Empowering Inclusive Education through eLabs: Removing technical barriers and widening access to data-science teaching

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Outline

- What is eLab?
- eLab tour (screenshots demo)
- Four teaching case studies
  - Inclusive-education wins
  - Barriers removed
- Learning gains & impact
- Key take-aways & Call to action
- Q & A

Web-based "virtual lab" – opens in any browser

Secure personal workspace for every student

Pre-loaded with Jupyter, RStudio, Python and more

No local installation required

Rapid set-up – tech team launches or retires an instance in minutes

Fully customisable to a single lesson or an entire course

Scales smoothly from a handful of learners to hundreds

Device-agnostic – identical experience on laptop, desktop or tablet

End-to-end coursework flow – deliver, complete and collect tasks within eLab

Data stays protected – sensitive files never leave the secure environment

What's an eLab?

Quick demo

eLab Home Airlock My machine My Learning Log in

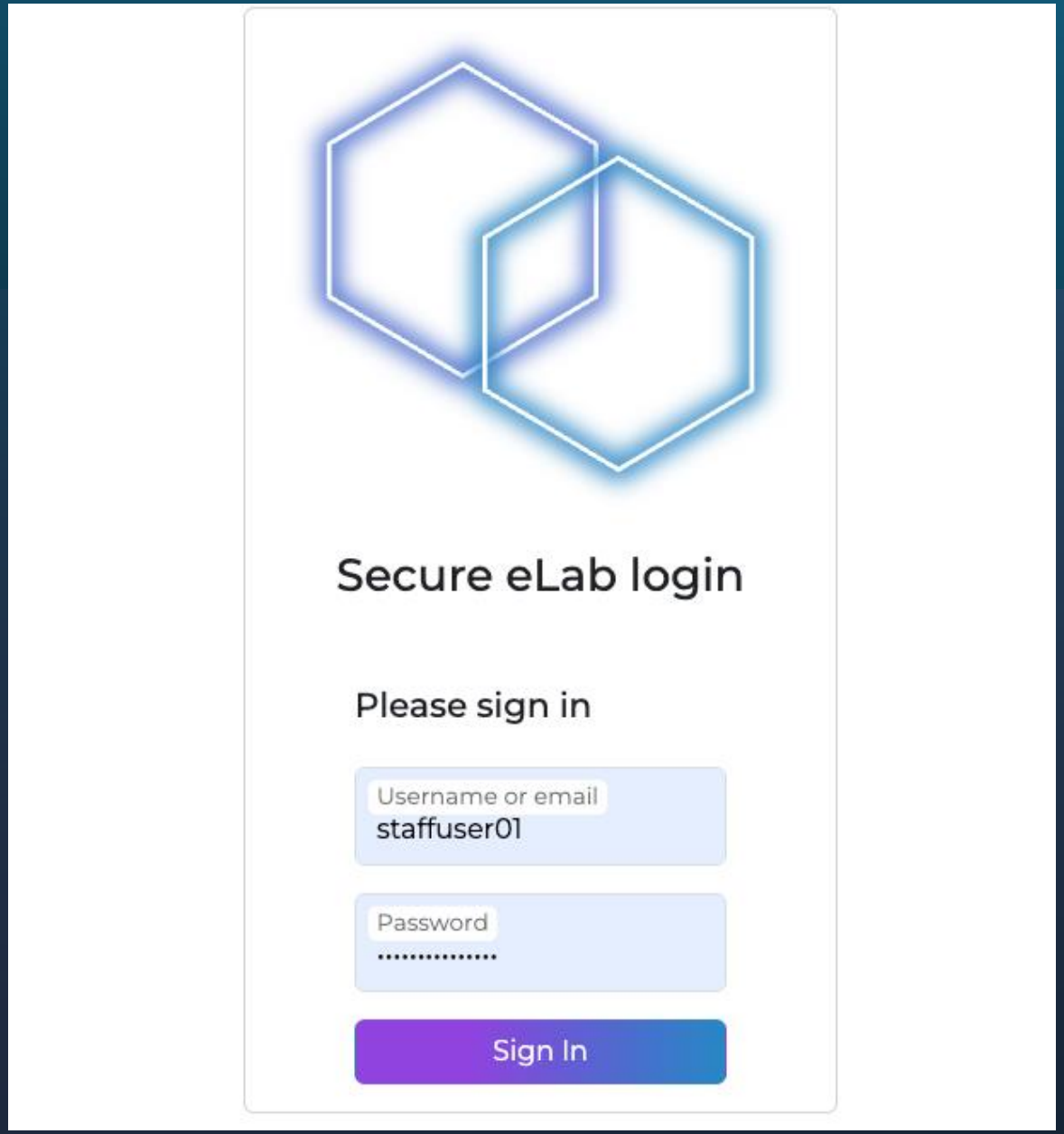
Welcome to the HDS Teaching eLab

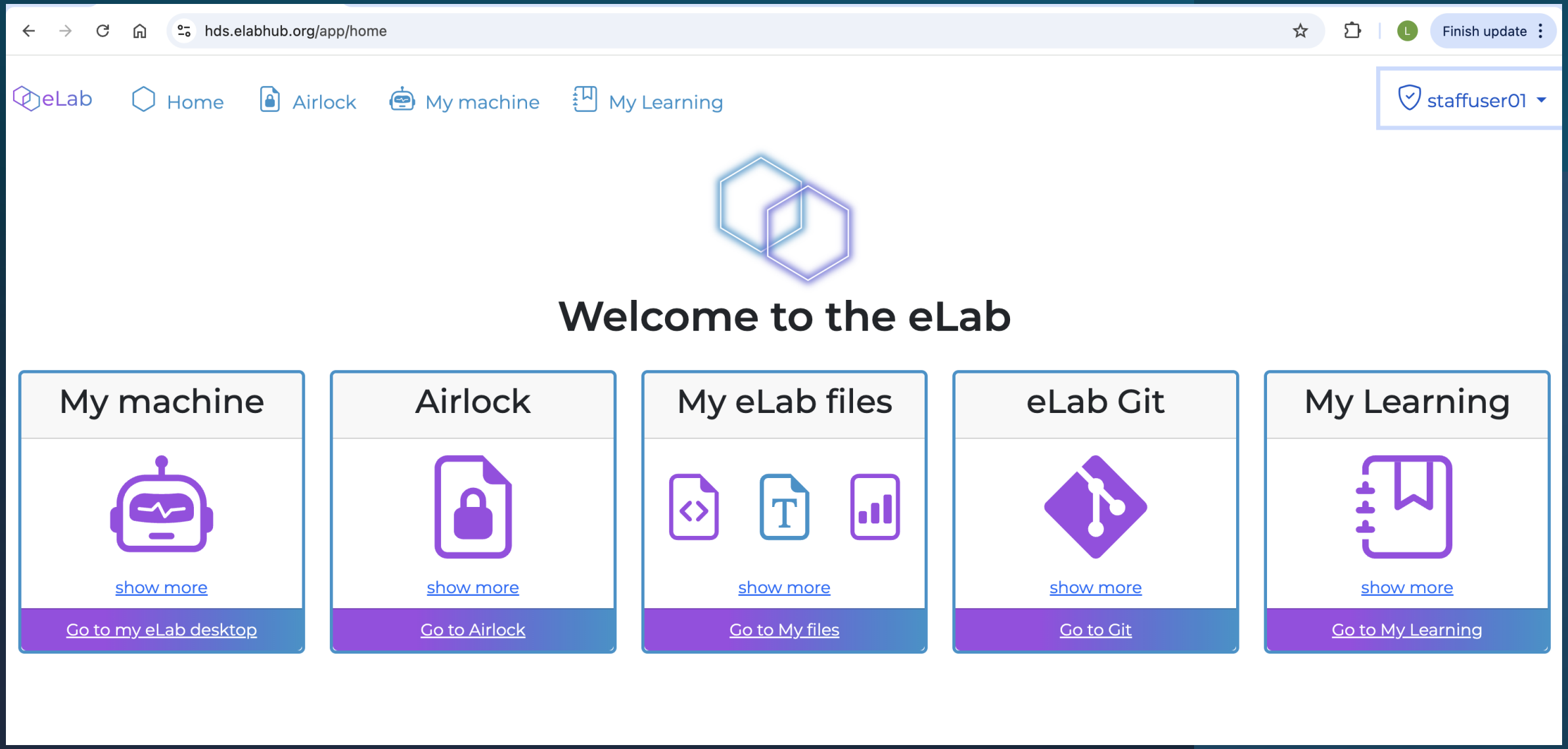
For support or general enquiries please contact
elabadmin@manchester.ac.uk

Click here to start

click here to learn more about the elab project at The Centre for Health Informatics at The University of Manchester

Version: elab4.7.0


Secure eLab login
Please sign in
Username or email
staffuser01
Password
Sign In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Finish update
eLab
Home
Airlock
My machine
My Learning
staffuser01
Welcome to the eLab
My machine
show more
Go to my eLab desktop
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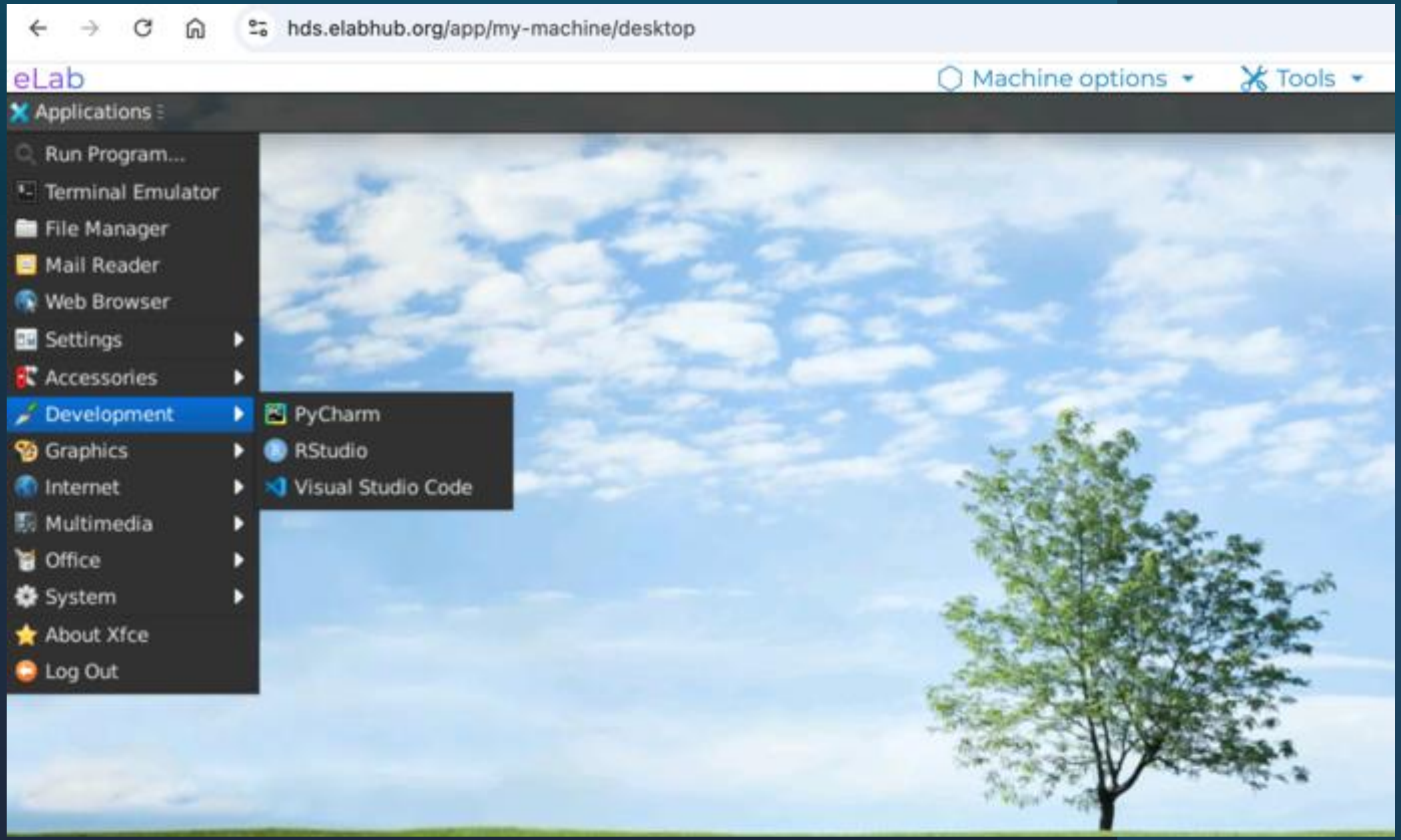
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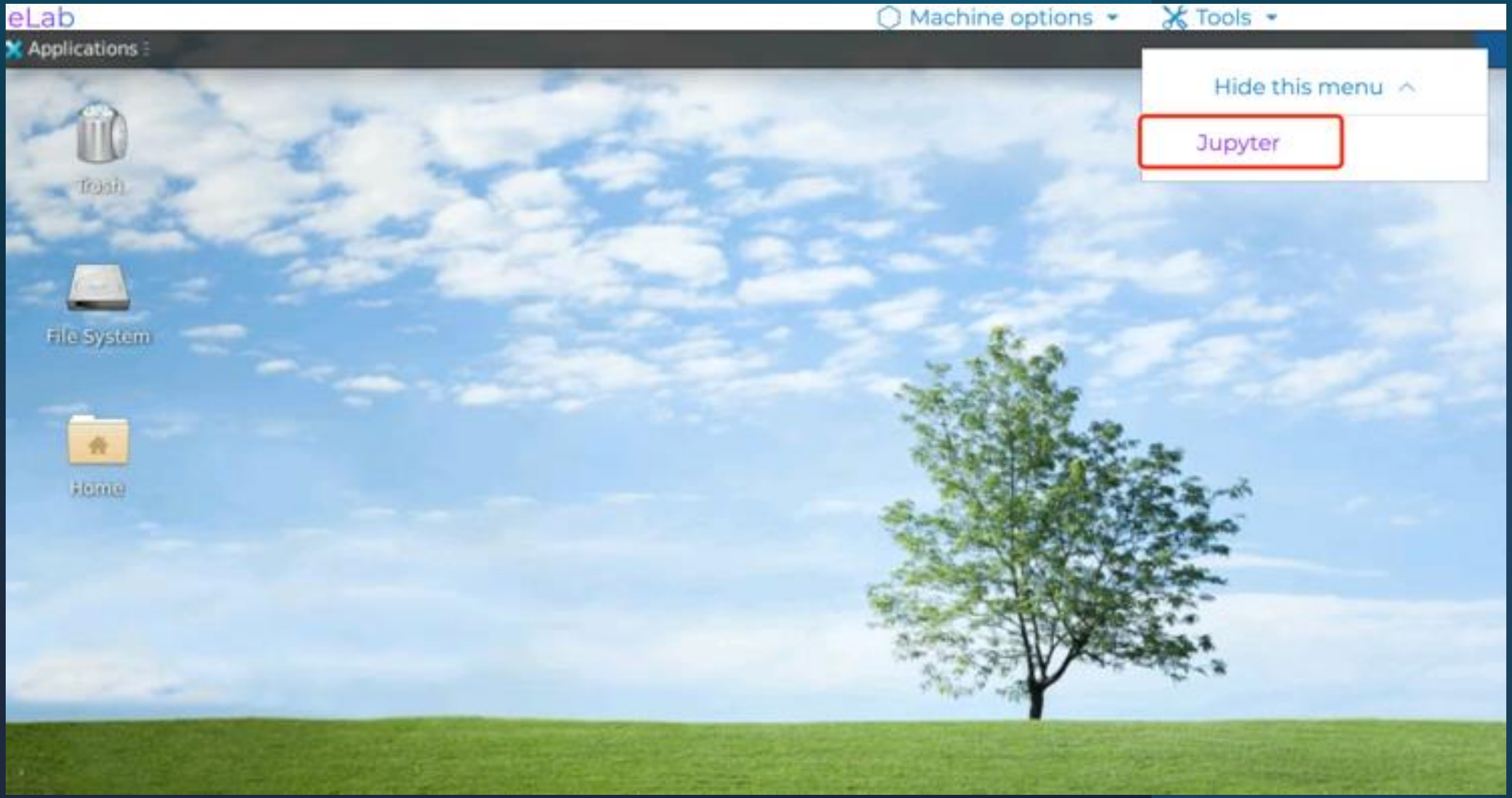
eLab
Machine options
Tools
Applications
Run Program...
Terminal Emulator
File Manager
Mail Reader
Web Browser
Settings
Accessories
Development
Graphics
Internet
Multimedia
Office
System
About Xfce
Log Out
PyCharm
RStudio
Visual Studio Code


eLab
Machine options
Tools
Applications
Hide this menu
Jupyter
Trash
File System
Home

Restart

jupyter

Files | Running | Clusters

Select items to perform actions on them.

Upload | New | ↻

0 | / | Name ↓ | Last Modified | File size

airlock	2 months ago	
Assignment2	a month ago	
Content	2 months ago	
datasets	9 months ago	
Desktop	2 months ago	
Documents	2 months ago	
Downloads	19 days ago	
Music	2 months ago	
Pictures	2 months ago	
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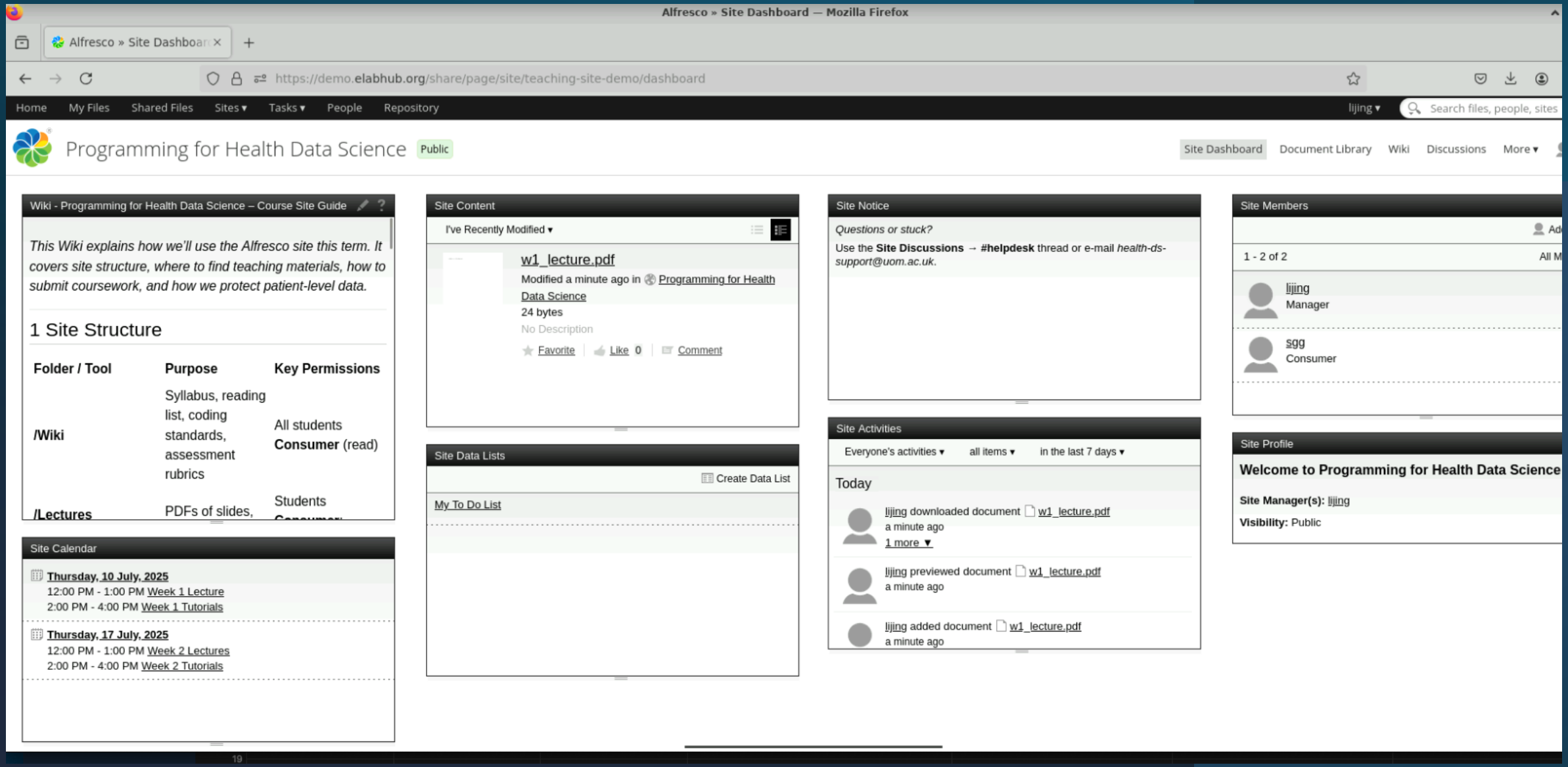
software	9 months ago	
Templates	2 months ago	
thinclient_drives	2 months ago	
Videos	2 months ago	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Home
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Shared Files
Sites ▾
Tasks ▾
People
Repository
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Search files, people, sites
Programming for Health Data Science
Public
Site Dashboard
Document Library
Wiki
Discussions
More ▾
Wiki - Programming for Health Data Science – Course Site Guide
This Wiki explains how we'll use the Alfresco site this term. It covers site structure, where to find teaching materials, how to submit coursework, and how we protect patient-level data.
1 Site Structure
Folder / Tool
Purpose
Key Permissions
/Wiki
Syllabus, reading list, coding standards, assessment rubrics
All students Consumer (read)
/Lectures
PDFs of slides,
Students
Site Calendar
Thursday, 10 July, 2025
12:00 PM - 1:00 PM Week 1 Lecture
2:00 PM - 4:00 PM Week 1 Tutorials
Thursday, 17 July, 2025
12:00 PM - 1:00 PM Week 2 Lectures
2:00 PM - 4:00 PM Week 2 Tutorials
Site Content
I've Recently Modified ▾
w1_lecture.pdf
Modified a minute ago in Programming for Health Data Science
24 bytes
No Description
Favorite
Like 0
Comment
Site Data Lists
Create Data List
My To Do List
Site Notice
Questions or stuck?
Use the Site Discussions → #helpdesk thread or e-mail health-ds-support@uom.ac.uk.
Site Activities
Everyone's activities ▾
all items ▾
in the last 7 days ▾
Today
lijing downloaded document w1_lecture.pdf
a minute ago
1 more ▾
lijing previewed document w1_lecture.pdf
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a minute ago
Site Members
1 - 2 of 2
lijing
Manager
sgg
Consumer
Site Profile
Welcome to Programming for Health Data Science
Site Manager(s): lijing
Visibility: Public

Inclusive Education

According to Advance HE, inclusive education is

> *education that is relevant and accessible to all students regardless of their 'cultural heritage [...] language; values; cultural capital; religion and belief; country of origin/residence; ethnicity/race; social background'*

According to UNICEF:

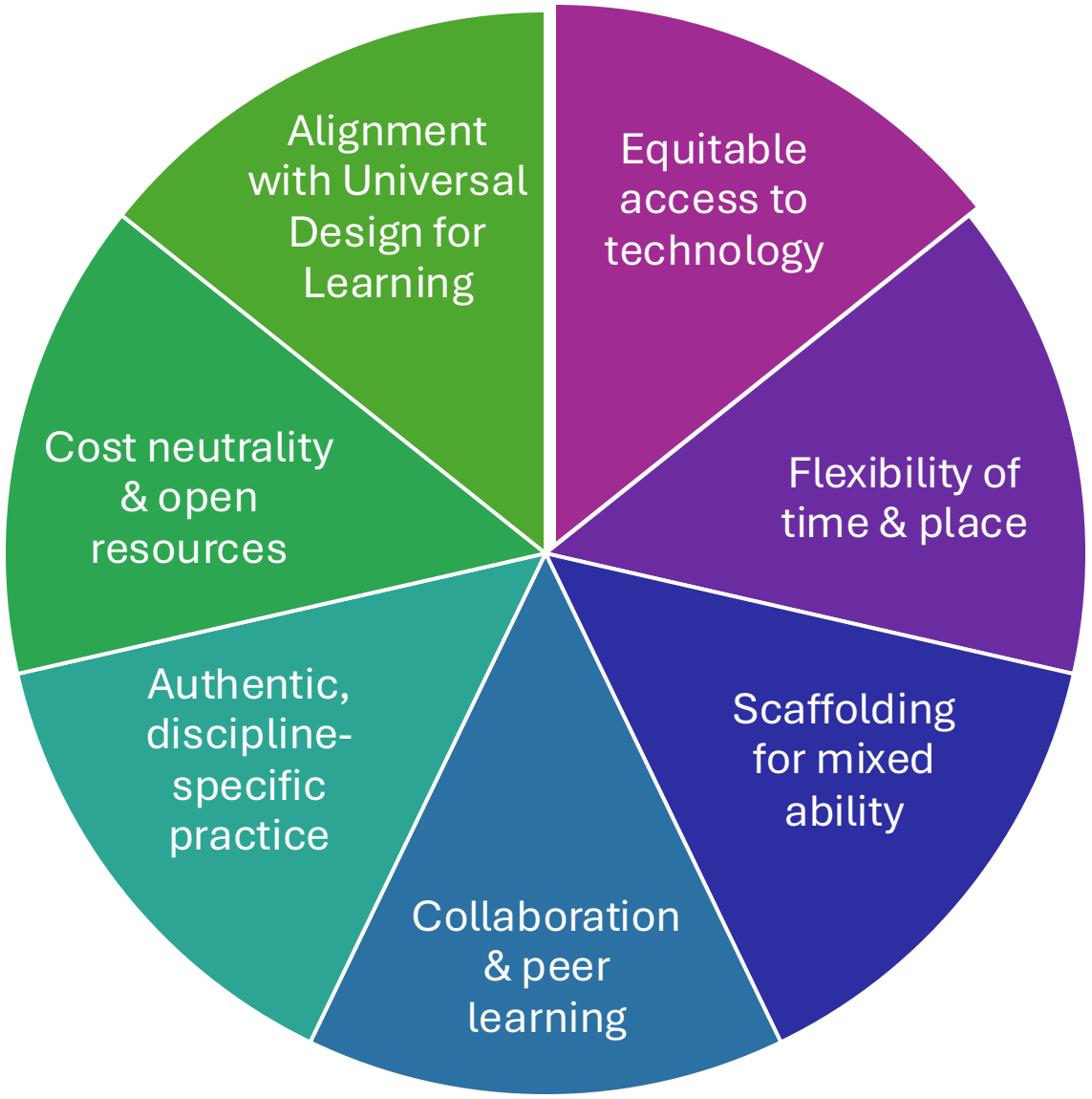
> *Inclusive education allows students of all backgrounds to learn and grow side by side, to the benefit of all.*

Thomas, L., and H. May. 2010. Inclusive Learning and Teaching in Higher Education. https://www.advance-he.ac.uk/knowledge-hub/inclusive-learning-and-teaching-higher-education

UNESCO. 2024. Celebrating Inclusion in Education: 30th Anniversary of Salamanca Statement, https://www.unesco.org/en/articles/celebrating-inclusion-education-30th-anniversary-salamanca-statement

UNICEF. 2024. Inclusive education. https://www.unicef.org/education/inclusive-education.

How eLab supports inclusive education



Case Studies

Case study / module	Audience & level	Typical cohort	Key challenges
AI: Robot Overlord, Replacement or Colleague?	UG, interdisciplinary (all faculties), 9-week online course	100	Very mixed tech background, totally remote delivery
Modern Information Engineering (MIE)	PGT, multidisciplinary	200	Bring everyone up to a common tech baseline in first 5 weeks
Machine Learning and Advanced Data Methods	PGT, multidisciplinary	100-150	High concurrent load; some labs need extra compute
NHS STP: Software Eng. & Diagnostic Sequencing	NHS staff, 3-year part-time	20	Locked-down hospital laptops; no admin rights; Wide curriculum; safe sandbox for containers

AI: Robot Overlord, Replacement or Colleague? (UG)

Undergraduate, interdisciplinary, fully online, 9 weeks

Mixed coding skills;

eLab hosts all marked notebooks – students work at their own pace anywhere;

Zero clinic hours needed for “it-won’t-install” issues

AI: Robot Overlord, Replacement or Colleague? (UG)

- Equitable access to technology
- Flexibility of time & place
- Scaffolding for mixed ability
- Cost neutrality & open resources

Interdisciplinary, fully online, 9 weeks

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Modern Information Engineering (PGT)

PGT, multi-disciplinary; Varied levels of tech background

Use of eLab the first 5 weeks of the module to host a series of around 25 Jupyter notebooks to bring everyone into the same level of tech knowledge and skills needed to complete the group-work activities.

Independent, flexible, own pace and own time; First 5 weeks focus on levelling tech skills

Learners hit the same baseline before group work starts

Modern Information Engineering (PGT)

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Machine Learning and Advanced Data Methods

PGT; Varied levels of tech background

Large cohort; compute-heavy tutorials

Some tutorials need additional compute power when many users are active simultaneously -- environment scales with users

Current eLab use: hosts Jupyter notebooks for hands-on practice

Future plan: on-demand GPU support for advanced deep-learning content

Machine Learning and Advanced Data Methods

Equitable access to technology

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Authentic, discipline-specific practice

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NHS STP: Software Engineering & Diagnostic Sequencing

NHS staff on a three-year, part-time career-development programme

NHS locked down laptops. Participants don’t always have permission to download software to their machines.

Broad syllabus: introductory programming, software engineering (Agile methods, Git, Bash) and diagnostic sequencing (including container technologies)

Current eLab use: hosts Jupyter notebooks, Ubuntu desktop environments and container playground

Future plan: Local installation permissions for students; Teach remote development

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Cross-cutting wins & Learning gains

Zero installs, zero friction – a full data-science desktop opens in any browser

Same experience on any device – laptop, desktop or tablet, on-campus or remote

Scales effortlessly – from a dozen to hundreds of learners

Secure "walled garden" – sensitive data never leave the platform, meeting InfoSec and ethics requirements

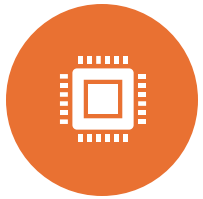
Equitable learning pathway – tools support everyone from absolute beginners to advanced users, with notebooks that progress from introductory to expert level

Built-in collaboration – shared Jupyter notebooks, in-platform wikis and Git integration enable real-time peer feedback and version-controlled assignments

Peer & professional skills – teamwork, code review, Git workflow and container practice mirror real research and industry settings

Inclusive, flexible spaces – self-paced access fosters diverse, discursive and participative learning communities, advancing SDG 4 (Quality Education) and SDG 10 (Reduced Inequalities)

Barriers the eLab removes



Technical complexity – everything pre-installed, version-matched

Institutional IT lock-down – bypasses admin-rights restrictions

Hardware inequalities – cloud desktop means low-spec machines are fine

Mixed skill levels – scaffolded notebooks let each learner progress at their own pace

Compute bottlenecks – cluster behind the scenes; future plan to include optional GPU nodes on demand

Data-security concerns – analysis happens where the data live; no risky downloads

Time & place costraints – fully online

Key take-aways for colleagues

- **Spin-up in minutes** – tech team handles all installs; you focus on teaching
- **One platform, many disciplines** – supports coding novices, clinicians, data scientists alike
- **Scales seamlessly** – from a small seminar to hundreds of remote learners
- **Keeps data safe** – analysis stays inside a secure, browser-based “walled garden”
- **Reduces IT stress** – no local admin rights or troubleshooting "it won’t install" issues
- **Boosts equity & engagement** – identical tools on any device, 24/7 access, built-in analytics
- **Customisable & extensible** – tailor environments, add new services, share resources across modules
- **Ready for pilots** – choose a module, talk to the eLab team, and be teaching in the cloud next semester

Call to action

01

Explore a demo eLab after the session

02

Identify a pilot module for next semester

03

Join our users' group exploring digital teaching innovation