

# Panel discussion on learning goals and their assessment in physics labs

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**Abstract.** A panel discussion on physics labs at all levels of education is proposed. It will address open questions on learning goals and their assessment and the interplay between those two. Two experts in the field will initiate the discussion. The workshop will end with an outlook to the future. Results of the discussion will be reported back to the community.

## Introduction

Under the umbrella of the [GIREP Thematic Group LabTiP](#) this will be the second in a series of workshops planned for the coming GIREP- and WCPE-conferences. The first workshop was held online during the Malta seminar in 2020 [1] and addressed lab work in teacher education.

There is a clear ongoing interest in lab courses that is broader than just teacher education illustrated by the following recent output in the field:

- Physical Review Physics Education Research [focused collection on Instructional Labs](#),
- A [call for papers on the subject](#) for the European Journal of Physics,
- [Open education material](#) published under a Dutch grant,
- A [recent document](#) posted on PhysPort, and
- A lab taxonomy project run by Gayle Geschwind, a student of Heather Lewandowski.

Throughout this sequence of workshops we aim to foster a dialogue in our community about physics laboratory courses. We intend to identify and address various open questions or questions with no definite answer in the field. The workshops are intended for physics instructors of all levels of education.

## Outline of the workshop

This workshop aims to address questions regarding learning goals and their assessment, and the interplay between these two aspects, in the lab. The workshop will take the form of an open panel discussion in which the public is encouraged to participate. Like in the first workshop [1], guiding questions will be provided but our intent is to broaden the scope of the discussion by letting the interest of the public lead the way.

The discussion on learning goals (and the more specific objectives and outcomes) and their assessment (for example using rubrics) will be initiated by two experts in the field. After these conclude, a discussion on methods to align learning goals and assessment will commence in which the constraints that teachers face while implementing these will play a role as well.

*Open questions on learning goals.* The introduction will contain results from research on how to transform a lab course [2] and on the effects of concept-focused, skills-focused, or mixed labs [3]. The two referenced papers and other theory will naturally lead to questions such as the following:

What is the role of labs in physics? Does my lab focus on concepts, skills, or both and why? How do I make sure that students' activities foster the achievement of my learning goals?

*Open questions on rubrics and grading.* In many labs, rubrics are used to assess students' learning. Rubrics are scoring tools that can be used for summative or formative assessment purposes [4]. They can also be used for students' self-assessment [5]. Rubrics can lead to improved performance, for example, by increasing transparency regarding expectations.

How do you make your assessment of students' work efficient [6]? How do you stimulate reflection by students on the given feedback?

*Open questions on the interplay between learning goals and their assessment and the future.* Ideally, learning goals, activities, and assessment are constructively aligned within each lab [7] and should be coherent over different courses and years.

How do you make sure your learning goals are properly assessed? What will the future look like? Which opportunities and challenges does AI pose to physics lab instruction?

The workshop will end with two final questions to the public: What did you take away from the workshop? And which aspects of lab courses would you like to discuss at the next conference?

## **Expected results and outlook**

After the conference results of the discussions will be reported on each question addressed in this workshop. At the end of this workshop participants will have the opportunity to propose topics for future workshops of the GIREP Thematic Group LabTiP. From this a priority of topics to address in future workshops will be created.

## **References**

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