

CUBE35: AV-supercharged educational space

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Abstract

In January 2021 a flexible, multifunctional, AV-supercharged educational space was completed on the Tilburg University campus in the Netherlands. It is dominated by a 7 metre-long interactive whiteboard equipped with several high-resolution cameras, professional-grade displays, long-range microphones and a high-end audio system. At a push of a button, the solution allows for intuitive distance and hybrid collaboration that gives everyone an equal chance to participate. Together, students, teachers and staff can continue to learn, innovate, and have fun, regardless of their physical location.

1 Background and context

EDUiLAB is the Center for Educational Innovation within Tilburg University, The Netherlands. EDUiLAB's office, known as CUBE35 and completed in January '21. It is in fact a flexible multifunctional education space dominated by a huge wall of whiteboards featuring state-of-the-art audio-visual technology. Here, different stakeholders meet and learn in a constant cycle of trial and error, where the learning curve is steep and the finishing line remains open.

[1] Kinly, Epson Europe B.V., Smit Visual B.V., Logitech Benelux B.V. and Extron Electronics

EDUiLAB's mission is to help teachers to develop, test and implement novel teaching methods, which in turn leads to effective, cutting-edge learning experiences. Innovation stems from collaboration and when initial talks about the design and furnishing of CUBE35 began, we wanted this 54 m² space to inspire collaboration, learning and innovation with the support of new technologies.

EDUiLAB collaborated closely with a consortium of private parties [1], all active in the field of audiovisual technology and applications. Together with an interior designer an innovative learning space was created. With its energetic colour scheme, mobile furniture and high-end user-friendly AV facilities, this space aims to immerse its users into an atmosphere that induces reactions linked to concepts such as "inspiring, interactive, challenging, dynamic".

EDUiLAB envisioned a collaborative learning environment that looks to the future and that effectively facilitates hybrid learning despite the many challenges it poses to both teachers and students. What confirms CUBE35 as a fully-fledged future-proof education space is the fact that it was preparing for a post-pandemic scenario even before the pandemic hit.

2 Features of the space

CUBE35's AV technology consists of 3 white boards that together with the interactive projectors, 4K webcams and document camera have multiple functionalities. The AV technology used in this room takes hybrid teaching and learning to the next level by providing a remote learning experience that almost completely resembles in-person learning thanks to the level of interactivity.

Seamless communication via spoken dialogue is allowed by 2 powerful microphones that pick up in-person students' contributions, so that online students can hear what is being said in the room. The communication flow is not interrupted by messages in the online conference chat or by the teacher having to relay in-person students' contribution back to the remote audience.



Figure 2: EDUiLAB Tilburg University Innovation room brainstorm

80% of nonverbal communication cues are also accounted for as cameras on opposite walls capture in-person users regardless of where they are sitting. This is in contrast with current hybrid teaching lecture halls where a wall of screens showing online students is placed behind the desks where physical

students sit, meaning that only the teacher is facing both audiences. The 3rd board and smaller screen opposite the boards show the gallery view of all online participants.

An additional document camera can be placed on any of the desks to broadcast images of objects being analysed or manipulated.

Ease of operation is allowed by the fact that pressing one single button will start the hybrid session. CUBE35 is unique in that it gives its users agency and independence. Despite the small “Silicon Valley” hidden behind the boards, such complexity still allows teachers to walk into the room, operate the facilities and run a session completely on their own. A true one-(wo)man show! While the concept can be scaled up by embedding the technology in larger spaces, this DIY potential remains unthreatened.

Analogue / Digital experience: the large white boards (148 x 222 cm) x 3 allow teachers to physically annotate content (preference of 90% of teachers). A 4K webcam capturing the 1st board allows online students to see what is being written in class, by making the teacher transparent.

The 2nd board projects slides used during presentations as well as shared-screen images.

The quality furniture aims to facilitate different forms of collaboration for up to 20 people. All furniture can be easily moved and stored in the room. It is lightweight, mobile, collapsible and stackable. The different elements of the furniture can quickly be adjusted as desired by 1 person to create a theatre, individual, or small group-work formation. Also the 4 desks can easily be turned into standing tables or used as whiteboards for small group brainstorming and agile scrum methodology sessions.

3 Impact

This project is a winner because the AV technology combined with the multifunctional character of the furniture makes CUBE35 an AV enabled multifunction educational space that enhances an innovative learning experience.

CUBE35 was completed in the middle of the pandemic, during which instruction is not allowed to take place on campus. It is therefore still not possible to include in this executive summary explanations on why and how CUBE35's solution has proven to be effective. What cannot be denied however is the fact that the conceptualisation and implementation of CUBE35 are a pioneering one in nature. It has resulted in the creation of an AV solution that was, until recently, unique in the Netherlands. No other spaces offered the multiple learning experiences provided by EDUiLAB to teachers and learners alike. While external circumstances have so far prevented CUBE35 from operating at full capacity, waves of inspiration have already reached other educational institutions in the country. LearnAnywhere has since installed similar solutions at 2 other universities. Far from being protective about CUBE35 uniqueness, the initial project already envisioned a positive domino effect based on which the CUBE35 model is spread beyond TiU's boundaries so that other institutions can learn from this.

4 Testimonials

“The EDUiLAB Innovation Room not only offers the opportunity for our lectures to give the best possible education, but it also connects our national and international teaching networks by using the state of the art AV-technology.”

On behalf of the Executive Board Tilburg University, Prof. Prof. dr. Wim B.H.J. van de Donk & Prof. dr. ir. Jantine (A.J.) Schuit

“During the corona period, we had to pull out all the stops to make education available digitally from one day to the next. We were not prepared for this, but everyone managed to make the transformation. It is clear that education has changed for good, with 'hybrid' becoming the new concept.

The question we asked ourselves was how we could facilitate this concept as effectively and easily as possible, where students have to be able to see each other, the teacher can see all the students and information can be shared and supplemented on the spot. The concept of the innovation room is a good example of cooperation between various market parties and the education sector.”

Director Library and IT Services Division drs. ing. Corno Vromans

“All a teacher needs to do is walk in, push two buttons, and start teaching? That’s awesome, sounds even easier than teaching from home!”

Carlie Rosmalen and Aukje Wijnen, Teachers in Business and Marketing (Tilburg School of Economics and Management)

5 References / Citations

Tilburg University (2021) Tilburg University's EDUiLAB Innovation Room. YouTube. Retrieved April 30 2021, from: <https://www.youtube.com/watch?v=PA9gecmVaYA>

6 Author biographies



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