



**D02.8 – RECOMMENDATIONS FOR THE
INTERDISCIPLINARY ARQUS VIRTUAL LAB
INITIATIVE**

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RECOMMENDATIONS FOR THE INTERDISCIPLINARY ARQUS VIRTUAL LAB INITIATIVE

INTRODUCTION

The Interdisciplinary Arqus Virtual Lab initiative aims to foster collaborative teaching, learning, research, and innovation across partner universities. To ensure the success of this initiative, we must address several obstacles that hinder truly interdisciplinary activities. This document provides a set of recommendations targeted at partner universities and the broader university sector. These recommendations can be accessed publicly as a downloadable pdf on the [Arqus website section on Living Labs](#).

SURVEY INSIGHTS

A survey was conducted among the Arqus Living Lab working group members from all nine Arqus partner universities. The Living Lab is divided into three clusters: :

1. Artificial Intelligence & Digital Transformation
2. Climate Change & Sustainability
3. European Identity & Heritage

These insights have been integrated into the subsequent set of recommendations to address the identified obstacles and optimize the implementation of the Arqus Virtual Lab Initiative. The key findings from the survey include the following:

1. Awareness and understanding:
 - A majority of survey respondents were unfamiliar with the concept of Virtual Labs, highlighting the need for clearer communication and a better understanding of their purpose and potential applications.
 - Many participants expressed interest in learning more about the concept, including examples of how Virtual Labs could be implemented, to assess their potential value and impact.
2. Perceived benefits:
 - Respondents highlighted the potential for virtual labs to enhance research collaborations and provide a shared space for interdisciplinary projects.
 - Some believed that virtual labs could serve as a valuable tool for teaching and learning, especially in the context of digital transformation and sustainable development clusters.
3. Challenges and Concerns:
 - Concerns were raised about the practicality and implementation of virtual labs, particularly regarding technical support, accessibility, and user management,
 - There were concerns regarding motivating participation and maintaining consistent usage among faculty members and students.

RESEARCH ON EXISTING VIRTUAL LABS

As part of our efforts to develop the Interdisciplinary Arqus Virtual Lab, we have researched existing virtual lab projects to understand best practices and innovative approaches. One notable example is the initiative led by our partner, Maynooth University.

The virtual lab project at Maynooth University is a collaborative effort involving five higher education institutions: Maynooth University (lead), Technological University of the Shannon: Midlands Midwest (TUS), Dundalk Institute of Technology (DkIT), University College Cork (UCC), and Dublin City University (DCU). This initiative focuses on using virtual laboratories as a teaching tool for chemical sciences and is funded by the Higher Education Authority (HEA) under its Human Capital Initiative Pillar 3 call.

The primary aim of the project is to design a new curriculum that equips the next generation with skills critical for success in the modern chemical sciences sector. The project provides undergraduate students with opportunities to experience a real work environment through a blended approach of physical and virtual components that integrates three key elements:

1. Real Laboratory: traditional physical labs where students conduct hands-on experiments.
2. Face-to-face Interaction: In-person sessions that facilitate group work, community building and peer-to-peer interactions.
3. Virtual Laboratory: digital platforms where students can engage in simulated experiments and learning activities.

This approach is based on evidence and survey results indicating that students find face-to-face work and group activities essential for building a community and enhancing the learning experience.

Furthermore, Maynooth's virtual lab emphasized the importance of supportive pedagogical tools and training. The training includes:

- Training materials that guide students on using virtual lab tools.
- On-site instructions and facilitators who oversee the onboarding process.
- Detailed instructions on how to navigate and utilize the virtual lab environment effectively.

These elements ensure that students are well-prepared and can maximize the benefits of both the physical and virtual lab experiences.

The representatives from Maynooth University highlighted several advantages of their virtual lab:

- Accessibility: students can access materials and instructions at any time, allowing for flexible and self-paced learning.
- Preparation: virtual labs prepare students for physical lab sessions, making them more confident and competent.
- Enhanced learning: the combination of digital and physical components enriches the overall educational experience.

Despite the many benefits, there are some challenges associated with the virtual lab:

- Pedagogical challenges: students have expressed a need for a sense of space within digital environments, which can be abstract and less tangible than physical labs.
- Time-consuming: navigating and engaging with digital environments can be time-consuming for some students as well as faculty.
- Community-building: while virtual tools facilitate learning, the importance of face-to-face interactions for building a sense of community and peer support remains critical.

In conclusion, the Maynooth University Virtual Lab project offers valuable insights in the effective integration of virtual and physical learning environments. By addressing both the advantages and challenges, this initiative provides a comprehensive model for developing work-ready graduates equipped with the skills necessary for success in the chemical sciences sector. The lessons learned from this project can inform and enhance the development of the Interdisciplinary Arqus Virtual Lab Initiative.

RECOMMENDATIONS FOR THE INTERDISCIPLINARY ARQUS VIRTUAL LAB

1. Enhanced communication and collaboration platforms
 - Objective: facilitate seamless communication and collaboration among interdisciplinary and international teams.
 - Recommendation: implement digital communication tools and platforms that support real-time collaboration, project management, and resource sharing. Ensuring that these platforms are accessible and user-friendly is key in order to encourage widespread adoption.
2. Professional development for academic and administrative staff
 - Objective: equip faculty with the skills and knowledge to engage in virtual teaching and research.
 - Recommendation: offer continuous professional development programs focused on interdisciplinary methodologies, digital tools, and collaborative teaching strategies.
3. Accessibility and inclusivity
 - Objective: ensure the virtual lab is accessible and inclusive for all users.
 - Recommendation: implement features such as multi-language support with automatic website translation for all Arqus languages, FAQ pages, chatbots for administrative questions, and short forms for material uploads. Focus on accessibility by adopting fonts, adding captions for images, and adjusting color schemes according to EU Web accessibility policy.
4. Support and resources for teaching and research
 - Objective: provide resources and support to maximize the effectiveness of online platforms.
 - Recommendation: include sections for security and privacy information, guidelines of best practices, and short courses on efficient online activities. Create a space for suggestions and exchange forums for teachers and professors to facilitate idea sharing and collaboration.
5. Evaluation and feedback
 - Objective: Continuously assess and improve the effectiveness of the virtual lab.
 - Recommendation: implement comprehensive evaluation frameworks that include qualitative and quantitative metrics. Collect feedback from students, faculty, and external stakeholders to identify areas for improvement.

CONCLUSION

By addressing these key areas and incorporating the insights from our survey, recommendation, and the successful model of the Maynooth University Virtual Lab Project, the Interdisciplinary Arqus Virtual Lab Initiative can overcome existing obstacles and create a vibrant, collaborative environment for teaching, learning, research, and innovation. Implementing these recommendations will not only benefit partner universities but also contribute to the advancement of the university sector.

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