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**“FOSTERING SOCIALLY DISTANCED AND INCLUSIVE ON
CAMPUS EDUCATION IN ARMENIAN HEIS”**

UNIVERSIDADE DE LISBOA (ULISBOA)

**BEST PRACTICE COLLECTION & POLICY
PAPER ON TECHNOLOGY ENHANCED (TE)
TLA**

COUNTRY CASE – PORTUGAL

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Contents

General Information	3
Section 1: Purpose & Context	3
Section 2: EU Partner HEI Profile	3
Section 3: E-Learning Multimedia Platforms	5
3.1 Learning Management System (LMS)	5
3.2 Multimedia and Video Tools.....	6
3.3 Collaboration and Communication Tools	7
Section 4: Instructional Technologies and Infrastructure	8
4.1 Hardware and Physical Infrastructure	8
4.2 Software and Licensing.....	9
4.3 Accessibility and Inclusive Technology	9
4.4 IT Support and Training for Staff	10
4.5 Pedagogical Approach	10
Section 5: Technology-Enhanced (TE) Ecosystems and Smart Classrooms	11
5.1 Smart Classroom Models	11
5.2 Hybrid and Blended Teaching Spaces	12
5.3 Specialist TE Learning Spaces.....	12
5.4 TE Ecosystem Governance and Standards	13
Section 6: Maturity Assessment and Benchmarking	13
6.1 Overall Benchmarking Summary	13
Section 7: Recommendations for Armenian HEIs	14
7.1 Priority Recommendations.....	14
7.2 Quick Wins vs Long-Term Investments	14
Section 8: Best Practice Examples	15
8.1 Best Practice.....	15
8.2 Impact & Recommendations	15
References.....	16

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This template is used to systematically collect and document best practices and infrastructure benchmarks. The information will directly feed into the eCAMPUS benchmark standards for e-learning multimedia platforms and smart classroom models in EU partner institutions.

General Information

EU Partner Institution	Técnico Universidade de Lisboa
Country	Portugal
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Section 1: Purpose & Context

This template covers: • E-learning multimedia platforms in use • Instructional technologies and tools • Digital infrastructure and connectivity • Technology-Enhanced (TE) classroom models • TE ecosystems and governance • Policies, standards and sustainability	Key output: Benchmark standards for e-learning multimedia platforms and smart classroom models for Armenian HEIs - WP4 public deliverable
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Section 2: EU Partner HEI Profile

What is the institution's overall approach to digital transformation and e-learning?
Técnico Lisboa, as part of the University of Lisbon, does not operate under a single, standalone institutional e-learning strategy. Instead, its approach to digital transformation and technology-enhanced learning is embedded within broader institutional, national, and European frameworks. At national level, digital transformation in higher education is guided by key strategic initiatives such as INCoDe.2030 (launched in 2017), the Digital Transition Action Plan (2020), and alignment with the European Union's Digital Decade objectives. These frameworks define long-term priorities for digital skills development, infrastructure modernisation, and the integration of advanced technologies such as artificial intelligence into education.

At institutional level, digital priorities are further reflected in annual activity plans, which include actions related to the modernisation of digital infrastructure, the reinforcement of digital teaching tools, and the promotion of innovation in teaching and learning processes.

Within this context, IST has progressively developed its digital education practices over the past decade, with significant acceleration during and after the COVID-19 pandemic. Rather than focusing on fully online programmes, IST adopts a "digitally enhanced campus-based model", integrating digital tools and platforms into predominantly face-to-face teaching.

The main goals of this approach include:

- Enhancing the quality and flexibility of teaching and learning through digital tools;
- Supporting blended and hybrid learning models where appropriate;
- Strengthening digital competences of both students and academic staff;
- Expanding access to learning through initiatives such as MOOCs and online resources;
- Improving student engagement, monitoring, and feedback through digital systems and analytics.

This approach is supported by institutional structures such as the Pedagogical Council, IT Services, and academic development units, which ensure the continuous integration of digital technologies into teaching and learning processes.

Year digital strategy was adopted	Responsible unit/office for digital education
2003 (started with several aspects connected with our web based system info and the launch of our unit to support the digital technologies in teaching)	The Pedagogical Council defines the institutional policies for teaching and learning, including educational technology. An example is the website created to support COVID-19 response measures: https://sartre.tecnico.ulisboa.pt/en The strategy is coordinated with the Management Council, particularly regarding investment and long-term sustainability, while the Procurement Services ensure operational implementation. The Pedagogical Support Office (GOP) is responsible for managing teaching spaces and their audiovisual resources. The IT Services (SI) support the infrastructure, systems, and digital resources, with departments and units maintaining a degree of autonomy.

Section 3: E-Learning Multimedia Platforms

3.1 Learning Management System (LMS)

What LMS does the institution use?	
Técnico does not rely on a single LMS, instead using multiple platforms. FenixEdu offers a local based (in house production) and powerful version with functionalities such as worksheets, assessment materials, and bibliographic resources (exportable and sold to other universities in Portugal and outside the country – ISCTE/IUL and Universidade de Aveiro). Open edX has also been used for MOOCs as part of the institutional strategy. Some departments have adopted Moodle installations, although without institution-wide uptake. From 2020 onwards, departments began using Open edX as an LMS, but this has not been fully integrated into the school's digital strategy. At present, there is no single unified platform, although there is a clear ambition to move towards convergence in the future. Some other platforms as Microsoft Suites are used and there is a licence campus available in all the schools of the university.	
How long has the LMS been in use?	What percentage of courses actively use the LMS?
Since 2003, a basic version has been developed in FenixEdu (e.g. worksheets, assessment materials, and bibliographic resources). From 2014 onwards, Open edX began to be used for MOOCs as part of the institutional strategy. Moodle has been used by some departments through their own installations, and since 2020 it has also been made available by Técnico, although without institution-wide adoption. From 2020 onwards, departments started using Open edX as an LMS, but not yet integrated into the school's overall digital strategy. In recent years, a new version of FENIX EDU was launched based in what we called "CONNECT" where the system are more user friendly and based in different schemes for different purposes to manage processes, admission and selection, HR, International Affairs, Department levels, etc. THE LMS based on google is also an alternative used during several years but is becoming less popular in the last years with the recent developments of FENIX EDU, even if they have some integration.	There is no consolidated metric due to the diversity of platforms in use. Moodle usage is more significant in large-scale courses, particularly foundational units that are transversal across multiple programmes (e.g. Linear Algebra), but FENIX, namely, with SARTRE system already explained is used often.

Which LMS features are most actively used by staff and students?

The most commonly used functionalities are related to digital assessment (e.g. question banks for generating assessments according to defined criteria, gradebook configuration), content distribution, and communication with students. Other features are used with more variable frequency, such as creating sections with study materials, embedding videos, and developing automatically graded exercises.

How is the LMS integrated with other institutional systems?

The LMS (Moodle) is integrated with several institutional systems. It is connected to FenixEdu, the institution's academic information system, enabling synchronisation of course units, enrolments, and user data. Authentication is managed through the institutional single sign-on system (Técnico ID), ensuring secure and unified access to all platforms. The LMS is also integrated with external and internal tools, including video platforms (via embedded links), online assessment systems (e.g. ExonlineX), and collaboration tools. Library services and digital resources are accessible through institutional platforms and are often linked within the LMS environment.

3.2 Multimedia and Video Tools

What tools are used to create, host, and deliver multimedia content (video, audio, interactive media)?

There are tools available in classrooms, such as interactive displays, which can be used for teaching and learning purposes. There is also a studio and equipment for image, audio, and video production, currently managed by the Content and Media Unit of the Communication, Image and Marketing Area (e.g. for MOOCs). In addition, various software tools are made available (some of which are listed on the Técnico Lisboa Software Portal: <https://si.tecnico.ulisboa.pt/software/>). There is no knowledge of other tools being provided in a fully centralised manner, although additional resources may be used independently by teaching staff.

Are lecture capture or screen recording tools in use?

There are tools available in classrooms, such as interactive displays, which can be used for teaching and learning purposes. MOOC training modules are recorded in Técnico's studio, which is equipped with a range of production tools. There is also the possibility of remote recording, with frequent use of Zoom (Pro license) and Microsoft Teams between 2020 and 2025. It is recommended to verify with the Pedagogical Council whether a

Are interactive video or H5P-type tools used?

Our systems support the use of H5P, but we do not have information regarding the monitoring of its actual usage.

structured institutional policy exists regarding the recording of in-person classes.	
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What is the policy on multimedia content ownership, storage, and accessibility?

The University of Lisbon has regulations governing intellectual property and copyright. However, information regarding a university wide policy specifically addressing multimedia content ownership, storage and accessibility is not centrally available. These aspects are generally addressed through applicable legal requirements, institutional regulations and the practices of individual schools and services.
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3.3 Collaboration and Communication Tools

What digital tools are used for online assessment, quizzes, and automated feedback?

A range of digital tools is used to support online assessment, quizzes, and feedback. These include built-in LMS quiz functionalities (Moodle), as well as dedicated platforms such as ExonlineX for online exams. Additional tools such as Socrative and Kahoot are used for formative assessment and interactive quizzes. Plagiarism detection is supported through tools such as Turnitin, particularly in the context of assignment submission. Automated feedback is partially implemented through quiz-based assessments and digital platforms, while more advanced AI-assisted grading is not yet widely adopted. Other tools as Google Classroom, Mentimeter or platforms to gamification are available to the use of professors.

How does the institution ensure academic integrity in digital assessments?
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Academic integrity in digital assessments is ensured through a combination of institutional guidelines, technological measures, and awareness initiatives. The Pedagogical Council has established guidelines and a code of conduct for online assessment, particularly following the increased use of digital tools during the COVID-19 period. These guidelines define appropriate practices for assessment design and student behaviour. Student authentication is ensured through the institutional single sign-on system (Técnico ID), which provides secure access to platforms and verifies user identity. In addition, plagiarism detection tools such as Turnitin are used, particularly in written assignments, to support academic integrity. The library also plays an active role by providing training and guidance on ethical research practices and proper citation. While dedicated remote proctoring systems are not systematically implemented, integrity is reinforced through assessment design, institutional policies, and student awareness. AI-based detection tools are not yet widely adopted in a structured manner. A recent manual was launched with rules and recommendations for the use of AI, written by an important set of professors, including Arlindo Oliveira that wrote books for MIT Press about AI.
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Section 4: Instructional Technologies and Infrastructure

4.1 Hardware and Physical Infrastructure

What hardware infrastructure supports digital teaching across the institution?	
Digital teaching is supported by institutional infrastructure and IT services, including access to digital platforms, computing resources, and technical support. Computer labs are available to students in each department, and teaching staff rely on institutional systems and personal devices to deliver digital content. The use of additional equipment and specific configurations may vary across departments and teaching spaces. Everything is possible to be configured in the own computers of each member of the community according the profile.	
Is there a device loan programme for students?	Is there a BYOD (Bring Your Own Device) policy?
No	This is standard practice at Técnico, supported by established guidelines on the ethical use of IT resources. The Técnico Acceptable Use Policy defines that institutional digital resources must be used for academic purposes and in alignment with the institution's mission, prohibiting unethical, illegal, or non-academic uses. Overall, the use of technological resources is expected to follow principles of responsibility, respect for other users, and compliance with institutional and legal frameworks. https://si.tecnico.ulisboa.pt/normas/uso-da-rede-do-tecnico/uso-aceitavel-da-rede-do-tecnico/.
Describe the institution's network and connectivity infrastructure.	
The institution operates a robust and high-performance network infrastructure supported by a dedicated fibre-optic backbone interconnecting all campuses (Alameda, Taguspark, and CTN). This backbone ensures high-speed, low-latency connectivity across all locations. External connectivity is provided through the national research and education network (RCTS - Rede Ciência, Tecnologia e Sociedade), managed by the Portuguese Foundation for Science and Technology (FCT). Through RCTS, the institution benefits from high-capacity Internet access and integration with international research networks such as GÉANT. Wireless connectivity is widely available across all campuses via the eduroam network, enabling secure and	

seamless access for the global academic community, as well as institutional Wi-Fi networks. These networks support a high density of devices in classrooms, laboratories, libraries, and common areas. In addition, specialised network segments are deployed to support research and laboratory environments, including high-performance computing, robotics, and experimental networks, ensuring dedicated performance and enhanced security. The entire infrastructure is centrally managed by IT Services, which implement security measures such as firewalls, intrusion detection systems, access control, and continuous monitoring to ensure network reliability, security, and performance.

4.2 Software and Licensing

What software licences does the institution provide to staff and students for digital teaching?

A range of software licenses is made available to support teaching and assessment, including platforms such as FenixEdu, Open edX, Moodle, Microsoft Teams, and Zoom. In particular, for assessment purposes, commonly used tools include ExonlineX, MOOC platforms, Google Classroom, Kahoot!, Fenix Worksheets, Técnico Quizzes, SpeedExam, CamScan, and Socrative. (<https://si.tecnico.ulisboa.pt/en/software/>)

4.3 Accessibility and Inclusive Technology

What accessibility technologies and provisions are in place?

The institution supports remote participation through the Colibri videoconferencing platform (Zoom-based), enabling access to teaching activities from different locations and operating systems (Windows, macOS and Linux). Accessibility provisions include screen sharing, digital content delivery, and the possibility of recording and making learning materials available through institutional platforms. No specific information was identified regarding assistive technologies, captioning services, screen-reader support, or other dedicated accessibility technologies.

Are digital accessibility standards formally applied (e.g. WCAG)?	Is there dedicated support for students with disabilities in digital learning?
The institution follows principles of digital accessibility, aligned with the Web Content Accessibility Guidelines (WCAG) as a recommended reference.	Yes. Instituto Superior Técnico provides dedicated support for students with disabilities and special educational needs through the Working Group for Students with Special Educational Needs (GENEE) and the institutional SSEN (Student with Special Educational Needs) framework. Students may request specific support measures and accommodations according to their individual needs. The

	institution promotes inclusion, accessibility and Universal Design principles, aiming to remove physical, technological and communication barriers and ensure equal access to learning opportunities. Support is available for students with sensory, motor, neurological, behavioural, emotional and specific learning difficulties.
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4.4 IT Support and Training for Staff

What IT support and training is available to teaching staff for instructional technology?
Teaching staff at Instituto Superior Técnico are supported through a combination of technical assistance and targeted training for instructional technology. IT Services provide ongoing technical support, including assistance with digital platforms (e.g. LMS, Microsoft Teams), troubleshooting, and guidance on the use of tools for teaching and assessment. In terms of training, the Pedagogical Council promotes several initiatives aimed at enhancing staff competences in digital teaching. The Digital+ programme focuses on developing digital skills and the effective use of educational technologies, including emerging tools such as AI. Complementary training is offered through the Pedagogia+ programme, which supports the integration of digital tools into pedagogical practices. Additional initiatives, such as Contigo+, provide targeted workshops on the use of specific technologies (e.g. AI tools) in teaching, learning, and assessment. Overall, teaching staff have access to both technical support and structured training opportunities to support the effective use of instructional technologies, although participation is generally voluntary rather than mandatory.

Is there a dedicated Learning Technology team or centre?	Is staff training in instructional technology mandatory?
No dedicated Learning Technology Centre has been identified. However, technology-enhanced learning is supported through the Information Systems Services (SI), which provide digital platforms, hybrid classroom infrastructure, technical support and guidance for teaching and learning technologies.	No, but the mandatory initial training for new workers are including some modules related with IT.

4.5 Pedagogical Approach

Methods used	How technology enhances learning
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The institution follows a digitally enhanced, campus-based pedagogical approach, combining traditional face-to-face teaching with the use of digital tools. Methods include blended and hybrid learning, supported by LMS platforms for content delivery, assignment submission, and assessment. Active learning approaches are also used, including project-based learning, collaborative activities, and the use of interactive tools (e.g. quizzes, forums). Digital tools are integrated to support student engagement, feedback, and continuous assessment. Overall, pedagogical methods are not based on a single formal model but are adapted by teaching staff, supported by institutional guidelines and training initiatives.	Technology enhances learning by enabling teaching staff to effectively integrate digital tools into their pedagogical practices. Through training initiatives and technical support, lecturers are better equipped to use platforms for content delivery, assessment, and student interaction. This contributes to more flexible and engaging learning environments, supporting blended and hybrid teaching approaches. Digital tools also facilitate continuous feedback, interactive activities, and improved communication between students and staff. Overall, technology enhances learning by supporting more dynamic, accessible, and student centred teaching practices.
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Section 5: Technology-Enhanced (TE) Ecosystems and Smart Classrooms

5.1 Smart Classroom Models

Describe the main smart classroom model(s) used at this institution.
The institution uses three main hybrid classroom models: Basic, Intermediate and Advanced Hybrid Classrooms. Basic Hybrid Classrooms: follow a traditional classroom layout and are equipped with a video camera, microphone and wired network connectivity. These rooms are designed to support hybrid teaching and videoconferencing, allowing simultaneous participation of in-person and remote students. Intermediate Hybrid Classrooms: are equipped with high-resolution PTZ cameras and integrated microphone/speaker systems connected through a single USB interface. These rooms support videoconferencing, remote participation and interactive teaching activities. Advanced Hybrid Classrooms: provide enhanced audiovisual capabilities, including one or two cameras, multiple microphones (tabletop, handheld and headset), loudspeakers, camera control units, audio mixers and video management systems. These spaces are designed for hybrid lectures, seminars, presentations and other teaching activities requiring advanced audio and video support.

The primary pedagogical use cases across all models are hybrid teaching, remote participation, videoconferencing and technology-enhanced learning.

How many smart classrooms exist across the institution?	What percentage of all teaching rooms are smart?
Approximately 80 Basic Hybrid Classrooms, 4 Advanced Hybrid Classrooms, and 2 Intermediate Hybrid Classrooms have been identified.	Some

Are there different tiers or types of smart classroom (e.g. basic, standard, advanced)?

Yes. The institution distinguishes between Basic, Intermediate, and Advanced Hybrid Classrooms.

5.2 Hybrid and Blended Teaching Spaces

Are there classrooms specifically designed for hybrid teaching?

Yes

Are hybrid classrooms a strategic priority?	What is the main driver for hybrid classroom investment?
Yes. The institution has invested in hybrid teaching infrastructure and digital learning technologies to support flexible and technology-enhanced education.	Post-COVID resilience, continuity of teaching activities, and support for flexible hybrid learning.

5.3 Specialist TE Learning Spaces

Are there specialist technology-enhanced spaces beyond standard classrooms?

Based on the available documentation, dedicated videoconferencing rooms and advanced hybrid teaching spaces have been identified. These facilities provide enhanced audiovisual capabilities for hybrid teaching and remote participation.

How are these specialist spaces managed, booked, and made accessible to students and staff?

The spaces are institutionally managed and supported by the Information Systems Services (IS). Access is provided through the institution's standard teaching and room

allocation processes. Technical support and user guidance are available when required. No specific information was identified regarding dedicated booking systems, opening hours, or formal barriers to access.

5.4 TE Ecosystem Governance and Standards

How does the institution define, maintain, and update its smart classroom and TE standards?

Standards are maintained through institutional technical specifications, equipment guidelines, and support provided by the Information Systems Services. No formal smart classroom standards framework was identified.

What procurement and lifecycle management process is followed for TE infrastructure?

Information not available.

Is there a formal TE classroom specification document?

Information on hybrid classrooms and videoconferencing at Técnico Lisboa is available online. For example, you may consult the following page: <https://tecnico.ulisboa.pt/pt/aulas-por-videoconferencia/#SalasHbridas>

Is there a sustainability or carbon reduction strategy for TE infrastructure?

No specific sustainability or carbon reduction strategy for Technology-Enhanced infrastructure was identified. Sustainability is addressed through broader institutional sustainability initiatives.

Section 6: Maturity Assessment and Benchmarking

6.1 Overall Benchmarking Summary

What is the single most impressive or distinctive practice you observed at this institution?

The most distinctive practice at Instituto Superior Técnico is the use of its Quality Assurance (QA) system to monitor and improve digital teaching. Digital tools and practices are systematically evaluated through course unit surveys, performance indicators, and stakeholder feedback. The results are used to support pedagogical improvements, staff development, and course adjustments. This stands out because digital education is continuously reviewed and improved, rather than implemented in isolated initiatives. It offers a structured and scalable model that could be valuable for Armenia.

What is the most distinctive feature you can describe for your institution?
A key distinctive feature of Instituto Superior Técnico is its digitally enhanced campus-based model. The institution prioritises face-to-face education while integrating digital tools to support teaching and learning. This allows flexibility and innovation without requiring a full transition to online education. This balanced approach makes digital transformation more accessible and sustainable, especially in contexts where fully online models are not yet feasible.

Is this model potentially transferable to Armenian HEIs?	What would be the main barriers to transfer?
Fully	The main barriers would be limited institutional capacity, digital infrastructure, and staff readiness. The implementation of structured QA systems and digital practices requires resources, technical support, and staff training, which may not yet be fully developed.

Section 7: Recommendations for Armenian HEIs

7.1 Priority Recommendations

What are your top 3 recommendations for Armenian HEIs based on this visit?
- Invest in scalable hybrid learning infrastructure. - Establish strong institutional support for digital learning. - Embed accessibility and inclusion in digital education.

7.2 Quick Wins vs Long-Term Investments

Quick wins (achievable within 1 year)	Longer-term investments (2-4 years)
- Equip selected classrooms for hybrid teaching - Develop institutional guidelines and training sessions - Strengthen accessibility and inclusion measures	- Develop a campus-wide smart classroom strategy - Expand specialist technology-enhanced learning spaces - Establish a dedicated digital learning support unit

Section 8: Best Practice Examples

8.1 Best Practice

Guidance: Describe a key TE-TLA best practice

Title: Dissemination of digital teaching practices
Problem addressed
Limited sharing of effective digital teaching practices across faculty.
Description
Digital teaching practices are shared through institutional mechanisms such as training programmes, internal guidelines, and good practice dissemination initiatives. This allows successful approaches to be progressively adopted by other faculty members.
Technologies used
LMS (Moodle), FenixEdu, Microsoft Teams, and online assessment tools.

8.2 Impact & Recommendations

Key Results
Improved teaching practices and increased use of digital tools across courses.
Student engagement
Greater interaction through digital tools, supporting participation and feedback.
Top 3 recommendations
- Integrate digital tools within QA processes - Promote sharing of good practices across faculty - Support the professors with referential programmes of training in digital competences
Transferability
Easily transferable through gradual adoption of digital tools and QA mechanisms.
Barrier

Limited resources, infrastructure, and staff digital readiness.

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