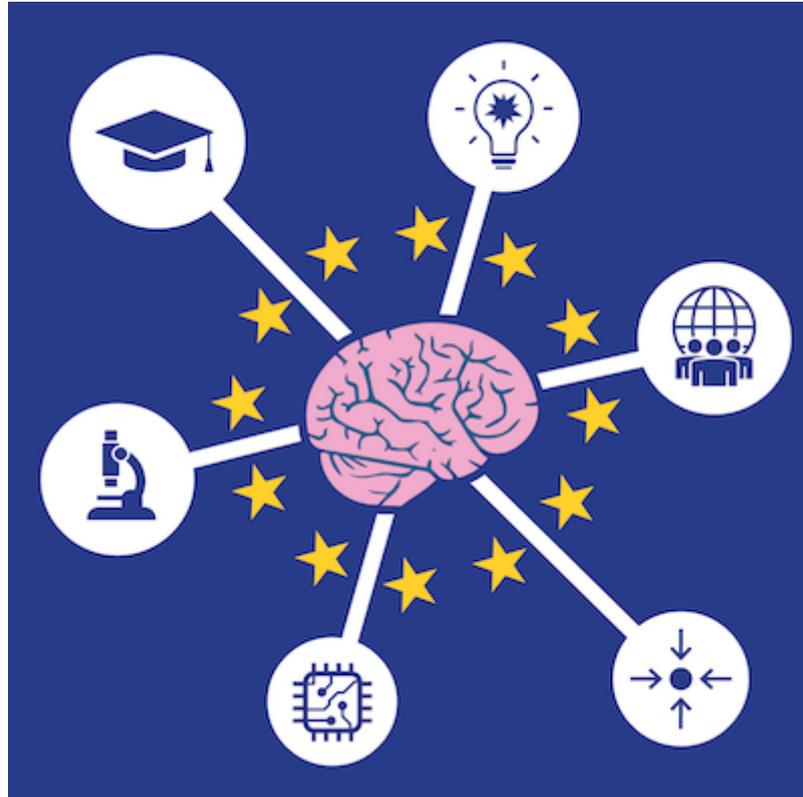# Neurotech^{EU}

The European University of Brain and Technology

D4.6

Development and testing of Virtual Lecture Hall environment for online courses

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Deliverable [4.6] – [Development and testing of Virtual Lecture Hall environment for online courses]

Authors

This document was developed by faculty and administrative staff from the founding universities of Neurotech[EU] - the European University of Brain and Technology, an initiative that aims to build a trans-European network of excellence in brain research and technologies to increase the competitiveness of European education, research, economy, and society. Neurotech[EU] Alliance partners are listed below in the order of their assignment to project work packages:

● Radboud Universiteit (The Netherlands)
● Universidad Miguel Hernández de Elche (Spain)
● Karolinska Institutet (Sweden)
● Rheinische Friedrich-Wilhelms-Universität Bonn (Germany)
● Boğaziçi Üniversitesi (Turkey)
● Universitatea de Medicină și Farmacie din Cluj-Napoca (Romania)
● Debreceni Egyetem (Hungary)
● Université de Lille (France)
● Haskolinn i Reykjavik EHF (Iceland)

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1. Introduction

1.1.   Purpose of this document

The aim of this document is to review the development and testing of a virtual lecture room environment for online courses and other NeurotechEU (NTEU) activities, and to provide suggestions for future development. The document will be updated as new activities are planned and implemented. It also serves as an overview for reporting on NTEU activities.

1.2.   A virtual lecture hall for NeurotechEU

A virtual lecture theatre is an online platform that allows teachers and learners to communicate and collaborate remotely. In a virtual lecture hall, teachers can give lectures, share multimedia content, hold discussions, and follow the progress of learners. Learners, in turn, can access course materials, participate in class activities, and interact with their fellow students and instructors. The benefits of a virtual lecture theatre are immediate flexibility, accessibility, cost efficiency and improved collaboration. However, they can also present some challenges, such as the ability of fellow users to exploit technical aids, technical dependency, lack of direct personal interaction and possible distraction or lack of concentration. Ultimately, the effectiveness of a virtual lecture theatre depends on how well it is designed and implemented and how it complements an institution's overall educational strategy.

The deliverable for a virtual lecture hall was drafted before the Covid-19 pandemic. During these worldwide lockdowns we have seen a rapid shift towards online teaching along with a fast development of widely available platforms for online teaching. The accelerated transition towards online teaching at NTEU partners led to a heterogenous landscape of platforms and tools among partners, each of which matched the individual needs of partners, their educators, their students, and the content. It quickly became clear that an NTEU-specific monolithic virtual lecture hall would be inferior to picking the best specific tool for the educational content that needs to be delivered. In this document, we review the lessons learned from the lockdowns during the pandemic and NTEU online events. We also provide suggestions and guidance for the creation of further content that could be made available through virtual lecture halls or similar tools.

1.2.1. Advantages

Flexibility: A virtual lecture hall offers students the flexibility to learn from anywhere with an internet connection. This can be particularly helpful for students with busy schedules or those who live far away from their school. With respect to the European University Initiatives this applies especially to life-long learners across the alliance, and diploma-seeking and exchange students who want to follow modules or semesters at another university.

Accessibility: A virtual lecture hall can be more accessible for students with disabilities or learning challenges, as it can provide tools such as closed captioning or audio descriptions that may not be available in a traditional classroom. Likewise, for the physically disabled (e.g., impaired mobility) or students with long-term medical conditions it can provide easier access to the lectures.

Cost-effective: Virtual lecture halls can be a cost-effective solution for educational institutions, as they eliminate the need for physical classrooms, transportation, and other expenses associated with in-person teaching. Combined with blended learning and with formation of local study groups this cost-effectiveness could be further expanded across the alliance.

Enhanced collaboration: A virtual lecture hall can facilitate collaboration and communication among students and instructors, allowing for more interaction and engagement in class discussions. For this to be effective, study groups need to be formed that can work together not only during one module, but preferably also across modules.

1.2.2 Disadvantages and potential solutions

Technical issues: Technical issues, such as internet connectivity problems or platform glitches, can disrupt virtual lectures and make it difficult for students to access course materials. Such problems can occur on the lecturer's side, but also at the students' side, which can make simultaneous progress for all students difficult.

Lack of personal interaction: Virtual lecture halls can lack the personal interaction and face-to-face communication that is a hallmark of traditional classroom settings, which can make it challenging for some students to stay engaged. We therefore recommend that student groups are formed where students get a sense of belonging to a team and responsibilities can be shared among them.

Potential distractions: Without the structure of a physical classroom, participants in virtual lecture halls can be more susceptible to distractions, such as social media or other online activities, which can detract from students' learning experiences. A strong set of learning guidelines, based on our experiences during the Covid-19 pandemic, should be provided to students. Also, guidelines should be prepared to advise lecturers on the most effective methods of teaching in a virtual lecture hall.

Learning curve: The utilisation of virtual lecture halls often entails a learning curve for both instructors and students, as they may need to get used to new technologies and teaching methodologies. It is important to acknowledge that this can pose challenges that one needs to prepare for. However, when introduced and implemented successfully virtual lecture halls can also serve as a catalyst, motivating students to enhance their engagement in a course.

1.3.   Overview and purpose of used tools and software

Crowdcast is a popular platform for organising webinars, live events, and online conferences. Crowdcast offers several advantages for both organisers and participants: It provides an interactive environment for virtual events. It offers features such as live chat, polls and question-and-answer sessions that allow participants to engage with the speaker and other participants in real time. This interactive experience fosters a sense of community and encourages active participation, enhancing the overall event experience. Crowdcast is designed for events of different sizes, from small webinars to large conferences. It can accommodate a large number of participants without compromising the quality of the live stream or interactive features. It also provides analytics and insights into attendee engagement and behaviour during the event. Organisers can track metrics such as attendance rates, engagement, and audience demographics. These analytics help evaluate the success of the event, understand attendee preferences, and adjust future events accordingly. It can record and archive all sessions. This feature allows attendees who were unable to attend the live event to access the content at any time. NTEU has used this primarily for central events such as a virtual Kick-off, NTEU Summits, Women of NeurotechEU events, the Neuroscience Lecture series, the student's Synapse Lecture series and the 3-minute thesis competition.

Microsoft Teams, Webex and Zoom: These are all popular communication and collaboration platforms used for virtual meetings, webinars, and remote team collaboration. They have been used to a varying degree within the alliance, depending on the security regulations and customs of the different alliance universities. While there are similarities, it is important to note that each platform has its own unique features, pricing structures, and user interfaces. At the University of Bonn University Hospital, for example, Webex is used for short and direct communication (chat function) and calls (connected to the mobile phone service), whereas at Radboud University the license for Zoom will be replaced by the all-in package that Microsoft Teams offers for webinars, direct communications and calls, and exchange of documents.

Wonder.me.: This tool (mcc Agentur für Kommunikation GmbH, Berlin), which has been free of charge until now, makes focusses on and emphasises social interactions. Content should not only be exchanged face to face at conferences, but contacts should also be made among colleagues virtually. With Wonder.me, up to 1000 people can be invited into a room and up to 15 further subdivided areas/rooms/table can be created. This has been used for various NTEU discussion rounds/topic tables. For example, participants can use "icebreaker" questions to get to know each other. This tool can also be used for study groups.

Learning Management systems (LMS): Some LMS have internal virtual classroom options. For instance, the virtual classroom in Brightspace (in use at Radboud University) can be used for groups up to 150 students, with 8 breakout rooms and 10 persons maximally in view with camera. A disadvantage is that with bigger groups not everybody is in view, which is limiting interactions between teacher and students. Sharing of recordings, either through the internal options, or externally recorded through Zoom or Microsoft Teams, in LMS is often also possible through an additional module. For example, Radboud University uses the Kaltura software for this, which is incorporated in Brightspace.

1.4. Recommendations on teaching methods

In today's digital era, virtual lecture halls are playing an increasingly important role in higher education. However, as lectures move online, educators face new challenges in designing effective learning environments. In this context, recommendations on teaching methods in the virtual lecture hall are crucial to promote student engagement and ensure a quality educational experience. For further information please see the NTEU Pedagogy Handbook. Also, the use of processes and tools such as green screens in the virtual lecture hall have become an essential part of digital education. These technologies enable teachers to create engaging and interactive learning environments that increase student engagement and improve the quality of education. We will briefly list some approaches and strategies that help to make virtual lectures efficient and interactive and to create an effective teaching environment.

A.   Make a video recording of the screen and camera recording of the lecturer (e.g., through Camtasia) so that participants who are absent or have technical difficulties can access the lecture at a later time point.

b.   Use a green screen to record lectures with the lecturer pointing to content.

c.   Provide lightboards so that the lecturer can write on a glass board while maintaining eye contact with online students

d.   Use knowledge clips. A teacher can work with animations and/or green screen to explain the use of a technique and to give a deeper background into a specific topic. These clips, typically only minutes long can be reused, but require substantial preparation time as scripting the process is required.

1.5. Central online platform

A central platform is needed as an entry point, e.g., for finding courses, their schedules, online material, recorded and interactive lectures. Intensive work is being done on the implementation of such a central web-based platform. The first educational NTEU content can already be found on the INCF training space (https://training.incf.org/) and gala platforms (https://www.learngala.com/). For more information, please see the NTEU Pedagogy Handbook (https://theneurotech.eu/wp-content/uploads/2023/07/UE_Pedagogy_Handbook_250523-1.pdf). NTEU shares its content on various platforms such as social media (for example LinkedIn, Instagram, and Twitter), email newsletters and partner websites to reach a wider audience. Particular attention is paid to professional design and implementation. The use of a corporate identity is essential. Furthermore, the use of attention-grabbing headlines and meaningful visuals such as images, infographics or videos is desired. When announcing courses and modules, their learning outcomes should be clearly formulated and sent out in a timely manner. A clear call to action, such as "sign up now" or "learn more", is also recommended. General templates are available to the alliance partners (e.g., via the NTEU project office at Radboud University).

2. Registration, assessment, and certification

Registration and assessment are integral parts of various types of online education. Registration collects the necessary information from people who wish to participate in a particular activity or event, while assessment evaluates their skills, knowledge and/or suitability for a particular purpose. Registration and assessment together streamline the selection and qualification processes and ensure that participants meet the criteria and standards set by the organisers.

The certification of successful participation serves as an official document that attests to the participant's successful completion of a course, lecture, or module. It provides proof of their acquired knowledge, skills, or competences. This documentation can be useful for employers, educational institutions, and/or organisations seeking evidence of the participant's educational achievements.

2.1. Registration

To ensure efficient organisation of any course, conference, workshop or simple lecture, prior registration is essential. It allows organisers to predict attendance, allocate resources effectively, communicate important updates, engage the audience, ensure safety, and obtain valuable feedback, as well as to evaluate individual progress and achievements. Participants will be required to pre-register for the lecture or class using a registration form (e.g., using a template provided by the NTEU central office). This form should collect the participant's personal information, such as name, email address, degree programme, university, and affiliation. Once participants have registered, an automatic confirmation email should be sent with the date, time, and link to the virtual lecture hall. This email should also contain all relevant details about the lecture or course, such as the course programme, the required materials, or any prerequisites. The participant must check in to the virtual lecture hall platform by entering a unique identifier that confirms their attendance. Using an attendance tracking feature, one should monitor who is attending the lecture or class. Knowing the number of registered participants in advance can ensure that all participants have access to the necessary resources and materials. Once registered, participants can receive updates, reminders and any changes related to the lecture, such as changes in time or cancellation. Organisers can use registration data to send surveys using, for example, Survey Monkey, Lime Surveys, or evaluation forms (e.g., a template provided by NTEU central office) to registered attendees asking for their opinions on the content, speaker, organisation, and overall experience. This feedback is part of the NTEU quality assessment and will be useful for future improvements and to assess the effectiveness of the event.

Overall, registering participants and confirming their attendance in a virtual lecture theatre requires a combination of strategies and tools that allow organisers to keep track of participants and ensure that all participants are accounted for. Registration provides a level of security and safety for both organisers and attendees. It helps to prevent unauthorised access or disruptions during the event. By having a record of registered participants, organisers can manage the entry process efficiently, verify identities if necessary, and maintain a secure environment for everyone attending. With these methods, lecturers can ensure that their lecture or course runs smoothly and that participants receive the education and training they need.

2.2. Monitoring procedures and measures

Monitoring procedures and actions in a virtual lecture theatre requires a combination of strategies and tools that allow the organisation to track student attendance, participation, progress, involvement, and engagement. By using these methods, we can ensure that students are actively engaged and learning, and lecturers can adapt teaching methods as necessary to enhance the learning experience.

- Attendance tracking: Attendance can be monitored by requiring students to log in to the virtual lecture hall platform at the start of each lecture or class. Attendance tracking features within the platform can be used to monitor students' attendance.

- Active participation tracking: To monitor students' participation in class, lecturers can encourage students to actively participate in class discussions, ask questions, and provide feedback. Lecturers can also monitor students' participation by reviewing chat logs and recorded lectures.

- Assessments and quizzes: Online quizzes and assessments can be used to monitor students' learning progress and comprehension. These tools can help identify students who may be struggling with the course material so that lecturers can provide them with additional support.

- Feedback and surveys: Feedback can be collected from students using online surveys or feedback forms. This can help lecturers identify areas for improvement and adjust teaching methods accordingly.

- Collaborative projects: Students can be assigned collaborative projects to complete within the virtual lecture hall platform. Lecturers can monitor their progress and participation by reviewing the work they submit and assessing their collaboration skills.

- Analytics and reports: Many virtual lecture hall platforms have built-in analytics and reporting tools that can help monitor student engagement, participation, and progress. These tools can provide insights into students' learning behaviours and help identify areas for improvement.

- Video conferencing features: Many virtual lecture hall platforms have built-in video conferencing features that allow for live discussions and interactions among students. These features can be used to monitor students' participation and engagement in real-time.

- Screen sharing: Screen sharing can be a useful tool to monitor students' progress and understanding of the course material. Lecturers can ask students to share their screens during class to show their work and ask questions, allowing lecturers to monitor their progress and provide real-time feedback.

- Clear expectations: Expectations should be made clear for students at the beginning of the course or lecture. This can include guidelines on attendance, participation, deadlines, and course objectives. By setting clear expectations, lecturers can ensure that students are aware of what is expected of them and can monitor their progress accordingly.

- Timely feedback: Students should receive timely feedback on their assignments, quizzes, and assessments. This can help students understand where they need to improve and allow lecturers to monitor their progress more effectively.

- Course analytics: Course analytics can be used to monitor students' progress and engagement. Many virtual lecture hall platforms have built-in analytics features that allow lecturers to track how much time students spend on the platform, which course materials they access, and how they interact with the platform. This information can be used to identify areas for improvement and allow lecturers to adjust their teaching methods accordingly.

3. Template for NeurotechEU Educational Content

The NTEU Educational Content document/template contains essential details including objectives, schedule, and requirements. It serves as a comprehensive guide for both lecturers and participants to ensure a successful learning experience. Using this template streamlines the course creation process, maintains consistency in the provision of information and improves clarity for all stakeholders involved in the educational process.

I General Course Information

Course Title	
Course code	include local course code, e.g. Course Neurobiology, course code NWI-BB101

Course level 1-4 1 Introductory e.g. 1st year B.Sc. 2 Medium e.g. 2nd or 3rd year B.Sc. 3 Advanced e.g. 3rd year B.Sc. or (1st) year M.Sc. 4 Expert e.g. Ph.D level	
Language	
Capacity	
Type of course	Please see pedagogy handbook
Workload [h]	

II. Organization and coordination

Teacher(s):	e.g. Prof. P. Verschure; Prof. T. Coolen; etc
Organizing partner institution:	e.g. Donders Center for Neuroscience, Faculty of Science, Radboud University
Coordinator:	e.g. dr. W. Scheenen, e-mail wim.scheenen@donders.ru.nl

III Educational information

Course description (Aims and Content):	
Learning objectives:	
Teaching methods	e.g. online lectures, work groups, blended teaching e.g. challenge-based learning, team-based learning, problem-based learning
Requirements for participation	
Recommended literature	
Form of testing and examination/exam Structure	

IV Further Information

Connects to dimension/content space; how:	
Use of: LearnGala/INCF training Space:	
Metadata:	
Remarks	

Please consider the following format options:

(1)   Logo & Brand identity:
        a.   each recording will have an animated intro and exit of the current NeurotechEU logo. In case of future logo changes for the consortium this animated logo will be updated.
        b.   The logo of the organizing partner institution can be used on the slides. Please keep the left 15% of the slide free of content for the video of the presenter, and the NeurotechEU logo

(2)   Resolution: Take into account that your course may be viewed on smaller screens of mobile phones or tablets:
        a.   Use the template of NeurotechEU, link, minimum font size 24
        b.   Adhere to 7x7 rules for presentations

(3)   Presentation length:

     a.   Keep the length of your individual chapters to a maximum of 15-20 minutes.

     b.   In case you have a longer lecture, include chapter markers for easy navigation by students

(4)   Privacy:

     a.   Make sure that the faces of your students are not recognizable in your recordings.

     b.   Don't use student names or student numbers in your recordings.