

## **Example: Flipped lecture “Biology IA” (Katja Köhler, Ernst Hafen)**

### **Conditions:**

5 h per week

1<sup>st</sup> semester

550 students

students from three Departments and four study programs (D-BIOL, D-HEST, D-CHAB)

2 lecturers

### **Structure:**

2 h self study (on Moodle)

1 h group work (with tutors)

1 h input lecture

1 h discussion

### **Scenario:**

Each topic starts with a self-study phase where students prepare the content using videos, interactive lessons and exercises on Moodle. In the group phase, students work on problems, apply their knowledge and reflect what they have learned. This session takes place in the lecture hall under tutor supervision. The following input lecture builds on the knowledge gained during the self-study and group phases to explain more complex aspects of the topic or a technical application. In the last hour of each module, the lecturer discusses the issues students had most difficulties with, as revealed by analyzing the activities solved during the self-study and group phase as well as students answers in the “Muddiest point” category.

For illustration, the module “replication” can serve as an example. After introducing the replication mechanism in the self-study, students are asked in the group work to use this knowledge to design a PCR (the technical application of the replication concept). In the input lecture, they have to integrate this knowledge to understand which problems occur during replication and how these problems are solved (e.g. how the ends of linear chromosomes are replicated without losing information, how errors can be erased). The discussion session summarizes the most important concepts and addresses issues that remain unclear based on the students online performance and the interactions with students during the group work (e.g. how the lack of understanding of the DNA structure affects their comprehension of the replication mechanism). Questions that were posed as muddiest points are discussed in the plenum where students are encouraged to ask questions and give feedback.

## **Example: Hybrid mode (frontal and flipped) lecture “Atmosphärenphysik” (Ulrike Lohmann, Amewu Mensah)**

### **Conditions:**

2 h per week

5<sup>st</sup> semester

40 students

Students from four Departments (D-USYS, D-ERDW, D-PHYS, UZH)

2 lecturers, 3 teaching assistants

### **Structure:**

Half of the lectures were conducted in flipped classroom (FC) mode. The structure in those lectures was:

1 h discussion of moodiest points of the background material the students had to read

1 h group work (with tutors)

### **Scenario:**

Each topic starts with a self-study phase where students prepare the content using background reading material and 10 multiple choice questions on Moodle. In addition to the multiple choice questions, the students can enter their muddiest point of the required reading material.

The first hour of each FC lecture was used to discuss their muddiest points and any questions that arose from answering the multiple choice questions. In the second hour the students work on problems, apply their knowledge and reflect what they have learned. This session takes place in the lecture hall under the supervision of the lecturers and the teaching assistants.

In the frontal lectures, we increased the level of interactivity by using eduApp and by applying various other classroom assessment techniques (Background Knowledge Probe with index cards, Categorizing Grid). In these traditional exercises the students had time to solve long quantitative exercises involving calculations. These complemented the MC questions that focused on a qualitative understanding.

To stimulate the students' motivation, we offered them a bonus of a quarter (half) of a mark when they answered correctly more than 80 % (90 %) of the MC questions and the traditional exercises that were handed out after the frontal lectures.