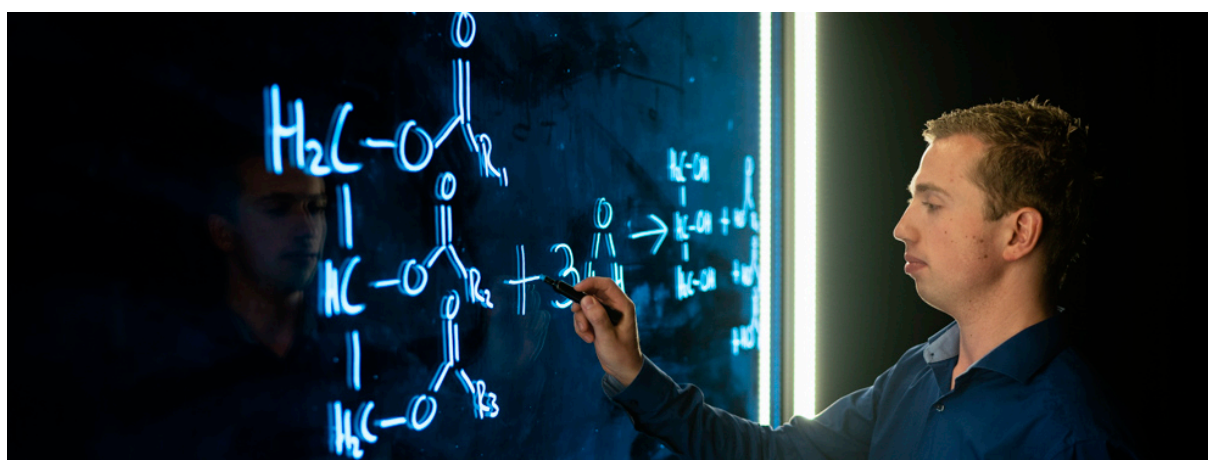


Teaching & Learning Lab, Activity Report 2018

Utrecht University



June 2019

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Utrecht University

TLL Teaching & Learning Lab

Executive summary

The Teaching & Learning Lab (TLL¹) of Utrecht University (UU) is an experimental learning space aimed at inspiring teachers and students to redesign and rethink their teaching and education, with a strong focus on the physical learning space. Equipped with a new and flexible set-up, the TLL implements the Utrecht educational model: small group learning, active and student centered learning. While using the facilities of the TLL, teachers develop a mind-set focused on redesigning and strengthening of their teaching.

The TLL consists of two learning spaces for innovative teaching practices and a studio for recording educational clips. During the academic year, the occupancy rate of the TLL lecture/ experimentation rooms was around 70%.

In numerous courses, workshops and research sessions activities the TLL succeeded in reaching many teachers, enticing them to challenge and improve their teaching practices. The TLL hosted a total of 14 higher education courses. In addition, a summer course, over 50 training sessions and workshops were held as well as an escape room for teachers. For secondary education, the TLL has hosted 45 U-Talent classes. In monthly inspiration cafés, professionals with an interest in education innovation gathered and in November, over 200 visitors participated in the TLL Autumn Festival. The TLL attracted high-level national and international delegations from a variety of education institutes, policy-makers and researchers. In the studio, 65 knowledge clips were recorded. The studio is also used for live webinars, media training sessions, and student projects.

An important result of TLL's educational experiments is the opening of an Active Learning Classroom at the Bolognalaan, Utrecht Science Park. In addition, Real Estate & Campus and the faculties of Humanities and Law, Economics and Governance have used the Teaching & Learning Lab as an inspiring environment to explore the requirements of a future educational cluster in the city centre.

New initiatives include the use of eye tracking for research purposes, introduction of equipment for distance learning and set-ups for augmented and virtual reality. The fourth TLL Autumn Festival, scheduled for November 21st, 2019 will be organised in close cooperation with Governance Lab, city campus and Coll@b, UMCU.

The TLL is initiated and hosted by the Freudenthal Institute² of the Faculty of Science and supported by the Faculty of Science³, the Centre for Academic Teaching⁴ and the Educate-IT program⁵ of Utrecht University. In addition, the TLL cooperates with suppliers of equipment, including the companies Ricoh and HP.



¹ <https://teachinglearninglab.nl>

² www.freudenthalinstituut.nl

³ www.uu.nl/en/organisation/faculty-of-science

⁴ <https://www.uu.nl/en/education/centre-for-academic-teaching>

⁵ www.educate-it.uu.nl/en

1. TLL, a short tour

1.1 Lecture/experimentation rooms

The TLL has two lecture/experimentation rooms:

Large room (BBG 3.22)

The large lecture/experimentation room (30 to 40 persons) is suitable for a variety of educational activities and pedagogical research. The set-up of the floor can be rearranged using mobile scrum tables (6-8 persons) that are adjustable in height, small two-person tables and chairs, and there are benches along the windows. There is an interactive wall for team work (*Nureva span*). On request, a lecture or lesson can be recorded using either fixed observation cameras on the ceiling, or 360 degrees-cameras.



Large lecture/experimentation room

Small room (BBG 3.19)

The small lecture/experimentation room (up to 25-30 persons) is used for workshops, trainings, lectures and inspiration cafes. In addition, it can serve as break-out room for the large room. Similar to the large room, it can be furnished with mobile scrum tables, small tables, and chairs.



In both lecture rooms, additional equipment can be placed, such as one or several Interactive Whiteboards, learning tables (horizontal multi-touch tables), short-throw beamers and laptops.

1.2 Studio

In 2018, lecturers and other users, including students, have used the studio for a number of purposes and recording options.

Professional operator-supported recordings

In the studio, an operator supports the lecturer in preparing the online lectures/webinars etc., performing the studio sessions (studio-set-up, light, sound) and afterwards editing the video material. In addition to a simple video with a white or standard background, users can choose to use a greenscreen, lightboard or interactive whiteboard.



Studio

In a greenscreen video, any picture, illustration or movie can be integrated in the background, during editing. The lightboard acts like a traditional blackboard – the lecturer speaks while writing and drawing – except that he is filmed through a glass plate, the lightboard. As a result, those who watch the clip see the lecturer facing the camera, and the text on the lightboard, which is mirrored in the recording, is flipped during editing, so that it can be read. The lecturer can use an interactive whiteboard for his presentation and is filmed next to it.

Occasionally, the studio crew films on location, e.g., in lecture rooms, in corridors or even in the open air. [More information](#)⁶.

Do-it-yourself recordings

The TLL studio also contains a set-up for Do-It-Yourself recordings, which can be reserved by lecturers who want to make a clip themselves and store it in Mymediasites. The Do-It-Yourself set-up is one of [five](#)⁷ at UU (campus and city centre) installed by the Educate-IT program.



For a quick overview of the possibilities that TLL offers, watch this [clip](#)⁸ (1'16'')⁹.

Collaboration with Ricoh

Utrecht University cooperates with Ricoh company in innovating educational tools. TLL can make use of Ricoh equipment, including interactive whiteboards, short-throw beamers, 360° cameras, learning tables and communication software. The whiteboards and short-throw beamers are used in the lecture/experimentation rooms, the learning tables in master student projects and the 360° cameras in the Monkey Reality project in which recordings of monkeys are made for educational purposes. The tools are tested in various projects, including both distance learning and daily use in the lecture rooms.

⁶ <https://teachinglearninglab.nl/studio/>

⁷ <https://educate-it.uu.nl/zelf-aan-de-slag/>

⁸ <https://www.youtube.com/watch?v=BNnxnvd33-k&feature=youtu.be>

⁹ <https://www.youtube.com/watch?v=BNnxnvd33-k&feature=youtu.be>

2. Active Learning Classroom: from TLL pilot to spin-off

At the end of 2018 / start of 2019, a new Active Learning Classroom has been installed on the campus. This was a direct result of experiments at the TLL, where starting in 2017 science lecturer Jasper van Winden spent two years converting TLL into an Active Learning Classroom (ALC).

The facilities manager for the faculties of Science, Geosciences and Social and Behavioural Sciences shared Jasper's enthusiasm and offered him the opportunity to design an innovative classroom at Bolognalaan 101. In the new ALC, the lecturer stands in the middle of the room, which reduces the distance to the individual students. The students sit or stand at six-person tables (like in the TLL), each table with its own screen and whiteboard. The classroom features extensive facilities for screen management: the lecturer can show his/her presentation on every screen, the students can share a screen to work in groups, and interesting work from one table can be displayed on one or more other screens as needed. This helps to increase the interaction between students and lecturers, and enables the students to work together effectively. The main advantage of the new classroom is that it is fully furnished for optimal active learning, so teachers do not have to rearrange the tables and chairs in advance of a session. This process highlights the concept of the TLL: bring new ideas and concepts for teaching to the campus, test them and, if they work, spread them across the campus.



The new Active Learning Classroom

Jasper van Winden regards the TLL as the nursery for new teaching concepts at the university: "It's a place where we can try out new ideas – and just as importantly – let new ideas fail. The goal is to have successful concepts spread throughout the university, and the ALC is the first step in that direction. I think that people are starting to understand that the space determines a large part of how you teach, and that we'll have to adjust our classrooms and auditoriums at the UU to accommodate our vision of small-scale, activating teaching", Jasper explains. Several other innovative classrooms have already been set up at UU, and the university is experimenting with more such new concepts.

3. Higher education

3.1 Courses for ECTS

A number of regular courses (for ECTS) was staged in the TLL.

In the bachelor course 'Meet your brains', lecturer Ferdi Engels tested the approach of *reciprocal peer tutoring*: students from different disciplines work in pairs, learning from one another. Using TLL's flexibility, he could rearrange the classroom, test new teaching formats and improve the course. [More about this course¹⁰](#).

In the Geosciences master course 'Techniques of futuring', the flexibility of the room allowed lecturer Jesse Hoffman to hand over the learning process to the students. The students study questions such as "How do we deal with an uncertain future?" and "How do we work towards a society that no longer uses fossil energy?" [More about this course¹¹](#).

In the course 'Scientist advisor', taught by Jasper van Winden, third-year biology students carry out projects for customers outside university. The set-up allowed the students to interact more with each other and with the lecturer than in a regular room. The seating/standing tables also proved to support the group dynamics. [More about this course¹²](#).

The TLL hosted also the *co-creation* course 'Pharmaceutical Humanities' under the supervision of Anne van Veen, Toine Pieters and Rik van Gangelt. The setting of the TLL allowed the students to iteratively design a new elective master course for the Department of Pharmaceutical Sciences. [More about this course¹³](#).

Once or twice a year, the lecture rooms also host [Co-Challenges¹⁴](#), two-week university-wide elective courses for 25-30 students (third year bachelors and masters). The municipality of Utrecht provides the challenge and after two weeks of hard work, student teams pitch their ideas and vision on solutions to the challenge. In the October challenge, the topic was: 'Co-create: life's professional challenges'

In 2018, the following courses were taught in TLL:

Month	Course	Target Group	Nr of sessions	Faculty / organisation
Jan	Techniques of Futuring	Geosciences masters	2	Geosciences
Feb	Pharmaceutical humanities	Pharmacy masters	4	Science
Feb	EduChallenge - Create Your own Course	All UU students	1	Centre for Academic Teaching
Feb-Apr	<i>Wetenschapper in Advies</i> (Scientists as advisors)	Science bachelors	12	Science
Feb-Apr	<i>Bèta in Bedrijf en Beleid</i> (Science in entrepreneurship and policy)	Science bachelors	10	Science
Ap	Energy in the built environment	Geo masters	1	Geosciences
Apr	Co-create: Life's professional challenges	All UU students	10 days	Medicine

¹⁰ <https://teachinglearninglab.nl/2018/12/03/reciprocal-peer-tutoring-studenten-van-elkaar-laten-leren/>

¹¹ <https://teachinglearninglab.nl/en/2017/03/06/handling-the-learning-process-to-the-students/>

¹² <https://teachinglearninglab.nl/2017/06/21/ieder-groepje-studenten-een-eigen-scherm/>

¹³ <https://pharmaceuticalcoursedesign.wordpress.com>

¹⁴ <https://teachinglearninglab.nl/en/2018/06/14/letting-students-work-on-their-skills-the-tll/>

Month	Course	Target Group	Nr of sessions	Faculty / organisation
Jun	Inverse Problems in Imaging (mastermath)	Mathematics masters	1	Science
Sep-Oct	Biology of Disease	Biomedical students	4	Medicine
Sep-Oct	Meet your brains	Pharmacy bachelors	6x2	Science
Sep-Oct	Communicating Science with the Public	Science masters	3	Science
Sep-Oct	Integrative Bio-Inspired Design: the Systems Level	GSLs masters	3	Science
Sep	Introduction to Science Education and Communication	Science masters	2	Science
Nov-Dec	Techniques of Futuring	Geosciences masters	5	Geosciences
Dec	Societal challenges for life scientists	GSLs masters	1	Medicine

In 2018, a total of 71 teaching sessions (ranging from 2 hours to full days) of ECTS-courses were taught in the TLL. Lecturers are very positive about the TLL. Most refer to the flexibility of the rooms. A few quotes:

“I see the TLL as the nursery for new teaching concepts at the university. It’s a place where we can try out new ideas – and just as importantly – let new ideas fail. The goal is to have successful concepts spread throughout the university, and the ALC is the first step in that direction.”
(Science lecturer)

“The flexible set-up and tools in TLL are unique, you cannot do this in a regular learning space.”
(Science lecturer)

“Very bright and flexible room. Urges students to work.” (Geosciences lecturer)

“Flexibility, scrum tables for standing – I do not want to have regular rooms anymore!” (Science lecturer)

“For space to think and move, bright, flexible set-up. Makes students think about innovation, activates because it is not a room with just tables and chairs.” (PABO-HU lecturer)



3.2 Escape rooms

The [Mastermind Escape room](https://mastermind.uu.nl)¹⁵, initiated by the Educate-It program, offers an array of educational tools that participants need to use in order to Escape from the room. By decoding the room's mysteries in 60 minutes, lecturers are introduced to these tools. In 2018, the Escape room was developed and pilot-tested in the TLL. It travels around the campus (USP and city centre); the TLL hosts the Escape room twice a year for a full week.



Mastermind Escape room

3.3 Summer & winter courses

The TLL hosts the annual two-day summer course and winter course by Educate-it, focusing on the use of IT Tools in teaching. In 2018, the topic of both courses was 'Strengthen your teaching'.

3.4 Workshops and training sessions

In 2018, over 50 workshop and training sessions have been organized in the TLL, including training sessions for the various ICT-tools, educational approaches, and masterclasses on curriculum design. Some highlights:

- Mathematics D Online Offline day,
- Workshop on how to use mobile phones in class by Zachary Walker,
- CAT special interest groups on videos and co-creation,
- Brainstorms on activating formats for education,
- Workshop 'Reaching the press',
- Workshop 'More added value from teaching'.

4. Secondary school teaching: U-Talent classes

4.1 U-Talent

Both lecture rooms are extensively used by [U-Talent](https://u-talent.nl)¹⁶, a collaboration between Utrecht University, HU University of Applied Sciences Utrecht and over 40 partner schools from the Utrecht region. Its objective is to strengthen regional science education in secondary education and in the bachelor of higher education, and to improve the transition from secondary to higher education. As well as science classes, U-Talent organises master classes on language, culture, people and society. In 2018, 45 classes have been organized, in which 26-30 vwo-students (aged 12-18) participated. In addition, the TLL hosted the conference 'Learning from each other' for U-Talent teachers as well as students.

4.2 Girlsday

During [Girlsday](https://teachinglearninglab.nl/2018/04/19/girlsday-teaching-learning-lab/)¹⁷ in April, 23 girls from Broklede school were introduced to the Faculty of Science and its possibilities. Venue: the TLL. As well as taking part in activities such as cooking proteins, glass blowing and solving mathematical pizza problems they programmed a hit song.

¹⁵ <https://mastermind.uu.nl>

¹⁶ <https://u-talent.nl>

¹⁷ <https://teachinglearninglab.nl/2018/04/19/girlsday-teaching-learning-lab/>

5. Research

The TLL accommodates research projects, including lesson studies and the study of actual classroom situations. The combination of flexibility, technical equipment and recording facilities makes the TLL the ideal setting for studying didactics.

Mathematics teacher and PhD Marianne van Dijke-Droogers used the TLL for studying classroom settings in which 14-15 year old students worked on statistics assignments.

The TLL also hosts lesson studies. A lesson study is a process for teaching improvement, in which small groups of teachers collaborate, discussing learning goals, and planning an actual classroom lesson (called a 'research lesson'). In this classroom lesson, they then observe how their ideas work in a live lesson with students, and report on the results so other teachers can benefit from what they learned. In 2018, a total of 19 study sessions took place in the TLL. Wouter van Joolingen discusses the [use of observation cameras for recording lesson studies](https://teachinglearninglab.nl/2018/05/22/ervaringen-wouter-joolingen-observatiesysteem)¹⁸.



Studying classroom interactions

¹⁸ <https://teachinglearninglab.nl/2018/05/22/ervaringen-wouter-joolingen-observatiesysteem>

6. Events

6.1 Inspiration cafés

In 2018, the TLL hosted 7 inspiration cafés, shown in the table below. In these cafés, UU and external guest speakers present an educational approach, a tool, a new product etc. Over a drink, participants can interact with the speaker.



Inspiration café 'E-learning environments - students' expectations'

Date	Speakers (all UU)	Topic
10 Jan	Laurens van Meeteren, Biology	Team Based Learning
8 Feb	Renée Filius, University Corporate Offices	E-learning environments - students' expectations
12 Apr	Daan van Loon, University Library	Open teaching materials
31 May	Vincent Crone, Department of Media and Culture Studies	Good teachers
14 June	Suzanne van Hoogstraten, University Corporate Offices	Co-creation: designing teaching with students
13 Sept	Irma Meijerman, Pharmaceutical Sciences	Scholarship of Teaching & Learning
11 Oct	Veronique Schutjens, Human Geography and Planning	'XChange' training exchange students in using their experiences for employability skills
8 Nov	Jeroen Vermeulen, USBO	Community Service Learning

6.2 Tours

A wide variety of institutes and delegations visited the TLL. The visits included among others:

- Members of the University's Executive Board (Anton Pijpers, Annetje Ottow)
- Dean of the Faculty of Science (Isabel Arends),
- Member of the House of Parliament (Dennis Wiersema),
- UMCU, ROC Midden Nederland, Leiden University,
- Delegations from Kazakhstan, Iran, Australia, Milan, Brussels.

In 2018, the TLL hosted 25 tours.

6.3 Autumn Festival

Every autumn, the TLL organizes the TLL Autumn Festival. In 2018, over 200 secondary school teachers and students, university lecturers, partners from industry, policy-makers, and researchers visited the festival, up from 150-200 in 2016 and 2017. They could attend 44 sessions on topics such as active learning classrooms, new educational approaches, new tools, and AR & VR. Educational regional institutes Hogeschool Utrecht, HKU, ROC Midden Nederland, as well as regional secondary schools gave guest lectures and workshops. In 2018 the festival was opened by Isabel Arends, dean of the Faculty of Science, Ralph Meulenbroeks, lecturer, and Judith Tielen, member of the House of Representatives. Prior to the festival, EduTech companies based in the Utrecht region organized a well-visited session about the digitalization of teaching. Participants of the blended Digital Higher Education Summit of LERU (League of European Research Universities) that took place in November 2018, also visited the Autumn Festival.



TLL Autumn Festival 2018

[Photo impression of the 2018 festival](https://teachinglearninglab.nl/foto-impressie-teaching-learning-lab-herfstfestival-2018/)¹⁹.

6.4 Other events

The primary aim of the TLL is hosting education-related events, such as courses, workshops, challenges and educational research. However, when available, the rooms are also used for research meetings (in 2019: 28), PhD meetings (5), vision meetings and workshops. In addition, conferences were organised on biology didactics and regional networks of secondary & higher education (*VO-HO netwerken*).

¹⁹ <https://teachinglearninglab.nl/foto-impressie-teaching-learning-lab-herfstfestival-2018/>

7. Studio recordings

The studio crew built on the previous (pilot) year. A variety of videos was recorded, for both educational and promotional purposes, inside as well as outside the studio.

7.1 Lightboard recordings

Especially the use of the lightboard has been a success. In 2018, a total of 35 clips have been recorded using the lightboard, by lecturers and for students' projects. Most of these clips have been used for educational purposes. The lightboard clips recorded in 2018 were viewed 1150 times (12 May 2019). In addition, the lightboard has been used in real time twice for webinars with LERU-partners abroad.



Lightboard recording

Course / module / project	For students	Nr of clips	Faculty
Philosophy	Geosciences	1	Geo sciences
Mathematics	Geosciences	1	Geosciences
PhD-training	PhD students	1	Science
Using futures for hedging	REBO students	1	Rebo
Public value management	REBO students	1	Rebo
Entrepreneurship and project management	Royal Conservatoire The Hague	2	HKU
Mathematics - regression	Social science students	2	Social sciences
Physics	Secondary school	2	Science
Mathematics	Hogeschool Utrecht	1	Science
Public Communication with the Public	Master students	4	Science
Basics of mathematics and physics	Chemistry bachelors	9	Science
Mathematics D-Online	Secondary school	6	Science
Introduction to the Lightboard	Lightboard users	1	Science
Girls' day	Participant Girls' day	1	Science
Nat4all	Physics teachers	1	Science
Biology didactics	General	1	Science
Motivation	General	1	Science
Atomic structure	Secondary school	1	Science

7.2 Recordings without a screen

In 2018, 30 clips without a screen as well as recordings of courses and events on locations outside the studio were made.

Course / module / project	For students	Nr of clips	Faculty
Introduction of TLL equipment	TLL users	2	Science
Chem4all lectures	Chemistry teachers	5	Science
Freudenthal education	Students of didactics	3	Science

Course / module / project	For students	Nr of clips	Faculty
Freudenthal research	NA	3	Science
Public Communication with the Public	Master students	1	Science
Chemistry conference registration	Chemistry teachers	2	Science
CERN visit registration	U-Talent	1	Science
Lecture Kathy Steckles at NWD	Math teachers	1	Science
Lecture René Filius, science café	General	1	Science
PR video's students Faculty board	Students	2	Science
Media training	UU researchers	5	Various
Breaking Science pitch	General	1	Science
Mineral Streak test	Students geoscience	1	Geosciences
Webinar	Students Indonesia	1	Science
Masterclass 'Program a hit song'	Secondary school students	1	Science

7.3 Whiteboard and greenscreen recordings

The studio facilitates recordings in which the lecturer is positioned next to a whiteboard. A total of 4 whiteboard clips have been produced as well as one recording using the green screen.

[Example of a whiteboard recording](#)²⁰.



Interactive Whiteboard recording

Course / module / project	Target Group	Nr of clips	Faculty
Mechanisms of toxicity	Students Institute for Risk Assessment Sciences,	1	Science
Education & pedagogy	Students social sciences	2	Social sciences
Cultural related context for math and science	Students of science didactics	1	Science
E-module 'My teaching in focus' (greenscreen recording)		1	Educate-it

7.4 Do-it-yourself studio

The Do-it-Yourself set-up was used twice by individual teachers and four clips were made for an online project with Indonesia (see 6.3). The studio has been used for broadcasting webinars during the blended conference 'Digital Higher Education Summit' of the League of European Research Universities.

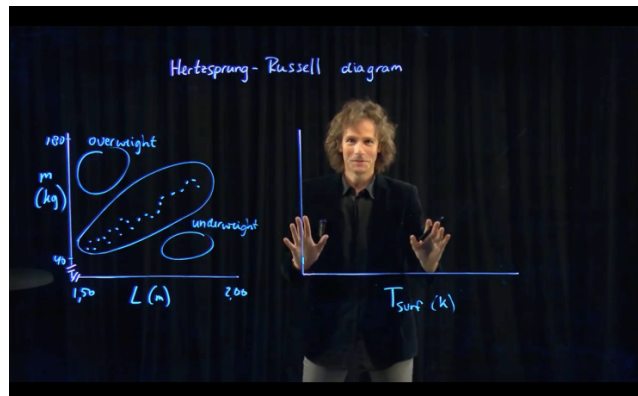
²⁰ <https://www.youtube.com/watch?v=TNre9UOBCEA&feature=youtu.be>

8. Projects

8.1 Online learning - Special Relativity online course

This Freudenthal Institute project aims to develop a course on Einstein's special relativity theory for in-service physics teachers. In this project, researcher Ralph Meulenbroeks compares a 100% online course with a blended version of that course. After the start in 2017, in which a first set of lightboard clips was recorded, all the learning materials for the course, including video clips, assignments, problems & solutions, trial exams, have been prepared and tested within a blended

version of the course. Furthermore, a study on the intrinsic motivation of the students has been performed (Lieke Marijnen, graduated April 2019). This study shows that intrinsic motivation is kept high by teacher-student and student-student interaction, both in online forums and in face-to-face contact. This material is now to be assembled and ordered into an online course. [Exemplary clip](#)²¹.

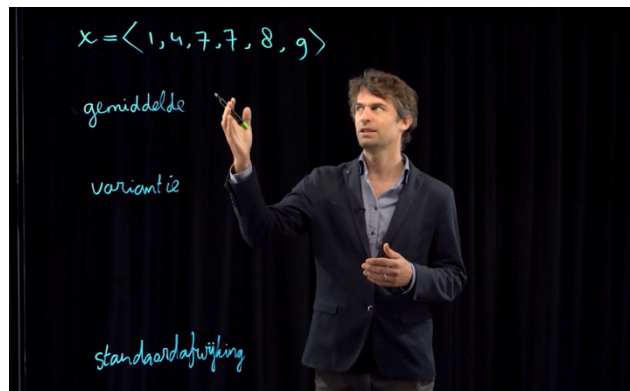


8.2 Online learning - Mathematics D online course

For secondary school children who are taught the subject Wiskunde D (Mathematics D) Rogier Bos of the Freudenthal Institute developed an online course. Because of a shortage of mathematics teachers, teaching a subject which is followed by only a few students per school is problematic. By offering an online version for havo (one for vwo already exists), students can continue following this subject.

In 2017 and 2018 light board clips for the Mathematics D online course were recorded.

This will be continued in 2019, and in 2019 the course will be implemented and evaluated. [Exemplary clip](#)²².



8.3 Online course about contexts and models in mathematics education for Indonesia

For pre-service mathematics teachers at Palembang University in Indonesia, Michiel Doorman of the Freudenthal Institute developed an online course in mathematics education as well as live online coaching. In 2018, the course was piloted, using clips recorded in the studio, with circa 30 Indonesian students. TLL hosted three Skype meetings for face-to-face contact with these students. Students presented their findings from Indonesia, and lecturers discussed their work and provided suggestions for improvement. The pilot has been evaluated by one the Freudenthal Institute SEC-master students.

In 2019, the course will be integrated in the Indonesian curriculum and the Freudenthal Institute will look for funding for support during the course.

8.4 Future learning spaces

²¹ <https://www.youtube.com/watch?v=12YbeHXwbuA&feature=youtu.be>

²² <https://www.youtube.com/watch?v=oJ3fyhm9siw&feature=youtu.be>

In 2018, the [Learning Spaces project](https://educate-it.uu.nl/en/future-learning-spaces/)²³ kicked off. In this project, funded by Educate-IT, the requirements and prerequisites of living up to Utrecht University's ambitions and educational vision for learning environments are investigated. The lessons and experiences learned from TLL are part of this project. These will result in a valuable knowledge base that will inform the final set of requirements for future-proofed designs of different learning spaces.

8.5 Design-based mathematics learning

For design-based research on mathematics learning, the large learning table serves as the perfect equipment. Its use enables post-doc Anna Shvarts to elaborate embodied tasks that offer the students an opportunity to 'embrace' mathematical concepts, such as a parabola, area of a rectangle or a sine graph. The learning table provides continuous feedback on the student's movements along the table surface, thus allowing to establish new sensory-motor types of coordination that ground the target mathematical concepts. [More embodied mathematics learning](https://digtep.sites.uu.nl/)²⁴.



Demonstrating embodied tasks on the learning table

8.6 Monkey Reality

In this project, footage of the behaviour and activities of a group of long-tailed macaques at BPRC is collected by placing one of TLL's 360° cameras both inside and in the outside enclosure of the monkeys. This footage is used for both educational and research purposes.

²³ <https://educate-it.uu.nl/en/future-learning-spaces/>

²⁴ <https://digtep.sites.uu.nl/>

9. Preview on 2019/2020

In 2019, various new initiatives are scheduled for both educational and research purposes:

Research using eye tracking

For studying students' visual attention during assignments, an eye-tracker, which records eye-movements, is very useful. Its use allows assessing the stage of learning and the problem-solving strategy. In 2019, TLL will purchase an eye tracker for studying the engagement of students with a variety of embodied designs for mathematics, including topics such as trigonometry and histograms. During the student tasks, the eye-tracker is fixed on a participant's forehead, preserving freedom of movements and gestures.

Distance learning

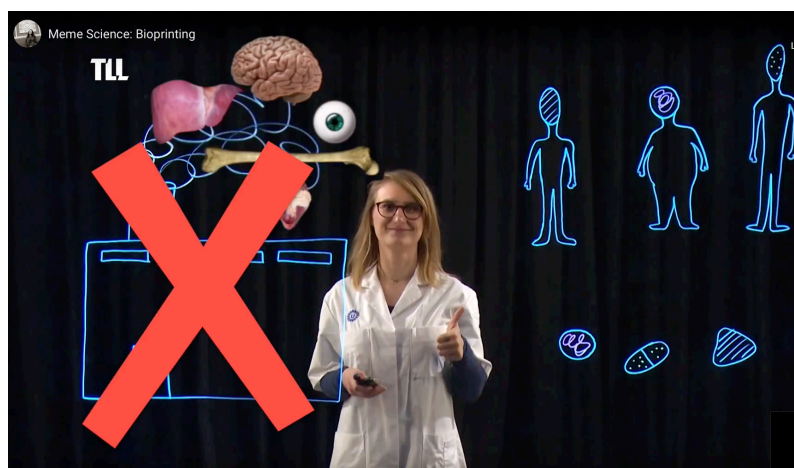
TLL will host a distance learning set-up, where lecturers can cast a webinar and interact with their students in several locations.

Teaching

An increasing number of lecturers is expected to book the lecture rooms as well as the studio for making clips. Those who find that their time slot for the TLL is already booked can now use the active learning classroom at the Bolognalaan.

New didactic tools

TLL staff regularly scout new teaching tools. If needed and feasible, new approaches or tools will be acquired and implemented in the TLL.



Clip produced by students for a science communication course

Project results

Projects using the studio such as the 'Special Relativity' and 'Mathematics D' online courses are expected to yield results in 2019.

Autumn Festival

On 21 November 2019, the fourth TLL Autumn Festival is planned. The festival will take place in close collaboration with UMCU's Coll@b and Governance lab in the city centre.

Augmented and virtual reality

The added value of augmented and virtual reality for model thinking in science learning is evident, e.g. for learning about for instance blood circulation or enzyme activity. In spite of the availability of teaching materials, secondary school teachers hardly make use of these. Therefore, the Freudenthal Institute plans to study the (impediments for) uptake of these technologies in secondary schools. For these projects, new equipment, including the Hololens 2, will be acquired.

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Photography:

- Ivar Pel: pages 1, 2, 7, 8 (upper), 11, 15, 17
- Studio TLL (stills): pages 4, 10, 12, 13, 14, 16
- Jasper van Winden: page 5
- U-Talent: 8 (lower)
- Marianne van Dijke-Droogers: page 9

Teaching & Learning Lab: www.uu.nl/tll

