

“Show me how to use a microscope” - The development and evaluation of certification as direct assessment of practical lab skills

Pernille Eidesen¹, Anne Bjune², and Simone Lang³

¹University of Oslo Department of Biosciences

²University of Bergen Department of Biological Sciences

³University Centre in Svalbard

March 6, 2023

Abstract

Practical lab skills are rarely directly assessed. To improve constructive alignment between described learning outcomes of practical skills and assessment, we developed and tested a certification procedure for microscopy skills. The procedure was embedded into the ordinary learning activity, so no additional time was needed. Three slightly different protocols were developed within the framework of sociocultural learning theory and built like a skill ladder including direct peer assessment and elements of gamified learning. The protocols varied slightly in the way students were prepared for the certification, the number of steps/levels of achievement, and the consequences of failing. We tested the protocols at three different academic institutions and within 11 courses of varying sizes and academic levels in biology or geology. Feedback were collected through online surveys (n = 207) or orally after sessions. One protocol provided instruction videos as preparation material. Instruction videos provided increased understanding of the task, but tactile training was most important for learning. Regardless of institution, type of preparation, and level of former experience, the certification procedure made students clearly more engaged in the exercise. The majority reported that the certification procedure increased their motivation to learn, increased their learning outcome, and was appropriate for assessing practical skills. Students with no or little experience in microscopy before the exercise were more positive about the certification procedure compared to skilled students, and the level of engagement and preparation was higher when there were some consequences of failing. Most students felt comfortable being certified by peers, but some students expressed concern about peers making mistakes. The presented certification procedure can easily be adapted to assess other practical skills, and with some adjustments be an efficient method for assessment-as-learning, merging formative- and summative assessment.

Hosted file

Microscopy_certify03032023_ufig.docx available at <https://authorea.com/users/592889/articles/628188--show-me-how-to-use-a-microscope-the-development-and-evaluation-of-certification-as-direct-assessment-of-practical-lab-skills>



