

# Focus groups

## A format of exercise classes for more equal opportunities

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**Abstract** Exercise classes aim to support students in understanding lecture material, working on problem sets, and successfully passing exams. Students have diverse backgrounds and different levels of prior knowledge and assess their skills and abilities differently. These differences can lead to students not daring to ask questions during exercise classes. Such early negative experiences can affect students' self-perception and sense of belonging and sustainably influence motivation and performance, dropout rates, and connection with ETH. Numerous studies suggest that underrepresented groups (e.g., women, first-generation students) are particularly affected by this. On the other hand, teaching assistants face a very heterogeneous group of students and cannot meet everyone's needs.

*Focus groups* provide a solution for students with little prior knowledge (based on self-assessment). The teaching assistants in the focus groups spend more time on the essential basics than in regular groups. This is communicated to students before enrolling in the exercise classes. Professors can easily implement focus groups into the existing setup. They do not require additional teaching assistants or other resources. In the fall semester of 2021, a pilot took place with two focus groups in the Physics I lecture of the first year in Mathematics / Physics. The pilot was very successful: 79.6% of the focus group participants passed the exam (compared to 74.6% in the entire cohort). The proportion of women in the focus groups was 52.5%.

In this document, we introduce the concept of focus groups, provide concrete guidance for implementation, and present an excerpt from the evaluation of the Physics I lecture.

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This document will be continuously supplemented and improved. Suggestions and feedback should be sent to the author.

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# Focus Groups: A New Format for Exercise Classes

## 1.1. What are Focus Groups?

Focus groups are exercise classes for students with little prior knowledge (students self-assess their knowledge). In focus groups, lecture-relevant basics are also explained, i.e., high school material essential for solving the problem sets. Students have diverse backgrounds when they enter ETH, e.g., different main subjects at high school, coming from the “Passerelle” or a gap year. Even if the relevant basics are introduced in the lecture, more is needed to compensate for the differing levels of prior knowledge. Focus groups thrive on the fact that the students and the teaching assistant know that everyone has assessed themselves as having below-average prior knowledge: the students feel a sense of belonging and ask their questions; the teaching assistant teaches a more homogeneous exercise group and knows that they should also carefully convey the basics. The target audience for focus groups and the type of content delivery in the exercise classes are characterized as follows:

1. Target audience: Students with little prior knowledge enroll in focus groups (upon self-assessment). Thus, these exercise classes are attended by students who objectively have little experience with the subject matter and / or perceive it as such subjectively.
2. Content delivery: The teaching assistants focus on a subset of the lecture material/problem sets and explain these in detail. To optimally promote students, prioritizing the material during the class is essential (more on this in Section 2.1). In the exercise classes, students should lay a solid foundation they can build on during self-study throughout the semester, during the learning phase, and in later lectures.

## 1.2. Why do we need Focus Groups?

Focus groups contribute to ensuring that everyone at ETH is optimally challenged and supported.

**Vision:** All students should benefit optimally from the exercise classes.

**Reality:** Students start their studies with very different backgrounds. Students with less prior knowledge or those who perceive their knowledge as lower often prefer to avoid asking questions in exercise classes. This hinders their learning success and is demotivating, as the self-perception as a “weaker student” confirms. The two effects reinforce each other.

**Possible solution:** In focus groups, students dare to ask questions, especially about the basics, which are essential for understanding the material and succeeding in their studies.

# 2

## Practical Guide for Implementation

In this chapter, teaching assistants will find a practical guide for implementing focus groups. We will discuss the material covered in the exercise classes in Section 2.1 and the teaching method in Section 2.2. As the situation in each lecture and exercise session is slightly different, the teaching assistants should adapt the concept according to the context. This chapter provides the necessary tools for this purpose. A one-hour workshop for all focus group teaching assistants takes place in the first week of the semester to network and clarify questions. Professors and their staff find answers to frequently asked questions about focus groups in Section 2.4.

### 2.1. Skillful prioritization

Many students find it helpful to see individual exercises of the exercise series solved in detail and discuss alternative approaches. Since the material that could be addressed in the exercise session exceeds the available time, good prioritization is essential. The following considerations can help the teaching assistant:

- What do students need to work on the exercise sheets? Can I convey multiple concepts / ideas / skills using a cleverly chosen example task?
- Which exercises will benefit students the most from discussing? Recommendation: Ask students directly, e.g., through a Doodle survey
- Break down exercises into sub-problems and solve them one by one. Students will be more relaxed and come with targeted questions, as they better understand where they got lost.
- Which concepts from the lecture are most relevant to the problem sets? Often, examples help to convey concepts well and make them “applicable.”
- Can I recommend resources to students to help them when they get stuck on the exercise sheets? Stackoverflow, YouTube channels, etc.
- Answer questions beyond the lecture material during breaks or at the end of the session
- Distribute tips on the new series digitally to save time during the exercise session
- If a students frequently ask questions beyond the lecture material, they are not well-suited for a focus group. The teaching assistant should tell them to attend a conventional exercise group instead.

### 2.2. Empathy in teaching

Two guiding questions can help when preparing for an exercise session [1]:

1. What was it like for me when I first saw the material?
2. How can I explain the material without assuming my (learned) intuition?

The attitude of the teaching assistant dramatically influences the number of questions asked during the session. Going into more detail in their explanations establishes the understanding that questions can arise about each sub-step. Two specific ideas from the pilot teaching assistant instructors [1], [2]:

- In the first exercise session, have a round where everyone is invited to share what they did before studying. This gives students the feeling that they are surrounded by students at a similar point in their studies.
- Provoke questions by writing a few steps of the solution on the blackboard without comment. Then ask the group which steps are unclear and explain the steps one by one.
- Ask: “Did anyone not understand that?” instead of “Did everyone understand that?”

### 2.2.1. The more questions, the better

It can happen that the teaching assistant doesn't get through the material because the students asked questions and many details were discussed. The students were involved and had “aha moments.” These moments mean the students have learned something, rather than rushing through more material but only touching the surface. The aha moments motivate them for the upcoming week and the learning phase.

## 2.3. No Additional Effort for Instructors

Compared to a conventional exercise session, focus group instructors have no extra effort. Preparing the lecture-relevant basics at the semester's beginning will take additional time. If focus group instructors for a lecture collaborate on designing the materials, the effort reduces. They can exchange ideas in the workshop at the beginning of the semester. Throughout the semester, the homogeneity of the group reduces the preparation effort for individual exercise sessions. If a question arises during the session that the instructor cannot answer, it's not a problem: A response like “I don't know right now, but I'll think about it for next week and get back to you” shows students that it's okay not to know everything by heart.

## 2.4. Q&A for Professors and Head Teaching Assistants

Please send any questions that remain unanswered in this document to the author ([martina.niggli@vseth.ethz.ch](mailto:martina.niggli@vseth.ethz.ch)).

### Do focus groups require additional resources?

No, focus groups are implemented within the existing structures of the exercise operations. They do not require additional teaching assistants or working hours.

### Is my lecture suitable for focus groups?

Focus groups make sense primarily in lectures where students have different prior knowledge. A good example is a computer science lecture introducing a programming language. Some students will already be familiar with the language, while others may have no programming experience. Focus groups are helpful in many first-year lectures but are not limited to the first year. If there are fewer than three exercise classes, we do not recommend implementing one as a focus group.

### How to introduce focus groups to students?

The following description is helpful: Focus groups are here for students with little prior knowledge of *XY*. In the focus groups, the focus is also on consolidating the lecture-relevant basics in *XY* (in addition to the exercise series and the current lecture content).

Optimally, students learn about focus groups before enrolling in the exercise classes, e.g., in the first lecture, when the organization of the exercise classes is introduced. Students benefit if focus groups should be marked as such in the tool used to enroll in the exercise groups.

### How many focus groups are needed?

Demand is challenging to estimate. Two focus groups were offered out of 24 exercise groups in the pilot. After opening the enrollment on *Moodle*, the focus groups were immediately fully booked. Ideally, many teaching assistants sign up for the focus groups, and the professor determines the number of focus groups accordingly after student enrollment. As a rough guideline, we recommend not running more than  $\frac{1}{3}$  of all exercise groups as focus groups.

**How to find focus group instructors?**

One option is to send this document to all teaching assistants, along with the question of who would like to take on a focus group. If too few people sign up, the topic should be discussed again at the first assistant meeting before the semester begins. Focus group instructors should be enthusiastic about this format and should, therefore, definitely volunteer.

# 3

## Evaluation Results

In the fall semester of 2022, focus groups were implemented in ten lectures in the Departments of Computer Science, Mathematics, Physics, Chemistry, and Biology. The evaluation needs to be thoroughly analyzed and will be appended to this document at the end of May 2023.

In the fall semester of 2021, two focus groups were implemented in the Physics I lecture (first-year math and physics studies) by Prof. Dr. Klaus Ensslin. The evaluation was conducted in collaboration with Prof. Dr. Sarah Hofer from the D-GESS. The evaluation consisted of three questionnaires distributed at the beginning and middle of the semester and after the exams to the participants of the two focus groups and two control groups (two conventional exercise groups). Students, not doctoral students, taught all four evaluated exercise groups. In addition, eleven interviews with students from both focus groups were conducted in December, and the results of the Physics I exam from the winter 21 / 22 examination session are available. The results of the interviews and the exam are presented below.

### 3.1. Interviews: Students Recommend Focus Groups

The interview results are positive. Students from the focus groups reported benefiting greatly from their exercise sessions (average 9.4 on a scale of 1-10) and would recommend the new format to someone with a similar background (average 9.9 on a scale of 1-10). The students' backgrounds are shown in Table 3.1. Many students voluntarily stated that they would also like to see focus groups in other lectures.

**Tabelle 3.1:** Backgrounds of the eleven interviewed students in the focus groups

Background	Number of students
Repeating first year	1
Passerelle	1
High School, Artistic Design	1
High School, Mathematics & Physics	2
High School, Spanish	2
High School, Italian	2
High School, Business & Law	2

Two quotes from the interviews:

Because we all chose a focus group, I have no inhibitions about asking questions.

Focus group student

I was afraid that we would be too slow in the focus group and, therefore, unable to keep up with the material. But that didn't happen.

Focus group student

### 3.2. Exam: Passing Rate Above Average

We compared the exam results of the focus groups to the overall average. For the list of participants in the focus groups, we asked both instructors to indicate who was usually in their session. From both focus groups, an above-average number of people passed the Physics I exam. This could not have been expected due to two factors:

- The proportion of women in the focus groups is very high at 55% and 50%. The Physics I exam statistics show that women often fail more frequently [3]. (In [3], 15 Physics I exams were analyzed since Summer 07. Men passed more than women in 12 of the 15 exams.)
- The proportion of students with little math / physics background is very high in the focus groups. These students, therefore, did not start their studies with the prerequisites that we would consider “optimal.”

**Tabelle 3.2:** Statistics of the two focus groups compared to the overall average

	Focus group I	Focus group II	Entire cohort
Mean	4.65	4.47	4.63
Std	0.74	0.57	0.85
Min	3.25	3.29	2.43
Max	5.75	5.29	6.00
% passing exam	84.2	75.0	74.6



# Referenzen

- [1] These questions are from Luca Morf (teaching assistant of a focus group in fall semester 2021).
- [2] Idea of Sales Indergand (teaching assistant of a focus group in fall semester 2021).
- [3] V. V. Vogler-Neuling u. a. "Improving the learning environment in the Department of Physics: a peer mentoring program for first-year female physicists alongside changes in the lecture program". In: *ETH Learning and Teaching Journal* 3.1 (2022). URL: <https://learningteaching.ethz.ch/index.php/lt-eth/article/view/202/174>.