

BUILDING LEARNING LABS AND INNOVATIVE LEARNING SPACES

Practical guidelines for school leaders and teachers

Case study GERMANY

edu.lab at Jakob-Fugger Gymnasium



This case study complements the European Schoolnet's publication "**Building learning labs and innovative learning spaces - Practical guidelines for school leaders and teachers**" (2019). Find the full report and other case studies here: fcl.eun.org/guidelines

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0, International License: <https://creativecommons.org/licenses/by-sa/4.0/>

Background and Inspiration

The Jakob-Fugger-Gymnasium was founded in 1879 and is nowadays a modern secondary school with two branches (STEM and economics). Although the school is not an international school, 750 students from more than 40 nationalities feel home in this building which is situated in the heart of Augsburg. The school is the only school in the whole region with a certified STEM profile as a member of the STEM excellence network of schools in Germany called MINT-EC. Due to the two branches which already has a lot of ICT lessons in the curriculum, the teachers were used to work with ICT in the classic way. In September 2018 the edu.lab was opened to enlarge the use of ICT and to offer a learning lab for new technologies.

Jörg Haas, Head of edu.lab project at Jakob-Fugger Gymnasium, Germany, first visited the FCL in Brussels in 2010 in connection with the EUN project Nanoyou.¹ Jörg recalls: *"My first impression was: Wow! There were so many technologies I was not familiar with. We had a tour and they showed us the different zones and I thought this could be good to have in my school or region."* However, at the time the school lacked the room to set up a similar FCL as it was larger than a normal classroom. Instead they started to look into the use of some specific technologies, e.g. interactive whiteboards.

Planning

Getting started

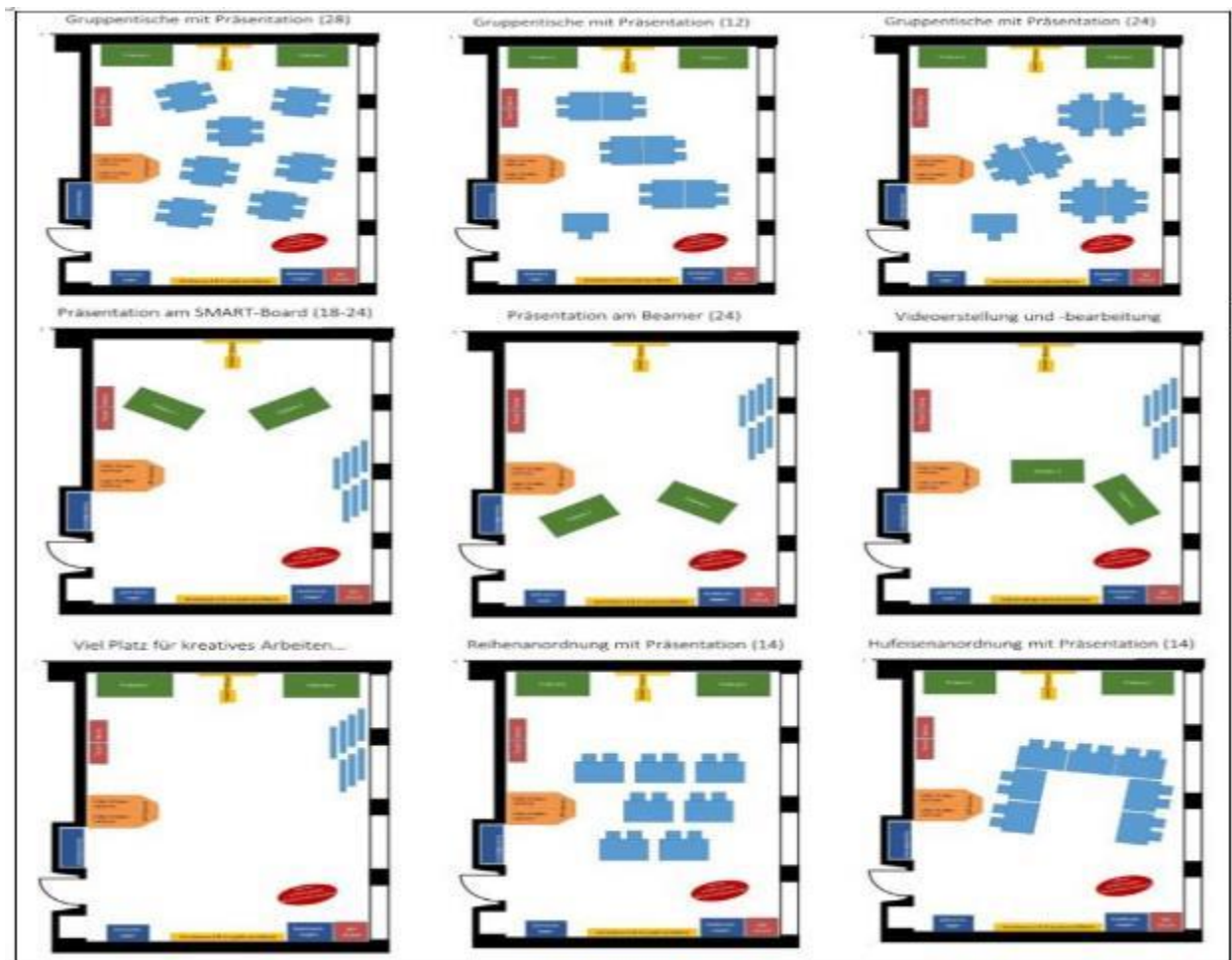
The project did not get started until 2016 and at that time the idea was to create a more modern computer lab. The school had two labs but, as the need for computers was increasing, it was difficult for teachers to book time slots in them. It was decided that a third lab was needed but the idea was to create something more flexible where students could do different things like project work and making things. The first idea was to model the lab quite closely on the FCL in Brussels including implementing learning zones.



Planning the lab 2016

¹ <http://nanoyou.eun.org>

Jörg shared these ideas with his colleagues and told them about the set up in Brussels. The feeling at that time was that Brussels is a good showroom, but the different zones would be complicated with classes of 30 students as there would be too many students doing completely different things. The teachers pointed out that most lessons involve one subject for 45 min and, although all the students might not be doing exactly the same things in that lesson, their activities would not be as dissimilar as science, making and communicating. Therefore, it was decided that an alternative to having different learning zones was to focus on creating spaces to suit different learning scenarios or use cases.



edu.lab layouts for different learning scenarios

A key idea was to find resources already in the school and collect them into one room. There was already an interactive whiteboard (IWB) in a single classroom but not in a lab which anyone could book to use. Also, there was a 3D printer in a physics lab which was moved into the new FCL. The school owned two or three video cameras but most of the time no one knew where they were. In the new FCL teachers are not allowed to take equipment away, so it is always there when other teachers and students want to use it.

Obtaining funding

Planning for edu.lab took a long time due to the expected cost and initially the school felt they would not be able to achieve something like the Brussels FCL. Jörg wrote more than 200 emails to companies seeking help, materials and financial support. The companies which answered were helpful, but there were only ten of them, of which five were a great help. These were non-German companies not connected to the school previously and some of them have now been working with the school for years. Finally the school recruited 12 companies and other organisations as partners. The companies provided equipment for the new lab and the local education authority paid for the building work and the networks that needed to be installed.

Drivers and aims

The main driver was the shortage of computer labs but the school also felt the need for a room where students could interactively use different technologies, e.g. robots, 3D printers and video production technologies. These would enable many different activities for the students. Another very important decision was that it should not only be a STEM lab, it should be possible to use the lab for other subjects, e.g. languages.

Key objectives were:

- To create a space in which all teachers would be able to find ways to use modern technologies and experiment with different pedagogical approaches.
- To enable teachers to enter a room where everything is operational so they can start immediately.
- To make it unnecessary for teachers to spend a lot of time studying the technology; after a short introduction they should be able to start using it.
- To make computers safe to use but without too many restrictions on their use by teachers and students.

Involving stakeholders in the planning process

Jörg found that *"you have to convince the teachers, although convincing students and parents is quite easy"*. During planning, the students helped a lot and as did some of the teachers. Jörg comments: *"In every school some teachers are open to digital transformation and it is important to find them and to get them to help in convincing the others. If you are alone you will stay alone"*.

Implementation

Jörg and one colleague were responsible for the computers when setting up the FCL. He looked at the EUN FCL Toolkit and videos of others experiences for information and advice but he says *"you always have your own special problems to solve that are not the same as other schools"*.

Building and equipping the FCL

The first thing installed in the lab was flexible furniture. Folding tables and school desks were made suitable for computers and the modern seating concept was implemented with partner companies *Topstar and Brasil Möbel*. Then mobile computers were introduced and equipment was installed on the walls allowing more room so that students can sit on the floor if they wish to. The SMART Board was rebuilt and the chalk board replaced by a whiteboard. A state-of-the-art LAN and WLAN were installed. 2-in-1 tablets and two computers for CAD/CFD and video editing were purchased and a tablet cart and two 3D printers were purchased cheaply on eBay. CADENAS GmbH donated two high-performance computers and a 3D screen. The *19-Zoll Tech Company* donated the teacher's workplace/station where they can connect their laptop. The company Dr Kaiser provided the administration system in the edu.lab and donations from Förderverein Jakob-Fugger-Gymnasiums, VDI Bezirksverein Augsburg, the parents' council, Smartsoftlab and Bernhard Koch purchased other equipment and small parts, e.g. adapters, cables. Jörg commented that the lighting and acoustics could have been better but there were no serious problems. There was a minor problem with noise but special blinds were used to decrease this and it was decided that users could live with a bit of noise as it was important to prioritise spending on technology.

Convincing the teachers and other staff

Jörg found that it is important to keep all the teachers updated about what is going on in advance and then present the ideas to them and advises: *"In every school you have to fight for a room if you want it and you have to fight for one in the best location and fight for it not to be just for teachers to use for other things."* With the IT and administrative staff, Jörg and his team showed them pictures and information about the FCL in Brussels and emphasised that there was nothing like it in Germany, so their school would be the first. Jörg suggests sometimes people are more likely to support projects offering them the kudos of being trailblazers.



Piloting and training

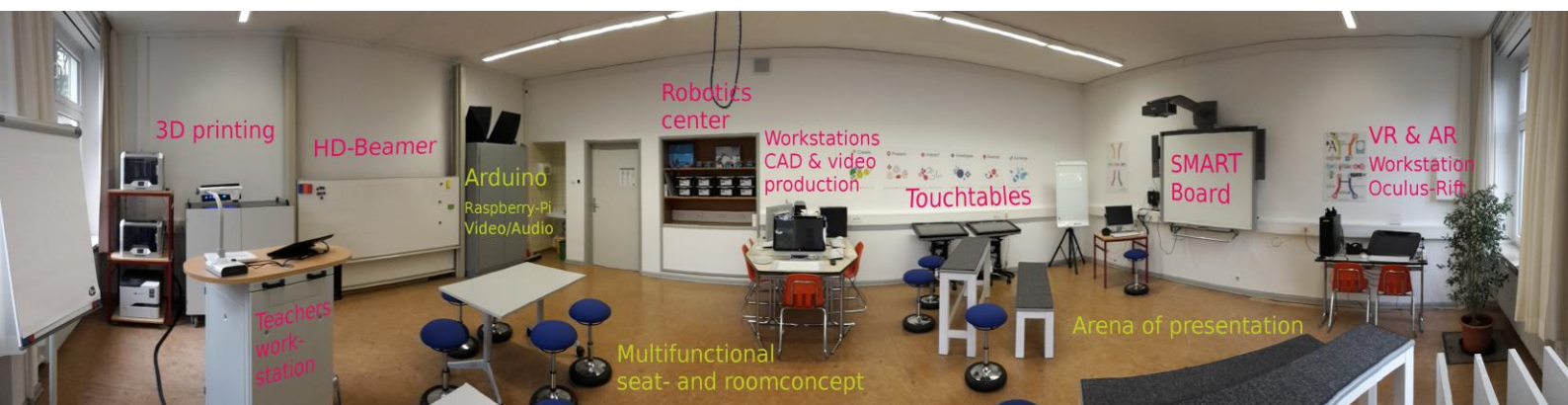
During the pilot phase in June and July 2018 only four teachers used the FCL, testing everything and finding issues. When the FCL opened in September 2018 there were five or six one-hour sessions for teachers. These sessions were used to show teachers what was in the FCL, how to use the equipment and how to work in the lab, including sharing the team's ideas about different approaches to teaching and learning.

Lessons learned during the start-up phase

The key lesson Jörg emphasised is: *"It is a lot of work, there were many hours when I thought it would never happen but eventually it is here."* Also there is a lot to learn, from finding ways to obtain equipment to learning how best to use it, and this should not be underestimated.

Using the learning lab

The FCL is available for all teachers to use now. The edu.lab consists of partially overlapping learning areas. Each area is characterised by four aspects: Physical space, Different resources, Changing roles of students and teachers, Support for different learning styles. The areas and their use align with the six learning zones in the FCL: Create, Develop, Exchange, Interact, Investigate and Present.



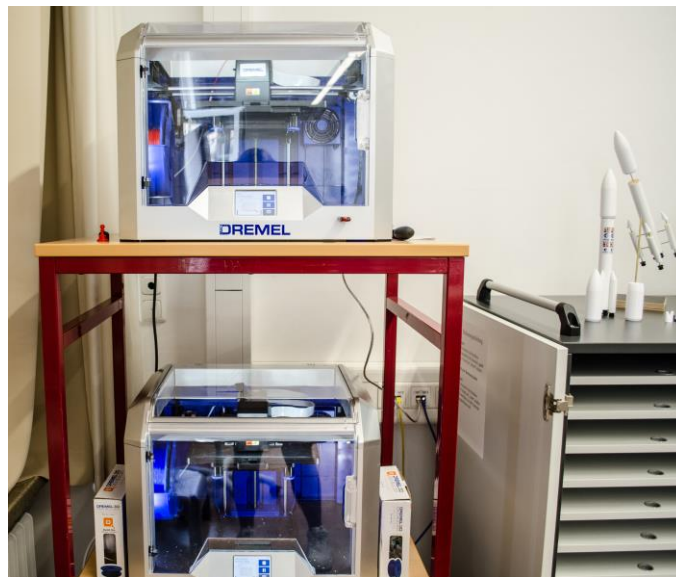
edu.lab layout

At the time of writing, edu.lab has only been live for two terms. There is a booking system for teachers using the room and bookings are increasing. Also Jörg says: *"I have not had complaints from teachers – no feedback is good feedback, they will soon tell you if they are unhappy!"*

The technologies

The room is now equipped with: a SMART Board, electronic flipchart (SMART kapp), video conferencing system, video cameras with greenscreen technology and lighting, 16 2-in-1 tablets with Wi-Fi, two interactive touchscreens, two high-performance CAD computers, HP Sprout multimedia computer with 3D scanner, high-performance VR computer with Oculus Rift VR glasses and 30 3D-glasses for mobile phone use for virtual excursions and 3D monitor, multifunctional teacher workplace

with second projector/DVD player etc., two Dremel 3D printers, one colour laser printer, eight LEGO robotics kits and eight mBot robots, 16 Calliope mini microcontrollers, 16 Arduino boards and 16 Raspberry Pi mini-PCs for the Internet of Things and Industry 4.0.



The “self-healing” system and technical support

The school’s policy is to allow students to use and experiment with everything in the FCL as they wish but it is important that everything always looks the same when teachers and classes come in. Therefore one of the commercial partners has implemented and supports a self-healing system for the FCL which restores things to “just like they were” before any changes or crashes. The school also has technical support from the city for the networks, which is normal for schools in the area, with one IT manager responsible for every 200 computers.

Impact on use of technology throughout the school

This has not really changed, partly because it is too soon but mostly because technology is not available in the other rooms. One idea was to use the lab to test technologies before buying more for the rest of the school, e.g. IWBs for every classroom. To date this has not happened but their use in the FCL has informed the decision not to buy IWBs for all classrooms. However, a teacher's station where they link up their laptop has been installed in all classrooms.

Impact

As the edu.lab has not been operational very long it is too early for reliable evidence of impact to be available. However, the school carried out a pre-test with teachers before they started to use the lab and the results of comparing this with post-use data will be available for the first evaluation in July 2020. Also the local university will soon start some research to evaluate the impact of edu.lab.

Benefits from commercial partnerships

When edu.lab launched there was a great deal of interest from the local press and television and, as the topic of digital transformation in schools is important, politicians also visited. This, and news of the support already received from others, encouraged commercial companies to want to become involved as partners; e.g. recently a company has sponsored use of augmented reality in classes. Also the desire of sponsors to publicise their involvement with the lab has the benefit of raising the profile of the school.

Pedagogy and teacher collaboration

Although it is early days, Jörg has noticed teachers are using the space more flexibly and some of his ideas about approaching teaching differently are already happening. There are also some signs that teachers are collaborating more and this will be encouraged at the annual teachers' conference. Also a buddy system has been proposed in which a teacher works with a preservice teacher buddy when using the lab. The school feels this could be a very effective collaboration as trainees have more time to plan.

The future

Plans for further development

In future the school plans to reach more teachers, as only about 50% of the teachers are using the lab now. The next step should be for teachers to use it to create more innovative teaching resources but they need training for this to have larger impact and to result in more specific use of the lab. A short teacher-training event is planned which will explain how to make a video in the lab and how to use a CAD system. At some point in the future the school may set up another FCL but probably it will not be exactly the same as edu.lab and may have less technology. This is partly due to cost but they also

feel a need to evaluate what is really needed before making decisions, after which they will need to raise money and convince people whose support they need.

Desired additional support

Jörg would like to meet with people running other labs to share ideas, solve problems and discuss questions like how to advertise, how to involve more commercial partners, etc. All labs have some common ideas but all are very different with their own different ideas, so there is potential for learning from one another.

Three pieces of advice for other schools

- Look for inspired colleagues to build a group.
- Ask local authorities if they like the idea, otherwise forget it.
- Use the popularity of the European Schoolnet FCL in Brussels and the fact that this is a pan-European initiative supported by Ministries of Education. If you say that schools in many countries are doing this and we could do it in our region too, people will be interested.



Information about the publication

This case study complements the European Schoolnet's publication "**Building learning labs and innovative learning spaces - Practical guidelines for school leaders and teachers**" (2019). Find the full report and other case studies here: fcl.eun.org/guidelines

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0, International License: <https://creativecommons.org/licenses/by-sa/4.0/>