

Munich University of Applied Sciences

CASE STUDY

Improving teaching and learning with Labster at Munich University of Applied Sciences



Overview

Munich University of Applied Sciences is the second biggest in Germany, with 18000 students, 40 faculties and offering 85 bachelor and master programs. Prof. Dr Karlheinz Trebesius is a course director for the Bioengineering course at the Department of Applied Sciences and Mechatronics and the Bio and Environmental Technology specialization at a bachelor level in the Engineering and Management course at the corresponding Department. In addition, he teaches Chemistry, Molecular Biology, Genetic Engineering and Cell Biology. Also, he leads lab-based internships for Biotechnology and Cell- and Microbiology.

Starting with Labster

Dr Karlheinz Trebesius first learned about Labster via a colleague responsible for Bioprocessing Engineering, where Labster was a voluntary tool for the students in the course. However, when the COVID-19 pandemic escalated, all the universities in Germany shut down and the classes moved to distance learning - the hands-on courses urgently needed a solution. "Labster rescued us in the COVID-19 situation, it's not identical to hands-on training, but it's quite close to it. And I think it was the best thing we could have offered to our students at that moment," mentioned Dr Karlheinz Trebesius. Allowing the students to continue their practical studies while at home has been a challenging situation for educators, "and the solution was perfectly delivered by Labster. Therefore, we are very happy to have Labster because we can offer our students an adequate educational system where they can learn some practical experience without physically going to the lab," said Dr Trebesius.

Number of students: 170 students using Labster; courses: Cell- and Microbiology, Gene Technology and Biotechnology - combined with hands-on laboratory internships.

Simulations used: Aseptic Technique, Bacterial Cell Structures, among others.

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“Labster was, indeed, so easy to use, and there were very few problems communicated by the students. Another good aspect is that Labster has technical support, and even the students can get access to it. So even if they have some problems, there is always somebody that helps them.”

— Dr Karlheinz Trebesius

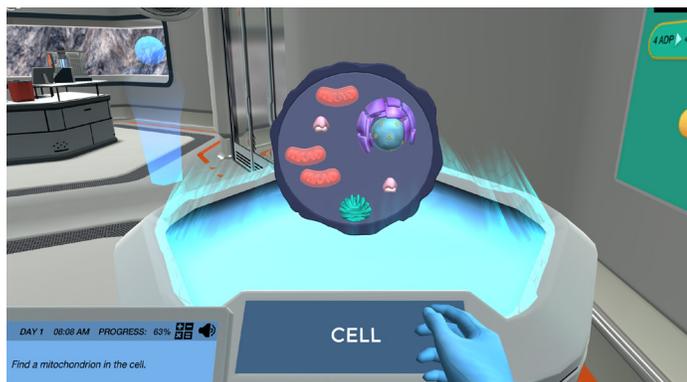
Engaging and real-life scenarios

According to Dr Karlheinz Trebesius, the students really appreciated a close approximation to the real-life lab work presented in Labster simulations. "I don't think that any other system at the moment is delivering this," said Dr Trebesius. "We use science videos also in the situation where we can't offer a hands-on practicum. Still, they aren't comparable to Labster, where the students go through the experiment step by step," he added. The students also learn about real-world problems in the lab. "It's much closer to the situation of a real practicum than all other systems that we know," followed Dr Trebesius.

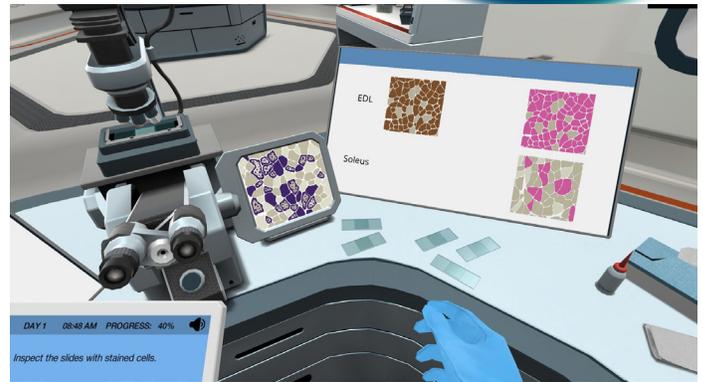
Labster as a supplement and blended learning approach

Even though Dr Karlheinz Trebesius used Labster as a direct lab replacement during the COVID-19 pandemic, virtual lab simulations can also serve as a supplement. “Labster could not entirely replace the hands-on experience. It’s a nice addendum, it’s something that you can add to the hands-on experience, but it’s not useful to replace it,” said Karlheinz.

In blended learning, online tools are combined with traditional teaching. Students can deepen their theoretical knowledge by playing a simulation after a theoretical presentation. “Labster can be very useful as help for lectures. After learning the theoretical backgrounds of some methods and different fields, the students can play Labster simulations and gain a much deeper understanding of the scientific concepts,” explained Dr Trebesius. This approach also gets a lot of positive feedback from the students. In the evaluation survey, “the question I ask the students is whether they think that Labster would be a useful addendum to the practicum. Almost 90% of students agree and appreciate the application of Labster,” said Karlheinz.



This teaching method can also free up the time spent in the wet lab and open more time for other projects, such as research. “I foresee for the future that one can reduce the number of hands-on teaching in the lab, which might give you the ability to do other things during that time. Maybe there will be more room for research students doing their bachelor thesis or the laboratories can serve for other tasks than teaching,” explained Dr Karlheinz Trebesius.



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“With Labster, you can perform experiments that cannot be performed in the lab because you do not have the equipment. So you can have a much broader spectrum of things that you can do. You can choose from the whole program, and the students can obtain practical experience about methods that you cannot offer them in your laboratory.”

— Dr Karlheinz Trebesius

An authentic teaching and learning experience

As an instructor, Dr Karlheinz Trebesius mentioned that Labster was very useful and fun to play. “The content is well based on scientific grounds, and it’s real and illustrative. So the students can understand different learning units very easily. Therefore, I think, it’s a quite good system to teach and a nice additional tool that is very helpful in transporting information to the students,” he explained.

When referring to distance education learning during the pandemic, Dr Trebesius thinks incorporating online tools will improve learning outcomes in the future. “I will also speak for my colleagues. I think we will use these digital opportunities more than we did before. Implementing online tools was a lot of work, but I think it will improve our teaching,” said Dr Karlheinz Trebesius.