping a database course with 200 first semester students. We investigate from the student perspective by using a mix of qualitative and quantitative approaches.

We have conducted a series of semi-structured interviews [8, Chapter 13]. The students were all asked to volunteer for an interview. At the end we managed to interview 6 candidates. We interviewed four of them midway through the course, and two students a month after the course had ended. Prior to each interview we sent a consent form to each participant. This explained that all data would be handled anonymously. It further described the purpose of the research project and how data from the interview would be stored and later deleted. It also explained the purpose of the use of an audio recorder in the interview. The overall topic for the interview was how the interviewee experienced being a student in the course.

The interviews were held using Skype. All the interviews were conducted by one of the researchers. Some notes were taken by the researcher during the interview. After the interview all the interviews were transcribed based on the recordings. The transcribed interviews were then sent back to the interviewees for approval. When all interviews were approved, we categorised our findings by looking for similar topics being covered in the different interviews.

In addition to the interviews, an anonymous survey was distributed among all the students enrolled in the course as part of the course evaluation. The survey

consisted of 25 questions, some multiple choice, others free text. The survey was created after the first four interviews, so we could use initial data from the interviews as valuable input to our questions. A total of 217 students had access to the survey. 55 answered the survey (25%). The result from this survey was used together with the interviews to support or further build upon the topics that were discussed in the interviews.

All course evaluations in DB1100 from 2013-2017 share 7 common questions. It is therefore natural to investigate to see if the evaluation in 2017 differs from previous years. Finally, exam grades for the last five years were also made available for this study. We can therefore compare the grades in 2017 with grades from earlier years.

Limitations

We recruited 6 students for the interviews. Students who *volunteer* for an interview may represent only the most dedicated part of the student group. This was also our impression in this case. A clear indication was the fact that out of the six students, four of them chose video portfolio as exam form. Video portfolio was a more demanding evaluation form which attracted some of the most dedicated students. This may explain why we generally found a more positive attitude to FC among the interviewees than in the survey.

4 Findings

We have grouped our findings in the following topics: *Student satisfaction*, *Class size and level*, *Resources*, *Student preparation*, *Organising the lectures and labs* and *Exam results*.

Student Satisfaction

The survey shows that the students generally found the use of FC to be somewhat satisfying. When answering to what extend they agree with the statement *I am pleased with the Flipped Classroom as a teaching method*, the average score was 3.74 on a scale from 1 to 6.

From the interviews, most of the candidates found FC to be both interesting and inspiring. A few pointed out that it took them a while to adapt to the FC way of learning.

> "*It took some time to get into the dynamics, but when I did, I think it was fine. When I understood that one did not have a lecture that took care of everything, but that we had to take a little responsibility for your own learning. So maybe I did not get it at first, but when I first got into it, I think it worked fine.*"

One candidate had been in work-life for the last 10 years, before returning to the school bench. He did not reflect much on the FC method of teaching, but found that he felt more prepared before the lab sessions than from what he remembered from the more traditional teaching methods.

> "*To be honest, I did not think so much about it. Because it's been a while since I've been sitting on the school bench before I started studying.*

I went to college in 2008, so it's been a few years. So I did not have such high expectations. I didn't really think so much about it when we started. But I quickly realised that I liked it. I liked that I felt, in a way, always prepared for the lecture - that hour. And the topics we had. I learned them quickly and it was clear."

As student satisfaction has been a topic in all course evaluations from 2013, it may be interesting to see these evaluations combined.

Statement	2013	2014	2015	2016	2017
I think this topic has a good content and structure	4.4	5.1	5	5	5
I think lecturer is capable of communicating the subject matter in this topic.	4.3	5.4	5.2	5.4	5.3
I have had good learning outcome in this topic.	4	4.6	4.9	4.9	4.7
Overall, I am pleased with this subject.	4	4.8	4.9	4.8	4.9
I think the lab sessions are well executed	4.4	4.8	5	4.8	4.5
I find the supervision useful	4.3	4.5	4.7	4.9	4.6

Table 2: Student satisfaction from 2013 to 2017

In table 2 we see that there are no major differences in student satisfaction within the last four years, although we see a minor decrease on lab-sessions and supervision. The major difference can be found from 2013 to 2014. This can be explained by the fact that 2013 was the lecturers first year teaching in higher education.

Class size and level

When answering to what extend they agree with the statement *I think Flipped Classroom works better with fewer students in the course*, the average score was 3.79 on a scale from 1 to 6. The interviews focused more on who FC is best suited for, rather than the size of the class. Some of the candidates think FC is more suited for students that are structured, scrupulous and motivated than the less structured and motivated students.

"*I really think FC might be something for the strong students. Because in my mind, a student is strong if he wants to go to school and work by himself."*

"*I think that those who are motivated and want to work simply benefit greatly. While those who are less motivated, maybe ... It's easier for them to skip the hours of preparation before the lecture."*

Resources

The lecturer provided three distinct type of resources for the students to use when preparing for each lab exercise: videos, slides and dedicated pages in the book on the curriculum. In addition to the dedicated resources, the students used other online

resources as they saw fit. On a scale from 1 (nothing) to 5 (very much) we asked them to rate how the different resources contributed to their learning.

Resource	Contribution
Curriculum book	3.1
Slides	3.8
Videos	3.3
Online resources	3.7

Table 3: How different types of resources contributed to the students learning.

Since FC may be understood as a teaching method involving videos as the main resource, the interviewees were asked specifically about the videos used in the course. It turns out that majority of the students preferred videos made by their lecturer rather than other online videos on internet. As commented by one of the students:

> "*Whats positive about the lecturer producing the material is that the lecturer is good at expressing himself. Usually, all of the material is already available on, for example, YouTube. I personally prefer that the lecturer produces all of the material, but I am open to using external existing systems/videos too.*"

Student preparation

In the survey we asked the students to provide some more details on their preparation. We found from the survey that most of the students spend no more than between 30 minutes to 2 hours preparing for the lab session. This is less than a normal lecture would be (typically 2 hours). The survey also found that most of the students prepare on their own, not in groups/together with others. So what motivates the students to prepare? From the interviews there seem to be a clear indication that if the students can prepare within the school hours for the lab sessions, they are more likely to meet prepared.

> "*Personally, I tried to meet fairly prepared, so I turned up to school early on the days when we had this course. The lab session started at 1 PM. So I can see that if you start early in the day, I think it would be more difficult to meet prepared. Because then people sleep until the exercises start anyway, or they may come after the lab. So maybe it's a good time to have the lab session in the middle of the day, because people can come early and have a good time to prepare.*"

> "*Many of my fellow students show up at 2 PM, but there are also some, including me, who are there between 9 and 11 and sit and work and take it as a database day. That's really why I think it works fine for me, I think.*"

Avoiding student preparations in the weekend was also mentioned as a motivating factor, as commented by this candidate:

> "*Yes, definitely. I see that in subjects where I know I should have been a little better at preparing before the lecture, it's a bit demotivating that I can not ... since the lecture starts at 9 am and not at 2 pm.*"

Organising the lectures and labs

With 200 students in a cohort, the lecturer cannot help all students in a lab session. To be able to provide sufficient supervision in these sessions, TAs were used to help the lecturer. In the survey, the students rated the contribution from the TAs to the learning outcome lower than the previously described learning resources with an average score of 2.8 (scale 1 to 5). The students in the interviews were more positive.

> "*I feel that they can answer. The also have access to the solution to the exercises. So if they got stuck, they just looked at it. But they do not give you the answer directly. They say either where to look for the answer or what to search for. If both me and the assistant are a bit stuck, then there will be a discussion between me and the assistant, and then we'll figure out a solution together.*"

In the survey, we asked the students specifically how they would prefer splitting the four hours of lectures and labs. Table 4 displays the results.

Preferred 4 hrs lecture/lab distribution	Percentage
2 hrs lecture —> 2 hrs lab	29
2 hrs lab —> 2 hrs lecture	18
3 hrs lecture —> 1 hr lab	7
1 hr lab —> 3 hrs lecture	0
1 hr lecture —> 3 hrs lab	18
3 hrs lab —> 1 hr lecture	15
Unanswered/Do not know	13

Table 4: How do students prefer to split 4 hours of lectures and labs?

In table 4, we see that only 15% of the students prefer the chosen 3 hrs lab + 1 hr lecture. This is further supported in the survey when we asked the students to evaluate how much they agree with the statement (1 to 6) "*I would have learned more about the subject if we had used the standard 2hr lecture followed by 2hr lab*", the average score was 3.9, indicating that they think they would learn more in a more traditional lecture/lab setting. This was also the most selected combination in table 4.

All course evaluations from 2013-2017 include self-reporting on how many lectures and lab sessions the student participated in. In 2017 the lecture was described as "lecture/gathering" as it was not strictly a lecture. Table 5 displays how the student cohorts from 2013 to 2017 participated in lectures and labs.

Participation (0-12)	2013	2014	2015	2016	2017
Lectures	10	11	11	11	11
Labs	9	9	10	10	11

Table 5: Self-reported student attendance in lectures and labs 2013-2017

We see that students in 2017 had a slightly higher attendance in labs than in previous years.

Exam results

This course has been taught by the same lecturer since 2013, and the exam have has the same format throughout these years[1], including 2017 after having introduced FC. Table 6 below displays the exam results from 2013 to 2017.

Grade	2013	2014	2015	2016	2017
A	11 %	7 %	13 %	6 %	13 %
B	17 %	19 %	22 %	20 %	15 %
C	25 %	25 %	36 %	33 %	35 %
D	23 %	20 %	24 %	19 %	19 %
E	17 %	20 %	1 %	10 %	7 %
F	7 %	8 %	4 %	12 %	10 %

Table 6: Exam grades from 2013 to 2017

We find no drastic changes in the grades in 2017 compared to previous years.

5 Discussion

Introducing FC by a *gradual flip* approach in DB1100 could be labelled a moderate success. Both exam results and student satisfaction was at the same level as before the flip. The main motivation for choosing a *gradual transition* to FC was the lack of dedicated resources. Flipping for the first time is challenging, usually involving a high initial cost and very time consuming for the lecturer [4] [6] [2] [9]. By gradually flipping the course, the initial cost was reduced. A gradual flip, in this case, is very different from the lecturer and student perspective. The students in DB1100 experienced a gradual flip as a mix of traditional (3) and flipped sessions (9). We did not find any indication that this mix in itself was a challenge for the students. This conforms well to the findings by O'Flaherty and Philips [9]:

> "*...there was no evidence presented to suggest whether flipping the entire course (majority of scoping review articles) is more beneficial than flipping only a few selected class sessions/ modules per course (4, 14).*"

For the lecturer, the flip also involves changing practices and producing new course resources (videos, assignments etc.). These are less noticeable changes from the student perspective. One of the most resource- and time consuming activities when flipping can be the production of videos [2]. As reported in Lauvås and Styve [6], some lecturers favour videos made by others, preferably in combination with the textbook used, while others produce own videos. In this specific case the lecturer used a combination of the two. Our results indicate that our students favoured the videos made by their lecturer. Given that the quality (in terms of presentation and content) are equal, the students will find videos produced by their own lecturer favourable. The videos produced for this course were low-cost screen-casts where the lecturer solved exercises while thinking out loud. The students

[1]The students of 2017 could actually choose to deliver a video portfolio as their exam delivery. Only 10 students chose to do so. These 10 deliveries are excluded from the results as the exam form is different from all other exams in 2013-2017. 9 out of these 10 students got an A or a B as their result.

said the videos contributed to their learning, but not as much as slides from earlier lectures and online content.

The fact that the students ranked slides higher than videos when it came to what type of resources contributed to their learning needs to be discussed. The most important fact to consider is that there were a very limited amount of videos in use. As opposed to flipped courses where earlier lectures are replaced with video content, this course used complementary videos in addition to a book and slides. DB1100 is a practical course where the assignments in the labs involve a lot of hands-on work. Examples include creating SQL-queries, creating database-models, normalising a database etc.. The content from earlier lectures (represented through the slides) were very relevant for the tasks at hand - especially as the assignments were based on the assignments from the previous year. The students could therefore use the slides as a place to look for specific topics needed to solve a specific task. The results suggest that if the student did not find what they needed in the slides, they searched for help online. The book on the curriculum did also contribute to student learning, but not as much as slides, online resources and the videos. The importance of the slides could possibly have lessened if the assignments had been altered more. We know from earlier studies [4] that videos are heavily *in use* in flipped classrooms. However, we find it interesting to see that our students report that videos are by far the only possible resource of importance in a flipped learning context. The low-cost screen-casts were well accepted.

The exercises for the lab sessions were modified from the previous year, but by far completely changed. Again, this was done deliberately to cut the initial cost of flipping. The lecturer was well aware of the findings from Foldnes [3]: Flipping a course in itself will not result in increased learning outcome (or exam results). But FC combined with collaborative learning in the lab-session will. Consequently, the lecturer in DB1100 did not expect increased learning outcome as an immediate effect when flipping the classroom. Our exam results finding shows that the exam results in 2017 was at the same level as for earlier cohorts. But after the initial flip, further improvement in the course can be implemented, including more collaborative assignments in the lab sessions. Hopefully, this will increase the learning outcome in a longer run.

We find multiple examples of both increasing [4] [9] and decreasing (e.g. [10]) student satisfaction within existing research. Our findings within a *gradually flipped classroom* suggest that the overall satisfaction was maintained from earlier deliveries before the flip. When we compare students satisfaction i 2017 to earlier years, there is little difference. We see a slight decrease in satisfaction with the lab sessions and the supervision. Although there is no dramatic difference, the difference makes a lot of sense. When flipping a classroom, more responsibility is placed on the students who have to prepare for lab on their own initiative (as opposed to simply showing up in a lecture). The same increased responsibility can be said about the TAs. In a class with 200+ students, they are the ones who meet the students first when a new topic is introduced. And in the transition (the first FC year), they have not experienced FC themselves. All TAs where in their second year of their bachelor degree. In retrospect, it could be that the TAs should have received more support from the lecturer than they did, especially the very first year.

In addition to collect comparable data on student satisfaction, we also asked the students if they would have been better off with a classical lecture/lab setting. The

majority would prefer the classical approach. At the same time they are somewhat pleased with the FC approach. When they are asked to split the 4 hours of lectures and labs, we get no clear favourite, but a classical approach is favoured. Three of the six alternatives start with lectures, and the other three start with lab (see Table 4). If we combine the lecture first-alternatives, we get a total of 54%. A lab first-approach is 33%. This adds to the impression that they are satisfied with FC, but would rather have lectures first.

FC does not suit every student equally well. As reported by Lauvås and Styve [6], one lecturer argued that FC was not suitable for students in the first semester, and that the students needed to be introduced to FC gradually through out the semesters. The same scepticism of an early FC-introduction in higher education is also found among students [11]. The study [6] also describe a scepticism to flipped classroom for large classes. Our findings support the findings by O'Flaherty and Philips [9] suggesting that there was no evidence to show whether the flipped approach is best introduced in introductory/first year courses vs. second, third or fourth year courses. The same study could also not find any evidence that FC is better suited for smaller classes (<150) vs large classes (>150), which also conforms to our findings. But our students were of the opinion that flipping a classroom would work better on smaller classes (less than what they experienced - 200 students).

One factor that seemed to have great influence on how well prepared the students were for the lab session, was the timing of the session. The lab sessions in DB1100 were placed in the afternoon (from 1 or 2PM), and the students had no other lectures prior to the lab that day. This enabled the students to use the hours from the morning and until the start of the lab session for preparation. Our findings suggest that the students are more motivated if they are given the opportunity to prepare for the lab sessions within the school hours, rather than having to use their spare time (late evenings and/or weekends). To the best of our knowledge, this specific timing of the lab sessions has not been described in earlier studies.

We do find earlier descriptions in review studies of both increasing [9] and decreasing [4] attendance when flipping the classroom. Looking into the underlying articles in the reviews, we find examples of lecture attendance dropping from 74% to 54% [2] and attendance slightly increasing [7]. Behind these conflicting results are different methods for measuring (self-reporting or not) and difference in what exactly is compared. As FC may be implemented in multiple ways, the before and after situations will differ also. Our contribution to this topic include a comparison of attendance 2013-2017. We had the same total number of lab and lecture sessions in all these years, but we structured them differently as a result of the flipped approach in 2017. We found no decrease in attendance, rather a slight increase. These are all self-reported numbers, though. One could argue that the timing of the lab session could also influence attendance, and thus explain why our students kept attending our sessions. But we have no empirical data to support that argument. We only have data on students arguing that the timing was good in order to fully be able to prepare for a session.

6 Conclusion

Our study shows that the introduction of FC does not have to require a lot of resources and preparations up front. By gradually flipping a course, a lecturer may spread the costs of flipping over time - even across multiple years. The *gradual flip*

in this study involved flipping 9 out of 12 sessions and reusing a lot of the course material from the previous year. The motivation for this study is not to encourage a gradual flip per se, but to investigate if a gradual flip is a valid alternative when dedicated resources for flipping the classroom is not available.

Our findings were found to adhere with existing topics within FC research. An interesting observation was the importance of the timing of the labs. Having the lab session in the afternoon, and making sure the students had no lectures prior to the lab that day, seemed to motivated the students to prepare.

We hope our contribution can motivate our fellow lecturers who are considering the move to FC or any other form of active learning.

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