Guidelines for Human-Centered Digital Transformation in Higher Education

A Framework for the Responsible Integration of Artificial Intelligence in Teaching, Learning, Assessment and Institutional Governance

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DISCUSSION PAPER

Artificial Intelligence is not the destination of digital transformation;
it is one of its drivers.
The destination remains a human-centered university.

Executive Summary

Higher education is experiencing an unprecedented phase of digital transformation. The rapid development of Artificial Intelligence, and particularly Generative AI, does not replace this transformation but accelerates and reshapes it. AI is progressively becoming embedded in teaching, learning, assessment, research, institutional management, and quality assurance, transforming the ways in which knowledge is created, shared, evaluated, and governed. As a result, universities are increasingly challenged to integrate technological innovation while preserving educational quality, academic integrity, human judgement, and their broader social mission.

These Guidelines present a *Human-Centered Digital Transformation Framework for Higher Education*. Developed within the Erasmus+ eCAMPUS project, the framework provides a shared vision for the responsible integration of Artificial Intelligence into higher education. Rather than prescribing specific technologies or promoting particular AI tools, it offers a coherent set of principles, competences, pedagogical approaches, assessment strategies, governance models, and operational recommendations that support institutions in designing sustainable and human-centered processes of digital transformation.

The framework is intended for university leaders, educators, students, instructional designers, quality assurance agencies, technical and administrative staff, policymakers, and all stakeholders involved in the digital transformation of higher education. It supports both strategic institutional decision-making and the everyday educational practices through which digital transformation ultimately becomes meaningful.

The proposed framework is grounded in a set of guiding principles that place human agency at the centre of technological innovation. Transparency, critical evaluation, ethical responsibility, academic integrity, inclusion, accessibility, data protection, digital well-being, and continuous professional development are presented as essential conditions for the responsible use of Artificial Intelligence. Within this perspective, AI literacy is understood as a transversal dimension of

digital competence, enabling educators and learners not only to use AI effectively but also to critically evaluate, supervise, and govern Human–AI collaboration.

Building upon these principles, the Guidelines describe how Human-Centered Digital Transformation can be translated into educational practice through pedagogical innovation, authentic assessment, institutional governance, faculty development, quality assurance, and continuous organisational learning. The document therefore moves beyond the discussion of AI tools towards a comprehensive institutional framework that supports universities in managing technological change while strengthening educational quality and preserving human responsibility.

The framework is closely aligned with the DigiComArm Framework and the National Certificate Programme developed within the eCAMPUS project. While DigiComArm defines the digital competences expected of higher education educators, these Guidelines provide the ethical, pedagogical, and organisational orientation necessary for integrating Artificial Intelligence across those competences within teaching, learning, assessment, and institutional governance.

Ultimately, these Guidelines argue that the future of higher education will not be determined by the widespread adoption of Artificial Intelligence itself. Rather, it will depend on the capacity of universities to govern digital transformation in ways that strengthen human judgement, cultivate critical and responsible citizens, promote inclusion and innovation, and preserve the educational values upon which higher education is founded. Human-Centered Digital Transformation is therefore presented not as a technological objective, but as a strategic commitment to ensuring that digital innovation continues to serve people, learning, and society.

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Conceptual Framework

1 Introduction

1.1 Purpose of the Document

Higher education is undergoing a profound process of digital transformation that is reshaping teaching, learning, research, assessment, and institutional governance. Within this evolving landscape, Artificial Intelligence (AI), particularly Generative AI, has emerged as one of the most influential technological developments, creating unprecedented opportunities while raising significant pedagogical, ethical, and organisational challenges [14, 15, 19].

The purpose of these Guidelines is to provide a common reference framework for supporting Human-Centered Digital Transformation in higher education. Instead of prescribing the adoption of specific AI technologies, the document proposes a coherent set of principles, competences, pedagogical approaches, assessment strategies, governance models, and operational recommendations that enable universities to integrate Artificial Intelligence responsibly while preserving human agency, academic integrity, inclusion, and educational quality.

The Guidelines are intended for university educators, institutional leaders, quality assurance bodies, instructional designers, technical staff, policymakers, and students. They support both strategic institutional decision-making and the everyday educational practices through which digital transformation ultimately becomes meaningful.

More broadly, the document provides a shared conceptual and operational framework to help higher education institutions govern digital transformation while ensuring that technological innovation remains aligned with educational values and institutional missions.

1.2 Digital Transformation in the Age of Artificial Intelligence

Digital transformation extends far beyond the adoption of digital technologies. It is a continuous process of organisational, pedagogical, and cultural change that redefines how educational institutions create, manage, and disseminate knowledge. As discussed by Lindebaum et al. [16], the emergence of AI is transforming not only educational practices but also the nature of epistemic agency within higher education.

Over the past two decades, universities have progressively integrated learning management systems, digital learning environments, open educational resources, learning analytics, and collaborative platforms into their educational ecosystems.

The rapid evolution of Artificial Intelligence represents a new stage within this broader transformation. Rather than replacing digital transformation, AI accelerates and extends it by introducing cognitive capabilities into educational processes. AI systems increasingly support content generation, information retrieval, tutoring, assessment, feedback, data analysis, and decision-making, becoming an integral component of contemporary higher education.

These Guidelines therefore interpret Artificial Intelligence as one of the principal drivers of digital transformation rather than as an independent technological phenomenon. This perspective emphasises that AI should remain embedded within broader educational objectives, institutional governance, and professional practice.

Accordingly, the framework adopts the concept of *Human-Centered Digital Transformation*, highlighting that digital innovation should ultimately strengthen human judgement, crit-

ical thinking, inclusion, educational quality, and institutional responsibility, consistently with Floridi's human-centred approach to AI ethics [13].

1.3 Relation with the eCAMPUS Project

These Guidelines have been developed within the Erasmus+ Capacity Building project *eCAMPUS*, whose overarching objective is to support the digital transformation of higher education in Armenia through the development of institutional capacities, educator competences, innovative pedagogical practices, quality assurance mechanisms, and sustainable professional development.

Within this context, the Guidelines complement the project's main outcomes by providing a shared reference framework for the responsible educational use of Artificial Intelligence. They contribute to the coherence between educator training, institutional policies, quality assurance, and the long-term sustainability of digital innovation across Armenian higher education institutions [10].

1.4 Relation with DigiComArm

The Guidelines are closely aligned with the *DigiComArm Framework*, which defines the digital competences expected of higher education educators in Armenia [10]. While DigiComArm establishes the competence framework supporting professional development and certification, the present document complements it by providing the pedagogical, ethical, governance, and implementation principles required for the responsible integration of Artificial Intelligence across those competence areas.

Accordingly, AI literacy is considered a transversal dimension of digital competence rather than an isolated technical skill. It permeates professional engagement, digital resource creation, teaching and learning, assessment, learner empowerment, and institutional quality assurance, consistently with the evolution of international competence frameworks such as DigComp 3.0 [8], DigCompEdu [21], the AI Pioneers extension to DigCompEdu [7], and UNESCO's AI Competency Frameworks for teachers and students [17, 18].

Together, DigiComArm and these Guidelines provide complementary perspectives. DigiComArm identifies *what* competences educators should develop, while the present framework explains *how* those competences can be enacted within a Human-Centered Digital Transformation of higher education.

2 Human-Centered Digital Transformation in Higher Education

Digital transformation has become one of the defining characteristics of contemporary higher education. As observed by Lindebaum et al. [16], universities are progressively redesigning their educational, organisational, and administrative processes in response to evolving pedagogical approaches, societal expectations, and rapidly changing technological developments.

Within this broader evolution, Artificial Intelligence represents a new stage of digital transformation rather than a separate technological revolution. Holmes et al. [14], Kasneci et al. [15], and Mollick [19] have shown how AI extends the role of digital technologies beyond supporting educational activities to participating directly in knowledge creation, reasoning, communication, assessment, and decision-making.

The guiding principle adopted throughout these Guidelines is that *Artificial Intelligence constitutes an enabling layer of Human-Centered Digital Transformation.* Technology should therefore remain aligned with educational purposes, institutional responsibility, human agency, and the public mission of higher education. AI is not the objective of digital transformation, but one of the principal means through which it is realised.

Figure 1 summarises the conceptual framework adopted throughout these Guidelines.

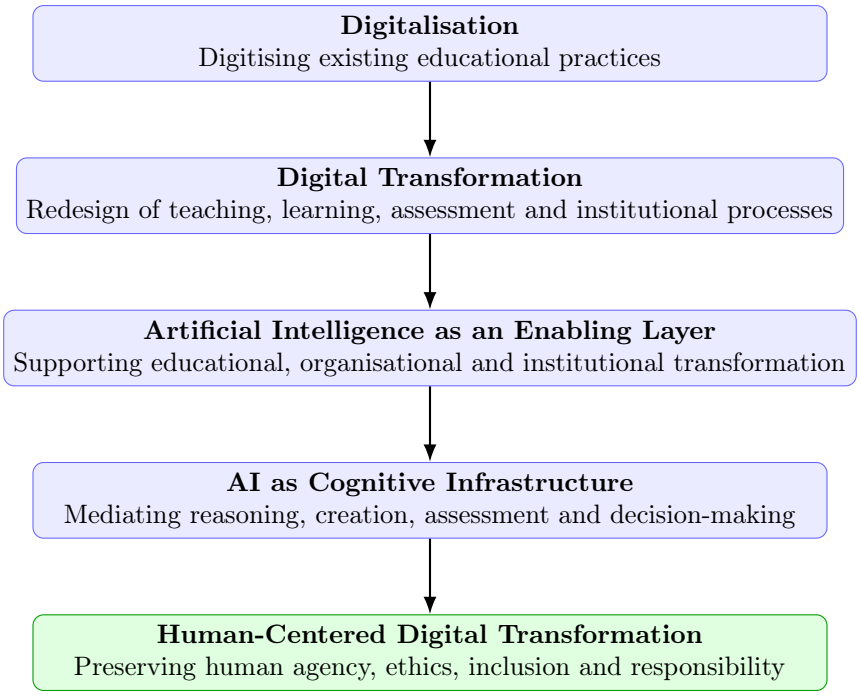

Figure 1: Evolution from digitalisation to human-centered digital transformation.

2.1 From Digitalisation to Digital Transformation

The digital evolution of higher education has developed progressively over the last decades.

The first stage can be described as *digitalisation*, namely the conversion of existing educational resources, administrative procedures, and communication channels into digital formats. During this phase, universities adopted Learning Management Systems, digital repositories, online communication platforms, electronic examinations, and virtual learning environments. Although these technologies improved efficiency and accessibility, they generally reproduced existing educational models without fundamentally changing how teaching and learning were organised.

Digital transformation represents a broader and more systemic process. Rather than introducing digital technologies into existing practices, it redesigns educational ecosystems, institutional processes, and organisational cultures. Teaching becomes increasingly learner-centred, collaborative, flexible, and data-informed. Assessment evolves towards authentic and continuous evaluation, while institutional quality assurance progressively incorporates digital evidence, learning analytics, and continuous monitoring.

Digital transformation should therefore be understood as a continuous process of educational and organisational redesign in which digital technologies, professional development, and institutional innovation evolve together to improve educational quality.

2.2 Artificial Intelligence as an Enabling Layer of Digital Transformation

The emergence of Artificial Intelligence marks a new stage within this ongoing transformation.

Unlike previous digital technologies, AI systems are capable of generating content, analysing information, interacting through natural language, supporting complex reasoning, assisting decision-making, and adapting dynamically to user needs. These capabilities significantly expand the potential of digital technologies across all dimensions of higher education.

Artificial Intelligence therefore acts as an accelerator of digital transformation. It enables personalised learning experiences, intelligent tutoring, automated feedback, multilingual communication, adaptive assessment, learning analytics, and evidence-informed institutional management. At the same time, AI challenges universities to rethink pedagogical models, assessment

strategies, educator competences, and institutional governance while operating within emerging regulatory frameworks such as the European Union AI Act [9].

For these reasons, the integration of AI should not be interpreted as the introduction of another educational technology, but as the emergence of a new phase of digital transformation in which cognitive capabilities become embedded within educational processes.

2.3 From Educational Technology to Cognitive Infrastructure

The growing integration of Artificial Intelligence fundamentally changes the educational role of technology.

Traditional digital technologies primarily facilitated communication, information access, collaboration, and content delivery. Generative AI, by contrast, actively participates in cognitive activities that were previously performed exclusively by human actors. AI systems increasingly contribute to idea generation, content creation, programming support, data analysis, formative feedback, language mediation, problem solving, and knowledge organisation.

AI is progressively becoming part of the cognitive infrastructure of higher education. As discussed in Adorni's framework on AI-mediated higher education [2], AI increasingly mediates interactions among learners, educators, knowledge resources, and institutional processes rather than functioning merely as an external tool.

This transformation does not diminish the importance of human expertise. On the contrary, it increases the need for critical judgement, reflective thinking, ethical awareness, and responsible decision-making. As AI assumes a greater role in supporting cognitive activities, the responsibility of educators and institutions shifts from simply using digital technologies to governing their educational integration.

This transition from educational technology to cognitive infrastructure represents one of the defining characteristics of Human-Centered Digital Transformation. Consequently, the educational challenge is no longer simply learning how to use AI tools, but developing the capacity to govern Human–AI collaboration while preserving human judgement, epistemic agency, and institutional responsibility [4].

2.4 Opportunities for Teaching, Learning, Assessment and Quality Assurance

Artificial Intelligence creates significant opportunities to enhance educational quality across the entire higher education ecosystem. Its value lies not simply in automating existing practices, but in supporting new forms of teaching, learning, assessment, and institutional quality assurance that are more personalised, reflective, inclusive, and evidence-informed.

In teaching, AI can assist educators in curriculum planning, the creation and adaptation of learning resources, the design of authentic learning activities, and the provision of timely formative feedback. By reducing the time required for routine or repetitive tasks, AI allows educators to devote greater attention to pedagogical design, learner support, and meaningful educational interaction.

For learners, AI offers opportunities to personalise learning pathways, receive immediate feedback, explore alternative explanations, and engage in iterative problem solving. When integrated within appropriate pedagogical designs, AI can strengthen learner agency by encouraging students to question, verify, refine, and apply knowledge rather than simply consume information.

Assessment also benefits from AI when it is designed to make learning processes more visible rather than merely evaluate final products. AI can support formative assessment, personalised feedback, learning analytics, and the documentation of learning trajectories, while educators retain responsibility for interpreting evidence, exercising professional judgement, and making certification decisions.

At the institutional level, Artificial Intelligence can support quality assurance through the analysis of educational data, the identification of emerging trends, the monitoring of learner en-

gagement, and evidence-informed decision-making. These capabilities should strengthen institutional learning and continuous improvement rather than replace human oversight or governance.

The educational value of AI therefore depends less on its technical capabilities than on the pedagogical approaches through which it is integrated into teaching and learning. Prompt-Based Learning, for example, has been proposed as a pedagogical model in which structured interaction with AI becomes an opportunity to develop problem solving, critical thinking, metacognition, and Reflective Human–AI Collaboration rather than simply generate content [5].

These opportunities demonstrate that the educational potential of Artificial Intelligence extends well beyond efficiency gains. When guided by sound pedagogical design and responsible institutional governance, AI can contribute to richer learning experiences, more authentic assessment, and continuous educational improvement while preserving human agency and educational quality. Consistent with the Human-Centered Digital Transformation Framework, technology creates value only when it strengthens human capabilities rather than replacing them.

2.5 Risks and Challenges for Human-Centered Digital Transformation

The opportunities offered by Artificial Intelligence are accompanied by equally significant challenges.

From a technological perspective, AI systems may generate inaccurate information, reproduce algorithmic biases, compromise privacy, or operate without sufficient transparency.

From an educational perspective, excessive reliance on AI may reduce learners' engagement in higher-order cognitive processes, encourage superficial learning, weaken critical thinking, and undermine academic integrity. Similarly, educators may become increasingly dependent on automated systems for designing educational activities, generating feedback, or evaluating student performance.

From an institutional perspective, universities must also address issues of digital inequality, unequal access to AI technologies, concentration of technological power, regulatory compliance, and the long-term sustainability of AI-enhanced educational ecosystems.

These challenges demonstrate that the central question is no longer whether Artificial Intelligence should be adopted in higher education. Rather, the challenge is how digital transformation can be governed in ways that preserve human agency, educational quality, institutional responsibility, and the fundamental values of higher education.

For this reason, the following chapters propose a set of guiding principles for Human-Centered Digital Transformation in higher education. Their common objective is to ensure that Artificial Intelligence is integrated in ways that strengthen human capabilities while preserving human judgement, educational quality, institutional responsibility, and the fundamental values of higher education.

3 Guiding Principles for Human-Centered Digital Transformation

Human-Centered Digital Transformation requires more than the adoption of new technologies. It depends on a shared set of educational, ethical, organisational, and governance principles that guide how Artificial Intelligence is integrated into higher education.

The principles presented in this chapter constitute the normative foundation of these Guidelines. Rather than prescribing specific technologies or institutional procedures, they establish a common reference framework for decision-making at institutional, pedagogical, and individual levels. Their purpose is to ensure that digital transformation strengthens educational quality, human agency, inclusion, and institutional responsibility while remaining adaptable to future technological developments.

Taken together, these principles support a vision of higher education in which Artificial Intelligence is integrated responsibly, transparently, and in ways that remain consistently aligned with the fundamental values of universities.

3.1 Human Agency, Human Judgement and Human Oversight

Principle. Human agency and human judgement remain the foundation of all educational decisions. Artificial Intelligence should support and extend human capabilities, but responsibility for educational decisions must always remain with human actors. Curriculum design, teaching strategies, assessment, learner support, and institutional policies require contextual understanding, ethical judgement, and professional responsibility that cannot be delegated entirely to automated systems.

Human oversight is therefore not merely a safeguard against technological limitations. It is an essential characteristic of education itself. Teaching and learning involve interpretation, dialogue, values, and responsibility that extend beyond the computational capabilities of AI systems.

Accordingly, AI is understood as an enabling component of educational ecosystems that assists educators and learners without replacing human judgement. This principle is consistent with Floridi's human-centred approach to AI ethics [13] and with the European Union AI Act, which maintains that responsibility for decisions supported by AI ultimately remains with human actors [9].

3.2 Transparency, Traceability and Declaration of AI Use

Principle. The educational use of Artificial Intelligence should be transparent, documented, and understandable. Transparency is a fundamental condition for trustworthy Human–AI collaboration in higher education. Educators, students, and institutions should clearly communicate when, why, and how Artificial Intelligence has been used within teaching, learning, assessment, research, and institutional activities.

Transparency extends beyond simply declaring that AI has been used. It also involves documenting the educational purpose of AI use, the extent of human contribution, and the role played by AI in supporting decision-making or knowledge creation. Such information enables educators, learners, and institutions to interpret educational outcomes appropriately and strengthens trust in AI-supported practices.

Transparent practices promote academic integrity, facilitate authentic assessment, and encourage responsible rather than hidden or indiscriminate uses of AI. They also provide a foundation for accountability, continuous improvement, and evidence-informed educational governance.

Transparency should therefore be understood as a pedagogical principle rather than an administrative requirement. As emphasised by the European Union AI Act [9], transparent AI use strengthens accountability, while the Human-Centered Digital Transformation Framework extends this principle by promoting reflection, dialogue, and responsible Human–AI collaboration [2].

3.3 Critical Evaluation and Human Verification

Principle. AI-generated outputs should always be subject to human verification and critical evaluation. Artificial Intelligence generates plausible responses rather than verified knowledge. Its outputs are produced through probabilistic models and therefore require interpretation, validation, and contextualisation before being incorporated into educational activities.

Educators and learners should develop the ability to critically evaluate AI-generated content by assessing its accuracy, reliability, relevance, coherence, completeness, and potential biases. Verification should be carried out through comparison with authoritative sources, disciplinary knowledge, empirical evidence, and informed professional judgement.

The educational objective is therefore not simply learning how to obtain AI-generated answers, but developing the capacity to question, interpret, validate, and appropriately integrate them into human reasoning.

Critical evaluation transforms interaction with AI from passive acceptance into an active process of knowledge construction. Developing this capacity is recognised by DigComp 3.0 as a fundamental component of digital competence, particularly within AI-mediated environments [8].

3.4 Reflective Human–AI Collaboration and Intentional Delegation

Principle. Collaboration with Artificial Intelligence should be intentional, reflective, and guided by human judgement. The educational value of Artificial Intelligence does not depend on the amount of AI employed, but on the quality of the human decisions that guide its use. Effective Human–AI collaboration requires individuals to make conscious choices about which cognitive activities may appropriately be supported by AI and which should remain under direct human responsibility.

This process is described in these Guidelines as *Reflective Delegation*: the deliberate and conscious decision to delegate selected cognitive activities to Artificial Intelligence while preserving human judgement, critical evaluation, and responsibility for educational decisions. Delegation therefore represents an active exercise of human judgement rather than a transfer of responsibility.

Within higher education, reflective Human–AI collaboration encourages learners and educators to use AI not as a substitute for intellectual effort, but as a cognitive partner that stimulates questioning, exploration, creativity, and critical reflection. AI-supported activities should therefore strengthen metacognition and problem solving rather than promote passive acceptance of generated outputs.

The concept of Reflective Delegation, introduced in recent work on Human–AI collaboration [6], represents the operational expression of AI literacy developed throughout these Guidelines. It complements the broader perspective of Human-Centered Digital Transformation proposed in [2].

3.5 Privacy, Data Protection and Intellectual Property

Principle. Human-Centered Digital Transformation requires the responsible protection of personal data, educational resources, and intellectual contributions. Artificial Intelligence relies on the collection, processing, and generation of large amounts of information. Consequently, the responsible integration of AI into higher education requires careful attention to the protection of personal data, institutional information, research outputs, and educational resources.

Educators, students, and institutions should ensure that AI-supported activities comply with applicable legal and ethical frameworks concerning privacy, data protection, copyright, licensing, and intellectual property. Users should also be aware of the terms of service, data retention policies, and potential risks associated with sharing personal, confidential, or sensitive information with AI systems.

Respect for privacy and intellectual property extends beyond legal compliance. It contributes to building trust, safeguarding academic integrity, protecting individual and institutional rights, and fostering a secure environment for teaching, learning, and research.

Transparency regarding the use of AI, together with appropriate documentation of human contributions, further supports the protection of intellectual property and the recognition of authorship.

In educational practice, responsible data stewardship and respect for intellectual contributions are therefore essential conditions for the trustworthy and sustainable use of Artificial In-

telligence [9, 1, 22].

3.6 Accessibility, Inclusion and Digital Well-being

Principle. Human-Centered Digital Transformation should promote accessible, inclusive, and sustainable learning environments. Digital transformation should expand educational opportunities for all learners by reducing barriers to participation and supporting diverse learning needs. Artificial Intelligence offers significant potential for improving accessibility through multilingual communication, adaptive learning pathways, assistive technologies, personalised support, and more flexible forms of interaction.

At the same time, educational innovation should contribute to learners' and educators' digital well-being. AI-supported environments should avoid unnecessary complexity, excessive automation, cognitive overload, and digital dependency. Technologies should remain understandable, transparent, and designed to support meaningful human learning rather than continuous technological interaction.

Accessibility and digital well-being should therefore be considered complementary dimensions of educational quality. An inclusive learning environment is one that enables all learners to participate effectively while preserving autonomy, motivation, critical thinking, and healthy relationships with digital technologies.

This perspective is consistent with DigComp 3.0, which recognises accessibility and inclusion as essential dimensions of digital competence [8], and with the OECD Teaching Compass, which places learner well-being and agency at the centre of educational innovation [20].

3.7 Shared Responsibility and Human Accountability

Principle. Responsibility for AI-supported education is shared among stakeholders, while accountability always remains human. Human-Centered Digital Transformation requires the active participation of all actors within the higher education ecosystem. Institutional leaders, educators, students, technical and administrative staff, quality assurance bodies, and technology providers all contribute to ensuring that Artificial Intelligence is integrated responsibly, ethically, and consistently with institutional values.

Although responsibilities differ according to institutional roles, accountability for educational decisions, learning outcomes, assessment practices, and institutional policies cannot be delegated to AI systems. Artificial Intelligence may support analysis, generate recommendations, or assist decision-making, but responsibility for interpreting information, making decisions, and evaluating their consequences always remains with human actors.

Shared responsibility therefore requires collaboration, transparency, and continuous dialogue among all stakeholders. Effective governance depends not only on appropriate technologies, but also on clearly defined roles, professional competences, institutional policies, and mechanisms for monitoring and continuous improvement.

As emphasised by the OECD Teaching Compass [20], educational innovation depends upon shared institutional responsibility, while accountability for educational decisions ultimately remains human.

No AI system can be accountable for educational decisions. Accountability ultimately resides with the individuals and institutions that design, implement, and govern educational processes.

3.8 Continuous Revision and Living Guidelines

Principle. Human-Centered Digital Transformation requires continuous learning, evaluation, and adaptation.

Digital transformation is an ongoing process rather than a fixed destination. Artificial Intelligence technologies, educational practices, regulatory frameworks, and societal expectations

continue to evolve, creating new opportunities while introducing new pedagogical, ethical, and organisational challenges.

Institutional policies and guidelines should therefore not be regarded as static documents. Instead, they should be regularly reviewed and refined through educational research, professional practice, quality assurance processes, stakeholder dialogue, and emerging scientific evidence.

Effective implementation also requires mechanisms for continuous monitoring, institutional reflection, and organisational learning. Feedback from educators, students, technical staff, institutional leaders, and quality assurance processes should inform the progressive refinement of both educational practices and institutional policies.

This perspective is consistent with UNESCO's vision of higher education as a continuously evolving ecosystem, in which institutions are expected to adapt their strategies and practices in response to technological, educational, and societal change [24]. Accordingly, these Guidelines are conceived as *living guidelines*: a dynamic framework that should evolve together with higher education while remaining grounded in educational quality, human agency, ethical responsibility, and the public mission of universities.

Ultimately, Human-Centered Digital Transformation is not achieved through the publication of guidelines alone, but through a sustained institutional commitment to continuous learning, reflection, collaboration, and responsible innovation.

4 Competences for Human-Centered Digital Transformation

Human-Centered Digital Transformation depends not only on technological innovation and institutional policies, but also on the competences that enable people to use digital technologies and Artificial Intelligence responsibly, critically, ethically, and effectively.

As Artificial Intelligence becomes increasingly embedded within teaching, learning, assessment, research, and institutional governance, educators, students, institutional leaders, and technical staff require new forms of professional expertise that combine digital competence, pedagogical knowledge, ethical awareness, critical thinking, and the capacity to collaborate reflectively with intelligent systems.

The guiding principle adopted throughout this chapter is that *AI literacy is a transversal dimension of digital competence*. Rather than introducing a separate competence domain, AI literacy extends existing digital competences by enabling individuals to engage critically, responsibly, and effectively with AI-supported educational environments.

Accordingly, this chapter presents an integrated competence ecosystem in which Digital Competence constitutes the educational foundation, AI Literacy represents a transversal capability, and Reflective Human–AI Collaboration becomes the operational expression of responsible AI use in higher education.

4.1 Digital Competence as the Foundation

Digital competence constitutes the educational foundation of Human-Centered Digital Transformation. It encompasses the knowledge, skills, attitudes, and values required to use digital technologies confidently, critically, responsibly, and ethically across professional, educational, and societal contexts.

Within higher education, digital competence extends well beyond technical proficiency. It includes the capacity to design learner-centred educational experiences, manage and create digital resources, foster collaboration and communication, assess learning, promote accessibility and inclusion, protect personal data, and contribute to institutional quality assurance and continuous improvement.

Contemporary competence frameworks recognise digital competence as a dynamic and evolving capability rather than the mastery of specific technologies. DigComp 3.0 defines the general

framework for citizens [8], DigCompEdu adapts these competences to educators [21], while DigiComArm contextualises them within the Armenian higher education system and the objectives of the eCAMPUS project [10]. UNESCO's AI Competency Framework further extends this perspective by addressing the responsible educational use of Artificial Intelligence.

Within this perspective, digital competence should be understood not as an end in itself, but as the educational foundation that enables Human-Centered Digital Transformation across teaching, learning, assessment, research, and institutional governance. It provides the knowledge, professional judgement, and critical awareness upon which AI literacy and responsible Human–AI collaboration can progressively develop.

4.2 AI Literacy as a Transversal Competence

The growing integration of Artificial Intelligence into higher education does not require a separate domain of competence. Rather, it extends and enriches existing digital competences by enabling educators, students, institutional leaders, and technical staff to engage critically, responsibly, and effectively with intelligent systems.

AI literacy should therefore be understood as a transversal competence embedded within digital competence rather than as an isolated technical skill. It encompasses the knowledge, skills, attitudes, and values required to understand the capabilities and limitations of AI systems, critically evaluate their outputs, recognise potential biases and risks, make informed decisions about their use, and integrate them appropriately into educational and institutional practices.

Within this perspective, AI literacy permeates every area of digital competence. It influences professional communication, the creation and management of digital resources, learning design, assessment, learner support, accessibility, quality assurance, research, and institutional governance. Rather than replacing existing competence frameworks, AI literacy strengthens them by introducing new forms of Human–AI interaction that require critical thinking, ethical awareness, transparency, and responsible decision-making.

Consequently, AI literacy should be developed across the entire higher education ecosystem rather than being confined to specialised courses or technical training. This perspective is consistent with DigComp 3.0 [8], DigCompEdu [21], UNESCO's vision of AI-enabled education [23], and the DigiComArm Framework [10], all of which recognise AI-related competences as an integral component of lifelong learning and continuous professional development.

If digital competence enables individuals to operate effectively within digital environments, AI literacy enables them to exercise informed judgement within AI-mediated environments.

4.3 From AI Literacy to Reflective Human–AI Collaboration

As Artificial Intelligence becomes increasingly embedded within teaching, learning, assessment, research, and institutional processes, competence development extends beyond understanding AI systems to the ability to collaborate with them responsibly and effectively.

Within these Guidelines, Reflective Human–AI Collaboration is the operational expression of AI literacy in educational practice. If AI literacy enables individuals to understand and evaluate Artificial Intelligence, Reflective Human–AI Collaboration enables them to work with AI responsibly, intentionally, and critically in authentic educational contexts.

A central component of this competence is *Reflective Delegation*: the conscious and deliberate decision to delegate selected cognitive activities to Artificial Intelligence while retaining responsibility for interpreting, validating, integrating, and communicating the final outcomes. Reflective Delegation therefore represents an active exercise of human judgement rather than a transfer of educational responsibility.

In this perspective, Artificial Intelligence is neither an autonomous decision-maker nor a simple software tool. Instead, it functions as a cognitive partner whose educational value de-

pends fundamentally on the quality of human supervision, critical evaluation, reflective decision-making, and pedagogical intentionality.

The concept of Reflective Human–AI Collaboration builds upon recent work on Reflective Delegation [3] and extends it into a broader educational framework for Human-Centered Digital Transformation [2]. Its objective is not to maximise the use of Artificial Intelligence, but to develop the capacity to decide when, how, and to what extent AI should support human thinking while preserving epistemic agency, educational quality, and institutional responsibility.

4.4 Towards an Integrated Competence Ecosystem

The proposed competence ecosystem integrates Digital Competence, AI Literacy, and Reflective Human–AI Collaboration into a coherent educational framework.

Within this ecosystem, Digital Competence represents the broad educational foundation that enables educators and learners to participate effectively in digitally mediated environments. AI Literacy builds upon this foundation by developing the knowledge, critical understanding, and responsible use of AI systems. These competence dimensions are complementary and mutually reinforcing.

Their integration enables Reflective Human–AI Collaboration, in which educators and students intentionally combine human judgement with AI capabilities through critical evaluation, ethical awareness, and informed decision-making. In this perspective, AI is not viewed as a substitute for human expertise but as a cognitive partner whose contribution remains under meaningful human oversight.

The competence ecosystem presented in this chapter is fully consistent with the objectives of the DigiComArm Framework and the National Certificate Programme. It connects existing European and international competence frameworks into a coherent educational perspective that supports Human-Centered Digital Transformation while preserving educational quality, human agency, and institutional responsibility.

Figure 2 summarises the competence ecosystem adopted throughout these Guidelines.

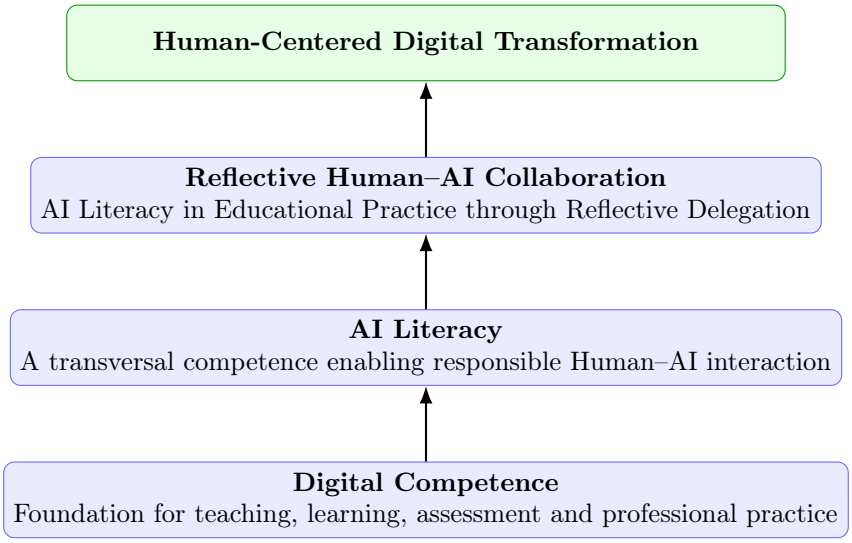

Figure 2: Relationship between Digital Competence, AI Literacy and Reflective Human–AI Collaboration.

The competence ecosystem presented in this chapter provides the conceptual foundation for the educational practices discussed in the following chapters. The principles introduced so far acquire practical meaning only when translated into approaches for teaching, learning, assessment, and institutional governance.

5 Pedagogical Transformation

Human-Centered Digital Transformation ultimately becomes meaningful through pedagogical practice. While digital technologies and Artificial Intelligence create unprecedented opportunities for innovation, educational quality continues to depend primarily on how learning experiences are designed, facilitated, and assessed.

Artificial Intelligence should therefore be understood as a pedagogical resource rather than a pedagogical driver. Educational objectives, learner needs, disciplinary contexts, and intended learning outcomes should determine when, how, and to what extent AI is integrated into teaching and learning.

Within this perspective, pedagogy continues to shape technology rather than the opposite. Within this perspective, pedagogy continues to shape technology rather than the opposite. Educational innovation therefore depends on learning environments in which Artificial Intelligence supports inquiry, critical thinking, collaboration, creativity, and reflective learning while preserving human agency, educational quality, and institutional responsibility.

This perspective is consistent with DigCompEdu [21], DigComp 3.0 [8], the OECD Teaching Compass [20], and the DigiComArm Framework [10].

5.1 Designing Human-Centered Learning Experiences

Effective educational design begins with learning objectives rather than technological choices. Intended learning outcomes, learner characteristics, disciplinary contexts, assessment strategies, and educational values should guide decisions about whether, when, and how Artificial Intelligence can meaningfully contribute to teaching and learning.

AI can assist educators in curriculum planning, the design of learning activities, the creation and adaptation of educational resources, the provision of formative feedback, and the personalisation of learning experiences. However, these activities continue to rely on pedagogical expertise, professional judgement, and ethical responsibility. As emphasised by DigCompEdu, technology supports educational practice only when it is guided by sound pedagogical design rather than technological availability [21].

Human-centered learning experiences should foster inquiry, dialogue, collaboration, authentic problem solving, creativity, and reflective thinking. Learners should be encouraged not only to use AI, but also to question its outputs, compare alternative perspectives, verify evidence, and integrate AI-supported knowledge into their own reasoning. This learner-centred perspective is consistent with the OECD Teaching Compass, which places learner agency and well-being at the core of educational innovation [20].

Educational design should therefore strengthen learner agency, intellectual autonomy, and Reflective Human–AI Collaboration while ensuring that technology consistently serves educational purposes rather than defining them.

5.2 Active Learning and Student Engagement

Human-Centered learning emphasises the active participation of learners in the construction of knowledge rather than the passive reception of information. In AI-supported educational environments, student engagement depends less on access to technology than on the quality of the learning activities through which technology is used.

Artificial Intelligence can enrich active learning by supporting inquiry, experimentation, collaborative problem solving, immediate formative feedback, and personalised learning pathways. These opportunities are educationally valuable only when learners remain actively involved in interpreting evidence, making decisions, and reflecting on their own learning processes.

Educational activities should therefore encourage students to formulate questions, explore alternative solutions, compare AI-generated outputs with disciplinary knowledge, and justify

their conclusions through evidence and reasoned argument. Such approaches strengthen learner agency by positioning students as active participants in knowledge construction rather than passive recipients of AI-generated information. This learner-centred perspective is consistent with the OECD Teaching Compass, which identifies agency, well-being, and active participation as essential dimensions of future-oriented education [20].

Meaningful engagement also requires opportunities for dialogue, collaboration, peer learning, and reflection. As highlighted in UNESCO's vision for the future of higher education, educational innovation should strengthen learners' capacity to think critically, collaborate effectively, and adapt continuously to changing technological and societal contexts [24].

Student engagement should therefore be evaluated not by the amount of AI employed, but by the quality of learners' cognitive, collaborative, and reflective participation. The educational objective is to develop individuals who can learn effectively with AI while preserving intellectual autonomy, critical judgement, and responsibility for their own learning.

5.3 Prompt-Based Learning as a Pedagogical Model

Prompt-Based Learning (PBL) is a pedagogical model that treats interaction with Artificial Intelligence as a learning activity rather than simply as a means of generating content. Instead of focusing on the production of answers, PBL emphasises the formulation of questions, the iterative refinement of prompts, the critical evaluation of AI-generated outputs, and the reflective construction of knowledge.

Within this approach, prompts become cognitive artefacts through which learners analyse problems, explore alternative solutions, make assumptions explicit, and progressively improve their reasoning. Learning therefore emerges through a continuous dialogue between the learner and AI, in which questioning, verification, revision, and reflection become integral components of the educational process. This pedagogical perspective has been proposed by Adorni et al. as a means of transforming Human–AI interaction into an opportunity for developing problem-solving skills, critical thinking, and metacognitive awareness [5].

Prompt-Based Learning differs substantially from Prompt Engineering. While Prompt Engineering seeks to optimise prompts in order to obtain the most effective AI output, Prompt-Based Learning focuses on the learner's cognitive development. The quality of learning is therefore measured not by the efficiency of the prompt itself, but by the learner's capacity to formulate meaningful questions, interpret AI-generated responses, justify decisions, and progressively refine understanding.

This perspective reflects a broader shift in the educational role of Artificial Intelligence. As discussed in the Human-Centered Digital Transformation framework, AI increasingly functions as part of the cognitive infrastructure of higher education, supporting reasoning and knowledge construction rather than simply automating educational tasks [2].

Prompt-Based Learning therefore provides an operational approach through which Human-Centered Digital Transformation can be translated into everyday educational practice. By combining intentional dialogue with AI, critical evaluation, and continuous reflection, it helps learners develop the knowledge, judgement, and autonomy required to collaborate responsibly with intelligent systems.

5.4 Assessment, Feedback and Learning Analytics

Assessment is an integral component of the learning process and should be designed to support learners' progress rather than merely measure achievement. In AI-supported educational environments, assessment increasingly values reasoning, problem solving, collaboration, and reflection alongside the quality of the final product.

Artificial Intelligence can assist educators by generating timely formative feedback, supporting the analysis of learning evidence, identifying patterns in learner performance, and facilitating

the personalisation of educational pathways. As recognised by DigCompEdu, these technologies can enhance assessment practices when they are used to inform pedagogical decisions rather than replace professional judgement [21].

Learning analytics further contribute to this process by providing evidence that helps educators understand learner engagement, monitor progress, identify potential learning difficulties, and evaluate the effectiveness of educational activities. The educational value of analytics, however, depends on the responsible interpretation of data within their pedagogical and disciplinary context.

Feedback should be viewed as a continuous dialogue that enables learners to reflect on their progress, identify areas for improvement, and regulate their own learning. Consistent with the OECD Teaching Compass, assessment becomes most effective when it supports learner agency, continuous improvement, and meaningful participation in the learning process rather than simply certifying performance [20].

The following chapter builds upon these principles by presenting a comprehensive framework for assessment in the age of Artificial Intelligence, with particular attention to authentic assessment, transparency, process documentation, and human validation.

5.5 Inclusive, Accessible and Sustainable Learning Environments

Inclusive learning environments recognise the diversity of learners and seek to ensure that all students can participate meaningfully in educational activities, regardless of their backgrounds, abilities, languages, or learning needs. Artificial Intelligence can contribute to this objective by expanding opportunities for personalisation, accessibility, and learner support.

AI-powered technologies can assist in adapting learning materials, generating alternative representations of content, supporting multilingual communication, improving accessibility for learners with disabilities, and providing personalised guidance throughout the learning process. However, these opportunities should always be implemented within an inclusive pedagogical design that considers the diverse needs of learners rather than relying solely on technological solutions.

As recognised by DigComp 3.0, accessibility and inclusion are fundamental dimensions of digital competence that should inform the selection and educational use of digital technologies [8]. Educational decisions should therefore consider not only the functionality of AI tools, but also their accessibility, transparency, potential biases, and impact on equitable participation.

Sustainability should be understood in a broad educational sense. Beyond environmental considerations, sustainable learning environments promote practices that remain pedagogically meaningful, ethically responsible, organisationally viable, and adaptable to future technological developments. In line with the OECD Teaching Compass, educational innovation should ultimately strengthen learner well-being, inclusion, and equitable access to learning opportunities [20].

Inclusive and sustainable educational environments are therefore created through thoughtful pedagogical design, supported—but never determined—by Artificial Intelligence.

5.6 The Evolving Role of the Educator

The integration of Artificial Intelligence into higher education is transforming the role of educators, not by reducing their importance, but by redefining the forms of expertise through which they create educational value. As AI increasingly supports routine tasks such as content generation, feedback, and information retrieval, the educator's contribution shifts towards those dimensions of teaching that require pedagogical insight, professional judgement, creativity, and ethical responsibility.

Rather than acting primarily as transmitters of knowledge, educators increasingly become learning designers, facilitators, mentors, and orchestrators of meaningful learning experiences.

They create the conditions in which learners engage critically with knowledge, collaborate with others, and use AI in ways that strengthen understanding rather than replace intellectual effort. This evolution is reflected in DigCompEdu, which places pedagogical competence, learner empowerment, and reflective professional engagement at the centre of educators' digital competence [21].

The growing availability of AI also reinforces the importance of continuous professional learning. Educators need opportunities to experiment with new pedagogical approaches, share practices with colleagues, critically evaluate emerging technologies, and adapt their teaching in response to changing educational contexts. Professional development therefore becomes an ongoing process of pedagogical innovation rather than simply acquiring technical skills.

Ultimately, educational transformation depends not on the capabilities of Artificial Intelligence, but on the capacity of educators to design learning environments that foster curiosity, critical thinking, collaboration, and lifelong learning. Consistent with the OECD Teaching Compass, the educator remains the professional who gives educational meaning to technology by placing learners, their development, and their well-being at the centre of the learning process [20].

6 Assessment for Human-Centered Digital Transformation

Assessment is one of the educational dimensions most profoundly influenced by the widespread integration of Artificial Intelligence into higher education. As AI systems become increasingly capable of generating texts, solving complex problems, producing software, supporting reasoning, and assisting knowledge creation, traditional approaches based primarily on the reproduction of information or the completion of isolated tasks become progressively less effective.

This evolution should not be regarded as a threat to academic integrity, but as an opportunity to rethink the purposes of educational assessment. Instead of focusing exclusively on the evaluation of final products, assessment should increasingly recognise the quality of learners' reasoning, critical thinking, problem solving, creativity, reflective judgement, and the responsible use of AI throughout the learning process.

The guiding principle adopted throughout this chapter is that *assessment should make learning visible*. Assessment is therefore understood not simply as a mechanism for measuring achievement, but as a means of documenting how learners construct knowledge, develop competences, exercise judgement, and progressively assume responsibility for their own learning.

This perspective is consistent with DigCompEdu, which places assessment and feedback among the core professional competences of educators [21], and with the OECD Teaching Compass, which promotes assessment as a process that supports learner agency, continuous improvement, and meaningful participation in learning [20].

6.1 Rethinking Assessment in the Age of Artificial Intelligence

The widespread availability of Artificial Intelligence challenges many assumptions upon which traditional assessment practices have long been based. When AI systems can generate texts, solve complex problems, produce software, analyse data, and support reasoning, assessment can no longer rely primarily on the reproduction of information or the completion of isolated tasks.

The central educational question is therefore no longer whether learners have used AI, but how they have used it and what they have learned through that interaction. Assessment should increasingly value learners' capacity to analyse problems, frame meaningful questions, evaluate evidence, justify decisions, reflect on their reasoning, and integrate AI-supported contributions into disciplinary understanding.

This shift places greater emphasis on the learning process alongside the quality of the final product. Evidence of learning increasingly includes learners' reasoning, critical evaluation,

metacognitive awareness, and their ability to explain and justify the decisions made throughout an educational activity.

As recognised by DigCompEdu, assessment should support learning by providing meaningful feedback and encouraging reflection rather than simply measuring performance [21]. Similarly, the OECD Teaching Compass highlights the importance of assessment practices that strengthen learner agency, continuous improvement, and informed participation in learning [20].

Rethinking assessment therefore means moving from evaluating what learners produce to understanding how they construct knowledge, develop competences, and progressively become more autonomous, reflective, and responsible learners.

6.2 Designing Authentic Assessment

Authentic assessment aligns evaluation with the complexity of real educational, professional, and societal contexts. Rather than measuring the reproduction of knowledge in artificial situations, it invites learners to address meaningful problems that require disciplinary understanding, critical analysis, informed decision-making, and the responsible use of AI.

Authentic assessment should therefore evaluate learners' ability to interpret evidence, justify their reasoning, integrate multiple sources of information, collaborate effectively, and apply knowledge in context. AI may legitimately support these activities, provided that learners remain responsible for evaluating its outputs, making informed decisions, and explaining the rationale behind their work.

Depending on disciplinary contexts and intended learning outcomes, authentic assessment may take many forms, including project-based assignments, case studies, portfolios, design challenges, simulations, collaborative investigations, research projects, and reflective reports. What these approaches share is the opportunity for learners to demonstrate not only what they know, but how they apply knowledge to address realistic and often ill-defined problems.

Designing authentic assessment requires constructive alignment between learning outcomes, learning activities, assessment criteria, and the permitted use of AI. As emphasised by DigCompEdu, assessment should be intentionally designed to support meaningful learning and provide evidence of competence development rather than simply measure performance [21]. Likewise, the OECD Teaching Compass highlights the importance of assessment practices that prepare learners to act effectively in complex and evolving professional contexts [20].

Ultimately, the authenticity of assessment does not depend on the absence of AI, but on the presence of informed human judgement, disciplinary understanding, and meaningful engagement with the learning task.

6.3 Transparency and Evidence of Learning

Transparency is a fundamental condition for trustworthy assessment in AI-supported educational environments. Its purpose is not to monitor or discourage the use of Artificial Intelligence, but to make learning processes explicit and open to discussion.

When AI contributes significantly to an assignment or learning activity, learners should document how it has been used, for which purposes, and how AI-generated outputs have been evaluated, revised, and integrated into their own work. Such documentation provides educators with richer evidence of learners' understanding, reasoning, and decision-making while reinforcing academic integrity through openness rather than prohibition.

Evidence of learning may take different forms depending on disciplinary contexts and institutional policies. AI Use Declarations, Prompt Journals, project documentation, intermediate versions of assignments, reflective commentaries, and learning portfolios all help to make the learning process visible and support more informed educational evaluation.

This approach is consistent with the transparency and accountability principles promoted by the European Union AI Act [9]. Likewise, DigCompEdu recognises the importance of assess-

ment practices that encourage learners to reflect on their learning and provide educators with meaningful evidence to support professional judgement [21].

Transparency should therefore be understood as a pedagogical resource that strengthens dialogue between educators and learners, supports authentic assessment, and contributes to a culture of trust and shared responsibility.

6.4 Process Documentation and Reflective Evidence

Assessment increasingly benefits from evidence that documents how learning has developed rather than focusing exclusively on final educational products. Process documentation enables educators to understand how learners analyse problems, make decisions, revise their work, and progressively construct disciplinary knowledge.

Learners should therefore be encouraged to record significant stages of their work, including problem analysis, planning decisions, prompt refinement, alternative solutions considered, validation strategies, revisions, and reflective observations. Such documentation provides valuable evidence of reasoning while fostering metacognitive awareness and self-regulated learning.

Depending on disciplinary contexts and institutional practices, process documentation may take different forms, including Prompt Journals, learning portfolios, design notebooks, project documentation, research diaries, or reflective reports. The choice of documentation should be proportionate to the learning objectives and assessment strategy rather than becoming an administrative requirement.

This perspective is consistent with DigCompEdu, which emphasises the importance of using assessment to support learners' reflection and competence development [21]. Likewise, the OECD Teaching Compass recognises reflection and self-regulation as essential capabilities for lifelong learning in rapidly evolving educational environments [20].

Process documentation therefore complements traditional assessment by making learning visible, supporting meaningful dialogue between educators and learners, and providing evidence of cognitive development that final products alone cannot fully reveal.

6.5 Oral Discussion and Human Validation

Oral discussion remains one of the most effective ways of validating authentic learning in AI-supported educational environments. Its purpose is not to determine whether learners have used Artificial Intelligence, but to understand how they have interpreted information, developed their reasoning, and constructed disciplinary knowledge.

Through dialogue with educators, learners demonstrate their ability to explain concepts, justify decisions, discuss alternative solutions, critically evaluate evidence, and connect theoretical knowledge with authentic educational or professional situations. Oral discussion therefore provides direct evidence of understanding that cannot be inferred from written products alone.

This approach is consistent with DigCompEdu, which recognises assessment and feedback as dialogical processes supporting learners' reflection and competence development rather than simply measuring achievement [21]. Within this perspective, oral assessment becomes an opportunity for educators and learners to examine reasoning, clarify assumptions, and discuss the learning process itself.

The concept of *Human Validation* extends this educational dialogue by emphasising that the ultimate objective of assessment is to validate human understanding rather than the originality of a product or the absence of AI support [3]. Human Validation therefore focuses on learners' capacity to explain, justify, defend, and critically reflect upon their own work, regardless of the technological tools that contributed to its development.

> *Human Validation is not the validation of AI use; it is the validation of human understanding.*

6.6 Assessment as Learning

Assessment should not be viewed as the final stage of an educational activity, but as an integral component of the learning process itself. When learners receive timely feedback, reflect on their progress, revise their work, and participate actively in evaluating their own learning, assessment becomes a powerful driver of competence development.

This perspective encourages the integration of formative feedback, self-assessment, peer assessment, iterative revision, and structured reflection throughout the learning process. These practices help learners monitor their progress, identify areas for improvement, regulate their learning strategies, and progressively develop greater autonomy and responsibility.

Artificial Intelligence can support assessment as learning by generating immediate formative feedback, suggesting alternative perspectives, identifying possible improvements, and stimulating reflection. However, AI should assist rather than determine educational decisions. Educators remain responsible for interpreting evidence, providing contextualised feedback, and evaluating learning in relation to disciplinary expectations and intended learning outcomes.

This approach is consistent with DigCompEdu, which recognises assessment and feedback as essential dimensions of educators' professional competence [21]. Likewise, the OECD Teaching Compass highlights the importance of assessment practices that promote learner agency, continuous improvement, and lifelong learning rather than simply certifying achievement [20].

Assessment as Learning therefore transforms evaluation into an ongoing dialogue that supports learners in becoming more reflective, autonomous, and responsible throughout their educational journey.

6.7 Trustworthy Assessment Ecosystems

Trustworthy assessment does not emerge from a single method or technological solution, but from the coherent integration of pedagogical, organisational, and ethical practices. In AI-supported higher education, trust is built when assessment enables learners to demonstrate understanding while providing educators with reliable evidence on which to base their professional judgement.

For this reason, Human-Centered assessment should not rely primarily on AI-detection technologies. Current detection systems remain limited in terms of reliability, transparency, explainability, and fairness, making them unsuitable as the foundation for educational decision-making. Instead, trust should be established through assessment designs that encourage authentic learning, openness, reflection, and meaningful dialogue.

A trustworthy assessment ecosystem therefore combines complementary practices, including authentic assessment, transparent documentation of AI use, evidence of the learning process, formative feedback, and opportunities for Human Validation. Together, these elements provide multiple sources of evidence that strengthen academic integrity while supporting learners' development rather than relying on surveillance or technological control.

This perspective is consistent with the principles of transparency, accountability, and human oversight established by the European Union AI Act [9]. Likewise, the OECD Teaching Compass emphasises that assessment should contribute to learner agency, institutional trust, and continuous educational improvement rather than simply certify performance [20].

Figure 3 summarises the assessment ecosystem proposed throughout these Guidelines. Trustworthy assessment emerges not from the exclusion of Artificial Intelligence, but from educational practices that make learning visible, support informed human judgement, and place responsibility at the centre of assessment.

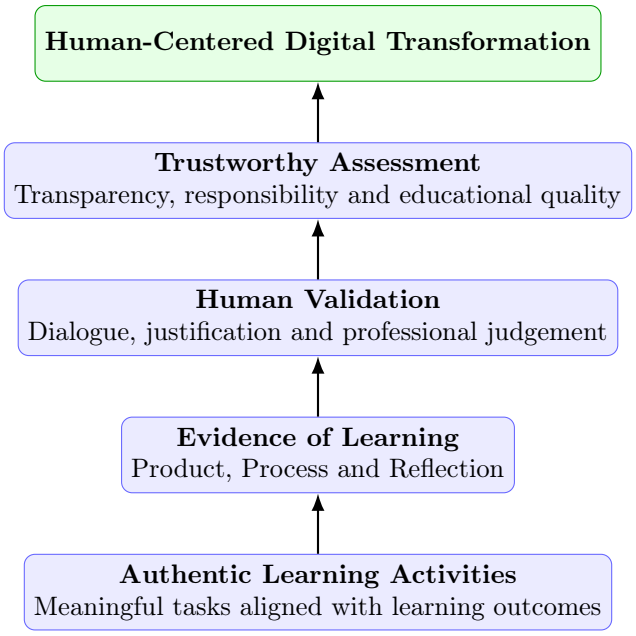

Figure 3: Integrated assessment ecosystem supporting Human-Centered Digital Transformation. Trust emerges from authentic learning, transparent evidence, and human judgement rather than from technological surveillance.

7 Shared Responsibilities for Human-Centered Digital Transformation

Human-Centered Digital Transformation cannot be achieved through the actions of individual educators or isolated institutional initiatives. It requires coordinated institutional action in which leadership, educators, learners, support services, quality assurance bodies, and external stakeholders work towards shared educational objectives.

The guiding principle adopted throughout this chapter is that *Human-Centered Digital Transformation is a shared institutional responsibility.* While Artificial Intelligence creates new opportunities and challenges for higher education, its responsible integration depends on the collective capacity of institutions to align technological innovation with educational values, ethical responsibility, and continuous organisational learning.

Shared responsibility does not imply identical responsibilities. Each stakeholder contributes according to its institutional role, professional expertise, and sphere of accountability. Leadership provides strategic direction; educators design learning experiences; learners actively construct knowledge; support services create enabling conditions; and external partners contribute expertise, innovation, and opportunities for collaboration.

Together, these complementary roles create trustworthy educational ecosystems capable of supporting sustainable and human-centered digital transformation. Figure 4 summarises the shared governance framework adopted throughout these Guidelines.

7.1 Institutional Leadership

Institutional leadership provides the strategic direction and organisational commitment required to implement Human-Centered Digital Transformation across the university. Its primary responsibility is not the adoption of new technologies, but the creation of institutional conditions that enable innovation while preserving educational quality, academic values, and long-term sustainability.

This responsibility includes defining a shared institutional vision, establishing coherent poli-

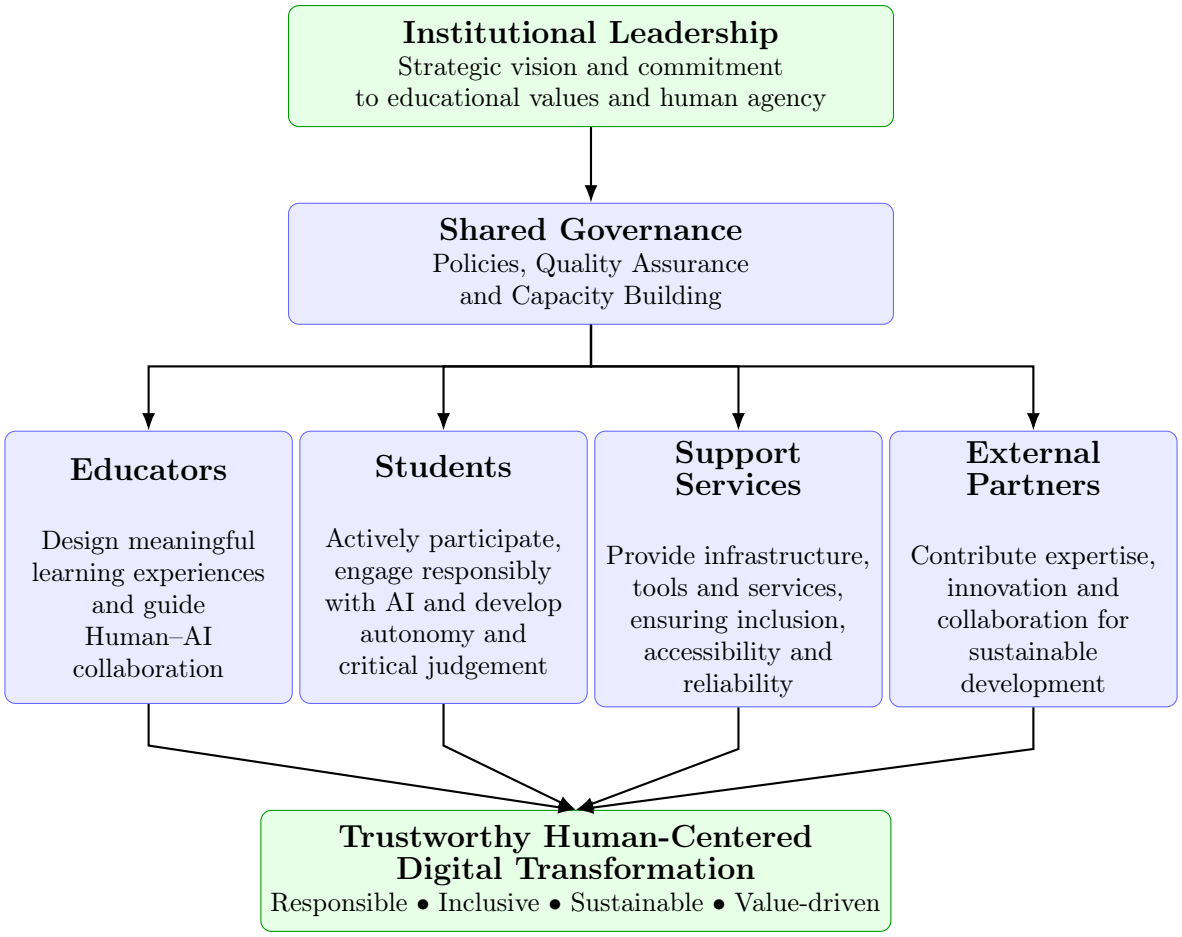

Figure 4: Shared governance ecosystem supporting Human-Centered Digital Transformation. Institutional leadership establishes the strategic vision, shared governance coordinates policies and quality assurance, while educators, students, support services, and external partners collectively enable responsible, sustainable, and human-centered digital transformation.

cies for the educational use of AI, investing in digital infrastructure, strengthening quality assurance processes, and promoting continuous professional development. Leadership also plays a key role in ensuring that technological innovation is aligned with institutional priorities and contributes to meaningful educational improvement rather than isolated experimentation.

Effective leadership depends on collaboration across the institution. Academic departments, quality assurance offices, information technology services, libraries, instructional support units, and administrative services should work within a coherent governance framework that enables coordinated decision-making and organisational learning. This systemic perspective is consistent with the OECD Teaching Compass, which identifies institutional leadership as a key enabler of educational transformation and continuous improvement [20].

Within the eCAMPUS initiative, the DigiComArm Framework further highlights the importance of institutional leadership in supporting capacity building, competence development, and sustainable digital transformation across Armenian higher education institutions [10].

Ultimately, the role of institutional leadership is to create an environment in which educators, learners, and support services can innovate responsibly while contributing to a shared institutional vision for the future of higher education.

7.2 Educators

Educators play the central role in translating institutional strategies into meaningful educational practice. While leadership establishes the vision and organisational framework for digital transformation, educators determine how Artificial Intelligence is integrated into teaching, learning, and assessment within their disciplinary contexts.

Their responsibility extends beyond adopting new technologies. Educators design learning experiences, facilitate inquiry, support collaboration, provide meaningful feedback, and create learning environments in which AI contributes to deeper understanding rather than replacing intellectual engagement. Through these professional choices, they shape how learners experience and benefit from technological innovation.

This evolving professional role requires continuous learning. As educational practices, AI technologies, and institutional policies continue to evolve, educators should regularly update their pedagogical approaches, experiment with new forms of teaching and assessment, and participate in professional dialogue with colleagues. DigCompEdu recognises this reflective and developmental dimension as a core component of educators' digital competence, emphasising professional engagement, pedagogical innovation, and continuous improvement [21].

The OECD Teaching Compass similarly highlights the importance of educators as designers of learning environments that foster learner agency, collaboration, and lifelong learning rather than simply transmitting knowledge [20].

Ultimately, the educational value of Artificial Intelligence depends less on the capabilities of the technology than on the expertise of educators in designing learning experiences that help students think critically, learn responsibly, and apply knowledge in meaningful contexts.

7.3 Students as Active Learners

Students are active partners in the digital transformation of higher education. Their role extends beyond the use of Artificial Intelligence as a learning tool to the responsible participation in educational processes that increasingly integrate AI into teaching, learning, and assessment.

This responsibility requires learners to make informed decisions about when and how AI can support their work while preserving disciplinary understanding, critical judgement, and personal accountability. Rather than relying uncritically on AI-generated outputs, students are expected to question information, compare alternative perspectives, verify evidence, and integrate AI-supported contributions into their own reasoning.

Students also contribute to the quality of the educational environment through responsible academic conduct. By documenting the use of AI when appropriate, engaging constructively with feedback, participating in dialogue with educators, and reflecting on their learning, they strengthen a culture of transparency, trust, and shared responsibility.

Beyond individual learning activities, students play an important role in institutional improvement. Their experiences and feedback provide valuable evidence for refining teaching practices, assessment strategies, and institutional policies as universities continue to adapt to rapidly evolving technological contexts.

This perspective is consistent with the OECD Teaching Compass, which identifies learner agency as a key dimension of future-oriented education [20]. Likewise, DigComp 3.0 recognises the responsible, critical, and autonomous use of digital technologies as an essential component of digital competence for lifelong learning and active participation in society [8].

Ultimately, students contribute to Human-Centered Digital Transformation not simply by using AI effectively, but by developing the capacity to learn, think, and act responsibly in increasingly AI-enabled educational and professional environments.

7.4 Institutional Support Services

The successful implementation of Human-Centered Digital Transformation depends on the coordinated work of institutional support services that translate strategic objectives into everyday operational practice. Their contribution extends beyond technical assistance to creating the organisational conditions that enable educators and learners to benefit effectively from digital innovation.

Information technology services, educational technology centres, libraries, instructional designers, quality assurance offices, accessibility services, legal and data protection experts, and administrative staff provide complementary expertise that supports the responsible integration of Artificial Intelligence across the institution. Together, they maintain digital infrastructure, ensure interoperability, promote accessibility, protect personal data, and facilitate the implementation of institutional policies.

Support services also play an essential role in strengthening institutional capability. They contribute to faculty development, provide pedagogical and technical assistance, disseminate good practices, support quality assurance processes, and help evaluate the effectiveness of educational innovation. In this way, they enable continuous organisational learning rather than simply responding to operational needs.

Within the eCAMPUS initiative, the DigiComArm Framework recognises institutional support structures as a key component of sustainable capacity building, ensuring that digital transformation becomes embedded in institutional practice rather than remaining dependent on individual initiatives [10]. This systemic perspective is also reflected in the OECD Teaching Compass, which emphasises the importance of coordinated institutional environments that sustain educational innovation over time [20].

Institutional support services should therefore be recognised as strategic partners in educational transformation, creating the operational capability through which institutional policies become meaningful educational practice.

7.5 Partnerships and External Stakeholders

Human-Centered Digital Transformation extends beyond the boundaries of individual institutions. Universities increasingly operate within interconnected ecosystems that include governmental agencies, quality assurance bodies, technology providers, research organisations, employers, professional associations, and international networks. These partnerships broaden institutional capacity by bringing together complementary expertise, resources, and perspectives.

External stakeholders contribute to educational transformation in different ways. They support the development of regulatory frameworks, competence models, quality assurance standards, professional development programmes, research collaboration, technological innovation, and the exchange of educational practices. Through these contributions, they help universities respond to emerging educational needs while maintaining coherence with national priorities and international developments.

Collaboration also enables institutions to learn from one another. The co-design of policies, educational resources, competence frameworks, and quality assurance mechanisms reduces fragmentation, promotes the dissemination of good practices, and strengthens the long-term sustainability of digital transformation. This collaborative approach is consistent with the European Commission's vision of digital education as a shared institutional and international endeavour supported through networks of cooperation and capacity building [12].

The eCAMPUS project provides a practical example of this approach. By bringing together Armenian universities, quality assurance agencies, ministries, and European partners, the project has supported the development of shared competence frameworks, professional development pathways, and institutional strategies that contribute to sustainable Human-Centered Digital Transformation [10].

Ultimately, partnerships strengthen institutional resilience by transforming individual experiences into shared knowledge, enabling universities to adapt continuously while preserving their educational mission and public responsibility.

Part II
Implementation Framework

8 Operational Guidelines

The previous chapters presented the conceptual foundations of the Human-Centered Digital Transformation Framework, including its guiding principles, competence model, pedagogical approaches, assessment strategies, and shared institutional responsibilities. This chapter translates those foundations into practical guidance that can support everyday educational practice.

The recommendations are intended to assist educators, students, and higher education institutions in making informed decisions about when, how, and to what extent Artificial Intelligence should be integrated into teaching, learning, and assessment. Rather than prescribing uniform procedures, they provide a flexible implementation framework that can be adapted to different disciplinary contexts, learning activities, and institutional policies.

This implementation-oriented perspective is consistent with the DigiComArm Framework, which emphasises the progressive development of institutional and professional capacity [10], and with the OECD Teaching Compass, which views educational innovation as a continuous process of reflection, adaptation, and improvement [20].

8.1 Recommended Practices

The following recommendations translate the principles presented in Part I into practical actions that can support the educational use of Artificial Intelligence across different disciplines and learning contexts. They are intended as adaptable guidance rather than prescriptive procedures and should always be interpreted in relation to the intended learning outcomes, the characteristics of learners, and the institutional context.

As recognised by DigCompEdu, the educational value of digital technologies depends on how they are integrated into pedagogical design rather than on the technologies themselves [21].

Before the learning activity

- Define the intended learning outcomes before selecting AI tools.
- Clarify the educational purpose of AI within the activity.
- Determine and communicate the permitted level of AI use.
- Design authentic learning activities requiring critical thinking, creativity, collaboration, and human judgement.
- Consider accessibility, inclusion, privacy, copyright, and data protection from the outset.

During the learning activity

- Encourage learners to use AI for exploration, clarification, brainstorming, and formative support rather than as a substitute for independent reasoning.

- Require learners to critically evaluate AI-generated outputs and verify information using authoritative sources.
- Encourage appropriate documentation of significant AI-supported learning activities.
- Promote dialogue, peer discussion, and collaborative reflection.

After the learning activity

- Encourage learners to reflect on how AI contributed to their learning.
- Collect appropriate evidence of learning through AI Use Declarations, Prompt Journals, portfolios, or reflective reports.
- Evaluate both the learning process and the final outcome.
- Review the effectiveness of the activity and refine future learning designs using evidence and feedback.

These recommendations are intended to support informed educational decision-making rather than prescribe uniform procedures. Educators should adapt them according to disciplinary contexts, learning objectives, and institutional policies.

8.2 Levels of Permitted AI Use

Different learning activities require different forms of interaction with Artificial Intelligence. For this reason, educators should explicitly communicate the level of AI use permitted for each activity, ensuring that expectations are aligned with the intended learning outcomes, assessment strategy, and disciplinary context.

The five-level model presented below provides a simple operational framework that can be adopted consistently across courses and programmes while remaining sufficiently flexible to accommodate different educational needs. It is consistent with the implementation approach adopted within the DigiComArm Framework, which promotes the progressive and transparent integration of AI into teaching and learning practices [10].

Operational Levels of Permitted AI Use

Select the level that best matches the intended learning outcomes and communicate it clearly before the activity begins.

Level 0 – No AI Use Artificial Intelligence is not permitted. The activity requires independent individual work to assess specific knowledge, skills, or competences.

Level 1 – Limited AI Support AI may be used only for peripheral support activities such as language revision, brainstorming, translation, or clarification. The intellectual contribution remains the learner's own.

Level 2 – AI-Assisted Learning AI may support content generation, coding, analysis, design, or problem solving. Learners remain responsible for critically evaluating, revising, validating, and appropriately declaring AI-supported contributions.

Level 3 – AI-Integrated Learning Interaction with AI forms an explicit component of

the learning activity. Learners are expected to document prompts, AI outputs, revisions, and reflections through appropriate process documentation.

Level 4 – AI as the Learning Object The activity focuses on developing or assessing AI-related competences. Learners critically analyse, evaluate, compare, design, or improve AI-supported processes.

The selected level should be communicated before the activity begins and reflected consistently in course documentation, assessment instructions, and, where appropriate, the AI Use Declaration. Practical examples illustrating each level are provided in Chapter 14 to support consistent implementation across different disciplines and educational contexts.

8.3 Checklist for Teachers

Before introducing Artificial Intelligence into a learning activity, educators should verify that its use is pedagogically justified and aligned with the intended learning outcomes.

The following questions provide a practical self-check that can support course design, assessment planning, and communication with students.

Teacher Checklist

Before implementing an AI-supported activity, consider the following questions:

- Are the intended learning outcomes clearly defined?
- Is the permitted level of AI use explicitly communicated?
- Does the activity require students to demonstrate understanding, critical judgement, or reflection rather than simply producing an output?
- Are students expected to verify, evaluate, and justify AI-supported contributions?
- Is appropriate documentation required (e.g., AI Use Declaration or Prompt Journal), when relevant?
- Have accessibility, privacy, copyright, and data protection requirements been considered?
- Does the assessment evaluate both the learning process and the final outcome?
- Is human judgement retained for all assessment and grading decisions?

This checklist is intended as a reflective design aid rather than a compliance instrument. Institutions and educators should adapt it to their disciplinary context, institutional policies, and assessment practices. As AI technologies evolve, the checklist should be periodically reviewed to remain aligned with pedagogical priorities and institutional governance.

8.4 Checklist for Students

Responsible use of Artificial Intelligence requires learners to remain actively engaged throughout the learning process. Before submitting any AI-supported work, students should be able to demonstrate that they understand both the assignment requirements and their own contribution.

The following checklist is intended to support reflection before, during, and after the use of AI.

Student Checklist

Before using AI

- Do I know whether AI is permitted for this activity?
- Do I understand the permitted level of AI use?
- Do I understand which parts of the work must be completed independently?

While using AI

- Am I using AI to support my learning rather than replace my thinking?
- Have I verified the accuracy and reliability of AI-generated information?
- Have I critically evaluated and revised the AI outputs where necessary?
- Have I protected personal, confidential, or sensitive information?

Before submitting my work

- Can I explain and justify every part of my submission?
- Have I documented my use of AI where required?
- Can I identify what I learned through my interaction with AI?
- Would I be able to defend my work during an oral discussion if requested?

The checklist is intended to encourage self-regulation rather than compliance. Its purpose is to help students develop reflective Human–AI collaboration, where responsibility for learning remains with the learner regardless of the degree of AI support.

9 Governance and Implementation Roadmap

The implementation of Human-Centered Digital Transformation requires more than the adoption of new technologies or isolated educational initiatives. It depends on the capacity of higher education institutions to translate shared principles into coherent organisational practices that support teaching, learning, assessment, research, and institutional development over time.

Implementation should therefore be understood as a continuous process of institutional learning. As universities progressively integrate Artificial Intelligence into their educational ecosystem, they develop the policies, professional competences, organisational structures, quality assurance mechanisms, and collaborative networks needed to sustain innovation in a coherent and responsible way.

This chapter identifies the principal institutional enablers that support this process. Rather than proposing a fixed sequence of actions, it outlines complementary areas of development that institutions can progressively adapt according to their strategic priorities, organisational maturity, and national higher education context.

This implementation perspective is consistent with the OECD Teaching Compass, which views educational innovation as a systemic and continuously evolving process of organisational learning [20]. It also reflects the capacity-building approach adopted by the DigiComArm Framework within the eCAMPUS project, where sustainable transformation is achieved through the progressive development of institutional competences rather than through isolated technological interventions [10].

9.1 Faculty Development and Training-of-Trainers

Faculty development is one of the principal institutional enablers of sustainable digital transformation. As Artificial Intelligence continues to reshape higher education, universities should provide structured opportunities for educators to strengthen the professional competences required to integrate AI effectively into teaching, learning, assessment, and academic practice.

Effective faculty development extends beyond technical training on AI tools. It combines pedagogical design, assessment innovation, ethical and legal awareness, accessibility, and opportunities for collaborative reflection, enabling educators to make informed decisions that are consistent with institutional priorities and disciplinary contexts. This perspective is reflected in DigCompEdu, which identifies continuous professional learning as a core dimension of educators' digital competence [21].

Training-of-Trainers (ToT) initiatives represent a particularly effective strategy for developing institutional expertise. By preparing educators who can subsequently support colleagues, facilitate local innovation, and mentor new participants, ToT programmes progressively strengthen internal capacity while reducing dependence on external expertise.

Faculty development should therefore be regarded as an ongoing institutional investment rather than a one-time training activity. Within the eCAMPUS project, the DigiComArm Framework adopts this approach by promoting sustainable competence development through structured professional learning pathways and institutional mentoring networks [10].

9.2 Communities of Practice

Formal professional development is most effective when it is complemented by continuous collaboration among educators and institutional stakeholders. Communities of Practice provide the organisational environment in which educational innovation can be discussed, refined, and progressively shared across courses, departments, and institutions.

Within these communities, educators exchange teaching experiences, co-design learning activities, discuss assessment strategies, evaluate emerging AI-supported practices, and collaboratively develop educational resources. In this way, successful innovations become part of the institution's collective expertise rather than remaining isolated within individual teaching experiences.

Beyond supporting individual professional development, Communities of Practice strengthen institutional capability by promoting interdisciplinary dialogue, reducing professional isolation, and creating continuous feedback between educational practice, faculty development, and quality assurance. The OECD Teaching Compass highlights collaborative professional learning as a key mechanism for sustaining educational improvement and organisational learning [20]. Similarly, the European Digital Education Action Plan encourages networks of cooperation that enable institutions to share knowledge and accelerate digital transformation [12].

The experience of the eCAMPUS project illustrates this approach. By fostering collaboration among universities, quality assurance agencies, and international partners, it has supported the development of shared competence frameworks, educational resources, and institutional practices that continue to generate value beyond the duration of the project [10].

Communities of Practice should therefore be recognised not simply as opportunities for professional exchange, but as institutional mechanisms through which innovation is consolidated, disseminated, and continuously improved.

9.3 Micro-Credentials and Open Badges

Continuous professional learning becomes more effective when competence development is recognised through transparent and flexible certification mechanisms. Micro-credentials and Open Badges enable higher education institutions to document the progressive acquisition of specific competences while supporting lifelong professional development.

Rather than replacing formal qualifications, micro-credentials complement existing professional development pathways by recognising learning achievements acquired through faculty development programmes, Training-of-Trainers initiatives, Communities of Practice, self-directed learning, and workplace experience. Their modular structure allows institutions to acknowledge incremental progress and encourages continuous engagement with competence development.

Within the context of digital transformation, micro-credentials may recognise competences related to AI literacy, digital pedagogy, assessment design, accessibility, ethical and responsible AI use, and educational leadership. Open Badges further enhance the visibility and portability of these achievements, facilitating their recognition across institutions and professional contexts.

The European Council Recommendation on Micro-Credentials encourages higher education institutions to adopt transparent and interoperable recognition systems that support lifelong learning and professional mobility [11]. Within the eCAMPUS project, these principles are reflected in the DigiComArm Framework and the National Certificate Programme, where micro-credentials provide a practical mechanism for recognising educators' competence development and supporting sustainable institutional capacity building [10].

Micro-credentials and Open Badges should therefore be understood not simply as certification tools, but as strategic instruments for fostering continuous professional learning and strengthening institutional capability.

9.4 Monitoring, Quality Assurance and Continuous Improvement

Sustainable digital transformation requires institutions to monitor not only the adoption of Artificial Intelligence, but also its educational impact. Monitoring and quality assurance should therefore provide evidence that supports institutional learning, strategic decision-making, and the continuous refinement of educational practices.

Rather than functioning primarily as mechanisms of compliance, quality assurance processes should help institutions understand how AI influences teaching, learning, assessment, professional development, and organisational effectiveness. This requires the systematic collection and interpretation of evidence from multiple sources, including educator and student feedback, institutional self-assessment, learning analytics, curriculum reviews, and evaluations of faculty development initiatives.

The resulting evidence should inform the continuous improvement of institutional policies, curricula, professional development programmes, and governance practices. In this perspective, quality assurance becomes an adaptive process that enables universities to respond to technological and educational change while maintaining coherence with their institutional mission and strategic objectives.

This approach is consistent with the OECD Teaching Compass, which recognises continuous evaluation and organisational learning as essential components of educational innovation [20]. Within the eCAMPUS project, the DigiComArm Framework similarly promotes quality assurance as a strategic instrument for supporting institutional capacity building and the responsible integration of Artificial Intelligence across higher education [10].

Monitoring and quality assurance should therefore be regarded not as the final stage of implementation, but as the mechanism through which institutions continuously learn, adapt, and strengthen their capacity for sustainable digital transformation.

9.5 Sustainability Beyond the Project

The long-term value of institutional innovation is determined not by the successful completion of individual projects, but by the institution's capacity to sustain and progressively extend the changes they initiate. Digital transformation becomes sustainable when new practices are embedded within the ordinary structures, processes, and culture of the university.

This requires the progressive integration of AI-related policies into strategic planning, curriculum development, professional development, quality assurance, digital infrastructure, and institutional governance. Rather than evolving independently, these dimensions should reinforce one another, creating an organisational environment capable of adapting continuously to technological and educational change.

Figure 5 illustrates the principal institutional enablers that contribute to this process. Faculty development, Communities of Practice, competence recognition, quality assurance, and strategic partnerships collectively strengthen institutional capability, which in turn enables sustainable Human-Centered Digital Transformation.

Within the eCAMPUS project, this perspective is reflected in the DigiComArm Framework, which seeks to establish lasting institutional capacity through shared competence frameworks, professional development pathways, and coordinated governance mechanisms that remain active beyond the duration of the project [10]. This approach is consistent with the OECD Teaching Compass, which views educational transformation as a continuous process of institutional learning and adaptation rather than a series of isolated initiatives [20].

Ultimately, sustainable transformation is achieved when institutions develop the capacity to learn, adapt, and innovate continuously, ensuring that technological change remains aligned with their educational mission and long-term strategic objectives.

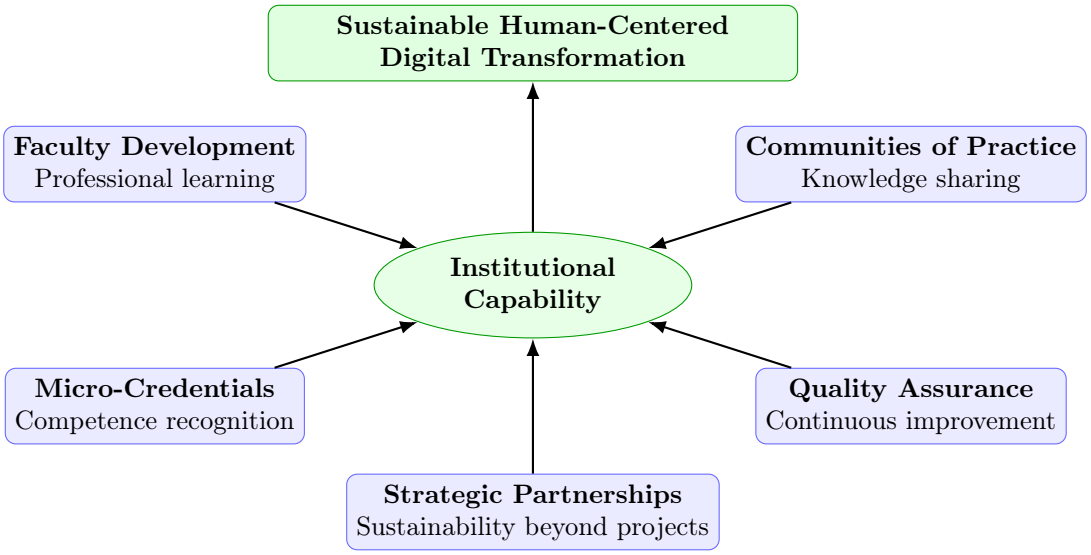

Figure 5: Institutional capability for sustainable Human-Centered Digital Transformation. Faculty development, communities of practice, competence recognition, quality assurance, and strategic partnerships collectively strengthen institutional capability.

Sustainability also depends upon long-term collaboration beyond individual institutions. Partnerships with universities, quality assurance agencies, governmental organisations, professional associations, employers, and international networks strengthen institutional resilience, facilitate the exchange of knowledge and good practices, and promote the continuous evolution of Human-Centered Digital Transformation across higher education systems.

Ultimately, sustainable transformation is not measured by the number of AI tools adopted, but by the institution's capacity to continuously learn, adapt, and innovate while preserving its educational mission and social responsibility [20, 8, 10, 12]. Figure 5 summarises the institutional enablers that collectively strengthen institutional capability and support sustainable Human-Centered Digital Transformation.

10 Recommendations for Armenian Higher Education Institutions

The implementation framework presented in the previous chapters is intended to support higher education institutions in translating shared principles into institutional practice. This chapter contextualises that framework within the Armenian higher education system, taking into account the objectives of the eCAMPUS project, the DigiComArm Framework, and the ongoing national process of digital transformation.

The recommendations do not prescribe a single implementation model. Instead, they identify strategic priorities that institutions may progressively adapt according to their organisational maturity, available resources, institutional mission, and national policy context. Their purpose is to support institutional capacity building while providing a coherent roadmap for the responsible integration of Artificial Intelligence across teaching, learning, assessment, and governance.

To facilitate implementation, the recommendations are organised into three successive phases. The first phase focuses on building institutional readiness; the second on embedding institutional capability within ordinary university practice; and the third on ensuring long-term sustainability through continuous improvement and strategic governance. This phased approach is consistent with the capacity-building strategy adopted by the DigiComArm Framework [10] and with the OECD Teaching Compass, which emphasises institutional learning as the foundation of sustainable educational innovation [20].

10.1 Phase 1 – Building Institutional Readiness

The first phase focuses on establishing the organisational conditions required to support the responsible integration of Artificial Intelligence within the institution. At this stage, the priority is not large-scale implementation but the creation of a shared institutional vision, appropriate governance arrangements, and the initial professional capacity needed to guide future development.

The actions proposed below provide a practical starting point that institutions may adapt according to their organisational context, available resources, and strategic priorities. Within the DigiComArm Framework, these activities represent the first step in building the institutional foundations for sustainable digital transformation [10].

Priority Actions (Phase 1)

- Adopt institutional guidelines for the educational use of Artificial Intelligence.
- Establish interdisciplinary working groups involving academic, technical, administrative, and quality assurance representatives.
- Identify and support local AI champions capable of facilitating institutional innovation.
- Launch Faculty Development and Training-of-Trainers initiatives.
- Pilot AI-supported teaching, learning, and assessment activities within selected programmes.
- Define institutional policies describing the permitted levels of AI use across different educational activities.

Successful completion of this phase should result in a shared institutional vision, initial governance structures, and the professional capacity required to support the subsequent integration of AI across teaching, learning, assessment, and institutional processes.

10.2 Phase 2 – Embedding Institutional Capability

Once the initial organisational foundations have been established, institutions should progressively integrate AI-supported educational practices into their ordinary academic and organisational processes. The objective of this phase is to move beyond isolated pilot initiatives by embedding innovation within curricula, professional development, quality assurance, and institutional governance.

This stage focuses on consolidating institutional capability through the systematic alignment of educational practices, competence development, organisational structures, and quality processes. Within the DigiComArm Framework, this represents the transition from institutional readiness to the routine and coordinated implementation of AI across the university [10].

Priority Actions (Phase 2)

- Integrate AI literacy across curricula as a transversal component of digital competence.
- Align institutional policies and professional development initiatives with the DigiComArm Framework and the National Certificate Programme.
- Embed AI-supported pedagogical practices within institutional quality assurance processes.
- Establish Communities of Practice across departments and partner institutions.
- Recognise professional development through Micro-Credentials and Open Badges.
- Promote interdisciplinary educational research on AI-supported teaching, learning, and assessment.
- Develop institutional repositories of educational resources, case studies, and examples of good practice.

Successful completion of this phase should result in AI becoming an integrated component of institutional practice, supported by coherent policies, shared professional expertise, and established quality assurance mechanisms that enable continuous institutional development.

10.3 Phase 3 – Ensuring Sustainable Transformation

The final phase aims to ensure that digital transformation becomes an enduring component of institutional development rather than an initiative linked to a specific project or funding programme. At this stage, the emphasis shifts from implementing innovation to sustaining the institutional capacity required to respond continuously to technological, educational, and organisational change.

This requires universities to embed AI-related policies, governance mechanisms, professional development, quality assurance, and strategic planning within their ordinary institutional processes. The objective is to create an organisational environment in which innovation becomes part of everyday academic practice rather than a series of isolated initiatives.

Priority Actions (Phase 3)

- Integrate AI governance into institutional strategic planning and leadership.
- Periodically review institutional policies in response to technological, pedagogical, and

regulatory developments.

- Strengthen collaboration among Armenian universities, quality assurance agencies, governmental organisations, and international partners.
- Contribute to the development of national frameworks and shared guidelines for AI-supported higher education.
- Promote evidence-informed decision-making through continuous monitoring, educational research, and institutional self-assessment.
- Ensure long-term investment in digital infrastructure, Faculty Development, quality assurance, and organisational innovation.
- Foster an institutional culture that supports continuous learning, collaboration, and responsible innovation.

Successful completion of this phase should result in institutions that are able to adapt continuously to emerging technologies while maintaining coherent educational policies, stable governance, and sustained professional development. Within the eCAMPUS project, this long-term perspective is reflected in the DigiComArm Framework, which seeks to establish lasting institutional capacity beyond the duration of the project itself [10].

Figure 6 summarises the progressive implementation roadmap proposed for Armenian Higher Education Institutions, illustrating the evolution from institutional readiness to institutional capability and ultimately to sustainable transformation.

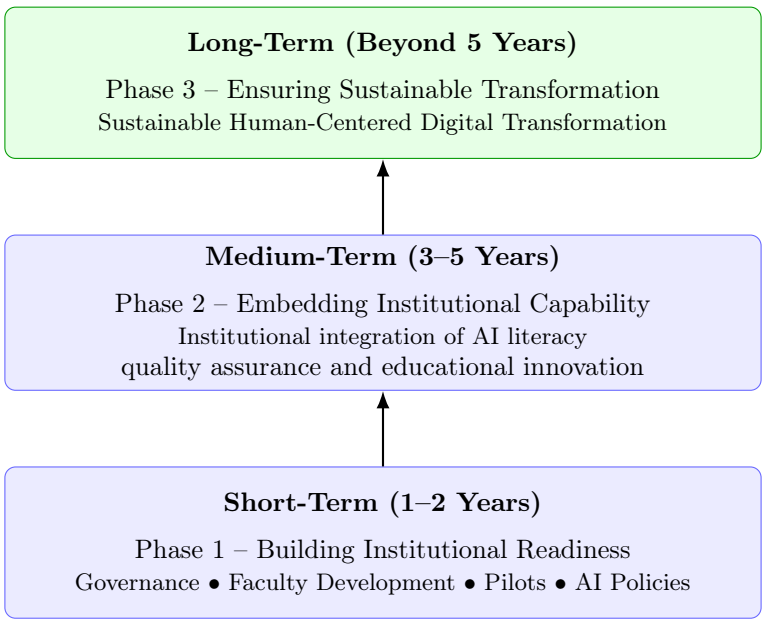

Figure 6: Implementation roadmap for Human-Centered Digital Transformation in Armenian Higher Education Institutions. The roadmap illustrates the progressive evolution from institutional readiness to institutional capability and ultimately to sustainable transformation.

11 Conclusions and Future Perspectives

Artificial Intelligence is transforming higher education at an unprecedented pace. Yet the central challenge facing universities is not technological but educational: how to ensure that increasingly capable AI systems enhance, rather than diminish, the human purposes of teaching, learning, research, and academic life.

These Guidelines have presented the Human-Centered Digital Transformation Framework as a strategic response to this challenge. Throughout the document, digital transformation has been interpreted not simply as the adoption of new technologies, but as the progressive development of institutional capability. This capability enables universities to integrate Artificial Intelligence responsibly while preserving educational quality, academic integrity, human judgement, and public trust.

The framework combines complementary dimensions that together support sustainable institutional development: digital competence, AI literacy, pedagogical innovation, authentic assessment, quality assurance, professional development, and collaborative governance. Rather than representing independent initiatives, these dimensions contribute to a shared institutional vision in which technology serves educational purposes and strengthens human capability.

Developed within the Erasmus+ Capacity Building project eCAMPUS, the framework provides practical guidance for Armenian Higher Education Institutions while remaining adaptable to different disciplinary, institutional, and national contexts. Its implementation roadmap and supporting resources are intended to facilitate continuous institutional learning rather than prescribe fixed models of practice.

As Artificial Intelligence continues to evolve, universities will need to review policies, strengthen professional development, foster interdisciplinary collaboration, and continuously evaluate the educational impact of technological innovation. Digital transformation should therefore be regarded as an ongoing institutional process that requires reflection, adaptation, and shared responsibility.

Ultimately, the future of higher education will not be determined by the sophistication of Artificial Intelligence systems. It will be determined by the capacity of universities to cultivate critical thinking, preserve human judgement, and ensure that technological innovation remains consistently aligned with their educational mission.

Artificial Intelligence will continue to evolve.
The enduring responsibility of higher education is not simply to adopt AI, but to ensure that human judgement, educational values, and critical inquiry evolve with it.

Part III
Supporting Resources

12 Glossary of the Human-Centered Digital Transformation Framework

The rapid evolution of digital technologies and Artificial Intelligence has introduced concepts that are often interpreted differently across educational, institutional, and policy contexts. Establishing a shared terminology is therefore an essential component of Human-Centered Digital Transformation.

This glossary provides concise operational definitions of the principal concepts used throughout these Guidelines. Its purpose is to support a common conceptual language for educators, institutional leaders, quality assurance bodies, policymakers, and other stakeholders involved in the digital transformation of higher education.

The glossary combines internationally recognised terminology with concepts that have been developed or adapted within the eCAMPUS project to describe emerging relationships between Artificial Intelligence, digital competence, pedagogy, assessment, and institutional governance. Together, these definitions constitute the conceptual vocabulary underpinning the Human-Centered Digital Transformation Framework.

Academic Integrity The commitment to honesty, transparency, responsibility, fairness, and ethical behaviour in teaching, learning, assessment, research and professional practice.

Artificial Intelligence (AI) Computational systems capable of performing tasks that normally require human intelligence, including reasoning, language processing, pattern recognition, decision support, and content generation. Within these Guidelines, AI is understood as an enabling component of digital transformation rather than as an autonomous educational actor.

AI Literacy The knowledge, skills, attitudes, and critical awareness required to understand, evaluate, use, and engage critically and responsibly with AI in educational and professional contexts.

Assessment as Learning An assessment approach in which evaluation actively contributes to learners' reflection, self-regulation, and continuous improvement rather than merely measuring achievement.

Cognitive Infrastructure An educational environment in which AI becomes an integral component of knowledge creation, reasoning, communication, assessment, and decision-making, mediating rather than replacing human cognitive activity.

Communities of Practice Groups of educators and professionals who collaboratively share experiences, develop knowledge, and improve educational practices through continuous interaction.

Digital Competence The confident, critical, responsible, and creative use of digital technologies for learning, teaching, working, and participation in society.

Digital Transformation The systemic redesign of educational, organisational, and institutional processes through the meaningful integration of digital technologies to improve educational quality and institutional effectiveness.

DigiComArm The Digital Competence Framework for Higher Education developed within the eCAMPUS project to support educator competence development and the National Certificate Programme in Armenia.

Evidence of Learning Documentation demonstrating how learning has developed throughout an educational activity, including portfolios, prompt journals, reflective reports, project documentation, and intermediate artefacts.

Generative Artificial Intelligence Artificial Intelligence systems capable of generating text, images, code, audio, or other forms of digital content based on user prompts or other input data.

Human Agency The capacity of individuals to exercise informed judgement, make autonomous decisions, and retain responsibility for educational processes and outcomes when interacting with digital technologies and AI.

Human Judgement The capacity to interpret information, evaluate evidence, make context-sensitive decisions, and assume responsibility for educational actions and their consequences.

Human-Centered Digital Transformation The strategic and continuous process through which higher education institutions integrate digital technologies and AI while preserving human judgement, educational values, ethical responsibility, institutional mission, and public trust.

Human–AI Collaboration A collaborative relationship in which human expertise and AI complement one another while maintaining human responsibility for educational decisions.

Institutional Capability The organisational capacity of a higher education institution to implement, govern, evaluate, and continuously improve Human-Centered Digital Transformation through policies, professional development, quality assurance, and collaborative governance.

Learner Agency The learner's capacity to make informed decisions, regulate learning processes, critically evaluate information, and assume responsibility for knowledge construction while interacting with AI.

Learning Analytics The collection, analysis, and interpretation of educational data to understand and improve learning processes and educational environments.

Micro-Credentials Short, focused certifications recognising the achievement of specific competences acquired through formal, non-formal, or informal learning.

Open Badge A digital credential that documents and communicates the acquisition of specific competences, knowledge, or achievements.

Pedagogical Transformation The redesign of teaching and learning approaches in response to evolving educational needs, digital technologies, and AI.

Prompt-Based Learning (PBL) A pedagogical approach in which structured interaction with AI supports inquiry, problem solving, critical thinking, metacognition, and Reflective Human–AI Collaboration.

Prompt Journal A structured record documenting prompts, AI responses, revisions, reflections, and learning decisions throughout an educational activity.

Quality Assurance Institutional processes that monitor, evaluate, and continuously improve the quality of teaching, learning, assessment, and organisational performance.

Reflective Delegation The intentional and conscious decision to delegate selected cognitive activities to Artificial Intelligence while maintaining human oversight, critical evaluation, decision-making, and responsibility.

Reflective Human–AI Collaboration A mode of Human–AI interaction characterised by intentional delegation, critical evaluation, continuous reflection, and active human judgement.

Reflective Practice The continuous process through which educators and learners critically examine their decisions, actions, and learning experiences in order to improve future practice.

Transparency The explicit communication of how AI has been used within teaching, learning, assessment, or research activities, including the purpose, extent, and role of AI support.

Trustworthy Assessment An assessment approach based on authentic learning, transparency, process documentation, reflective evidence, and human judgement rather than automated AI detection.

13 Implementation Toolkit for Human-Centered Digital Transformation

The resources presented in this Toolkit complement the conceptual framework and operational guidance developed throughout these Guidelines. They provide practical instruments that higher education institutions may directly adopt or adapt to support the responsible integration of Artificial Intelligence into teaching, learning, assessment, research, and institutional governance.

The Toolkit is intended to facilitate implementation rather than prescribe mandatory procedures. Its resources promote transparency, Reflective Human–AI Collaboration, academic integrity, authentic assessment, and continuous institutional learning while remaining sufficiently flexible to accommodate different disciplinary traditions, institutional policies, and national regulations.

The Toolkit includes:

- a Model Declaration of AI Use;
- a Prompt Journal Template;
- a Teacher Reflective Checklist;
- a Student Reflective Checklist.

Together, these resources support the practical implementation of Human-Centered Digital Transformation by making learning processes more transparent, assessment more authentic, and educational uses of Artificial Intelligence more responsible.

13.1 Model Declaration of AI Use

The following template provides a model declaration that students and educators may use to transparently document the use of Artificial Intelligence within teaching, learning, assessment, or research activities.

The declaration supports transparency, academic integrity, and Reflective Human–AI Collaboration by documenting how Artificial Intelligence contributed to an educational activity. Institutions are encouraged to adapt the template according to local regulations and disciplinary requirements.

AI Use Declaration

Course:

Assignment Title:

Student Name:

Date:

I declare that Artificial Intelligence has been used during the preparation of this assignment as follows:

- ☐ No AI tools were used.
- ☐ AI was used exclusively for language revision.
- ☐ AI supported brainstorming or idea generation.
- ☐ AI assisted programming or data analysis.
- ☐ AI contributed to drafting or restructuring parts of the work.
- ☐ Other (please specify): _____

Describe briefly how AI contributed to your work and how you verified or modified the generated outputs:

Student Signature:

13.2 Prompt Journal Template

The Prompt Journal is a reflective learning instrument designed to document and reflect upon the interaction between learners and Artificial Intelligence throughout an educational activity. Rather than recording prompts for monitoring purposes, it makes the learning process visible by documenting how learners formulate problems, interact with AI systems, evaluate generated outputs, make decisions, and progressively construct knowledge.

Within the Human-Centered Digital Transformation Framework, the Prompt Journal supports Prompt-Based Learning, reflective Human–AI collaboration, and authentic assessment by encouraging learners to document not only what AI produced, but also how human judgement shaped the learning process.

Comparable to a laboratory notebook, a design journal, or a research diary, the Prompt Journal is intended as a pedagogical resource that promotes metacognition, transparency, and continuous reflection. Its primary purpose is to help learners develop awareness of their interactions with AI while providing educators with richer evidence of learning processes than final products alone.

When appropriate, and in compliance with institutional policies and applicable data protection regulations, Prompt Journals may also provide valuable evidence for educational research on Human–AI collaboration, learning processes, Prompt-Based Learning, and the development of AI literacy.

Suggested structure

Step	Time	Goal	Prompt	AI Output	My Decision	Reflection
1						
2						
3						
...						

Reflective Questions

At the end of the activity, students are encouraged to reflect on their learning experience by considering the following questions:

- What did I learn through my interaction with AI?
- Which AI responses were particularly useful?
- Which responses were incorrect, incomplete, or misleading?
- Which decisions remained entirely my own?
- How did my prompts evolve during the activity?
- What would I do differently next time?

The Prompt Journal is intended as a learning tool rather than a monitoring instrument. Institutions may adapt its structure according to disciplinary needs, learning objectives, and assessment strategies.

13.3 Teacher Reflective Checklist

This checklist supports educators in designing, implementing, and evaluating AI-supported teaching, learning, and assessment activities consistent with the principles of Human-Centered Digital Transformation. It is intended as a reflective planning instrument that promotes continuous improvement rather than compliance.

Before the Learning Activity

- ☐ The intended learning outcomes are clearly defined.
- ☐ The educational purpose of AI use is explicit.
- ☐ The permitted level of AI use has been communicated to learners.
- ☐ Learning activities and assessment methods are aligned.
- ☐ Accessibility, inclusion, privacy, and copyright have been considered.

During the Learning Activity

- ☐ Learners understand how AI may be used appropriately.
- ☐ Critical evaluation of AI-generated outputs is encouraged.
- ☐ Human judgement and educator supervision remain central.
- ☐ Reflection, discussion, and collaborative learning are promoted.
- ☐ Relevant Human–AI interactions are documented where appropriate.

After the Learning Activity

- ☐ Learning outcomes have been evaluated.
- ☐ AI-supported work has been discussed with learners.
- ☐ Assessment considered both the learning process and the final product.
- ☐ Good practices and emerging challenges have been documented.
- ☐ Opportunities for improving future activities have been identified.

The checklist is intended to support reflective educational design and continuous professional learning rather than compliance with predefined procedures.

13.4 Student Reflective Checklist

This checklist encourages learners to engage with Artificial Intelligence responsibly, critically, and reflectively throughout the learning process while maintaining responsibility for their own understanding and decision-making.

Before Using AI

- ☐ I know whether AI use is permitted for this activity.
- ☐ I understand the permitted level of AI use.
- ☐ I understand the intended learning outcomes.
- ☐ I know which tasks I am expected to complete independently.

While Using AI

- ☐ I am using AI to support rather than replace my own thinking.
- ☐ I have verified the accuracy and reliability of AI-generated information.
- ☐ I have critically evaluated AI-generated responses.
- ☐ I have modified, refined, or integrated AI outputs using my own judgement.
- ☐ I have protected personal, confidential, and sensitive information.

After Completing the Activity

- ☐ I can explain and justify every part of my work.
- ☐ I would be able to defend my work during an oral discussion.
- ☐ I have documented my use of AI whenever required.
- ☐ I can identify what I learned through my interaction with AI.
- ☐ I can identify how I would improve my approach next time.

Responsible use of Artificial Intelligence is not determined by how much AI is used, but by the quality of human judgement exercised throughout the learning process.

14 Illustrative Examples of AI Use

The examples presented in this section illustrate how the AI Use Levels introduced in Chapter 8 may be applied in different educational contexts. They are intended as illustrative scenarios rather than prescriptive models. Institutions and educators are encouraged to adapt them according to disciplinary requirements, intended learning outcomes, assessment strategies, and institutional policies.

The examples demonstrate that the AI Use Levels do not simply represent increasing amounts of Artificial Intelligence, but progressively different educational roles assigned to AI within teaching and learning activities. Consequently, different activities within the same course may legitimately require different levels of permitted AI use.

Example 1 – Level 0: No AI Use

Illustrative activity
Closed-book written examination in Mathematics.

Educational objective
To assess independent reasoning, procedural competence, and individual problem-solving without AI assistance.

Permitted AI use
Artificial Intelligence is not permitted during the activity.

Expected learner contribution
Students complete the assessment independently, demonstrating their own knowledge and reasoning.

Recommended documentation
No declaration or Prompt Journal required.

Example 2 – Level 1: AI as a Support Tool

Illustrative activity
Preparation of an academic essay in a Humanities course.

Educational objective
To improve written communication while preserving the student's original ideas and arguments.

Permitted AI use
AI may support grammar correction, language revision, readability improvement, and formatting.

Expected learner contribution
Students remain fully responsible for the intellectual content, structure, and conclusions of the work.

Recommended documentation
AI Declaration recommended when AI support has substantially contributed to the submitted work.

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Example 3 – Level 2: AI as a Cognitive Assistant

Illustrative activity
Programming assignment in Computer Science.

Educational objective
To develop programming competence while learning to critically evaluate AI-supported solutions.

Permitted AI use
AI may assist with code generation, debugging, documentation, and alternative implementation strategies.

Expected learner contribution
Students critically verify, test, revise, and justify all AI-supported solutions before submission.

Recommended documentation
AI Declaration required.
Prompt Journal recommended.

Example 4 – Level 3: AI as a Learning Partner

Illustrative activity
Prompt-Based Learning project addressing an authentic interdisciplinary problem.

Educational objective
To develop problem-solving, critical thinking, metacognition, and Reflective Human–AI Collaboration.

Permitted AI use
AI is used throughout the activity as a collaborative learning partner for exploration, analysis, and iterative refinement.

Expected learner contribution
Students document their interactions with AI, justify their decisions, critically evaluate AI outputs, and explain how AI contributed to the final solution.

Recommended documentation
AI Declaration required.
Prompt Journal required.
Reflective discussion or portfolio recommended.

Example 5 – Level 4: AI as the Object of Learning

Illustrative activity
AI Literacy or Educational Technology course.

Educational objective
To critically analyse Artificial Intelligence itself, including its capabilities, limitations, ethical implications, and educational applications.

Permitted AI use
AI systems become the explicit subject of analysis, experimentation, comparison, and evaluation.

Expected learner contribution
Students critically evaluate AI systems, compare alternative tools, discuss ethical implications, and reflect upon the role of AI within education and society.

Recommended documentation
AI Declaration required.
Prompt Journal required.
Reflective report and oral discussion recommended.

Table 1: Recommended documentation requirements associated with the five AI Use Levels.

AI Use Level	Declaration	Prompt Journal	Reflection	Oral Validation
Level 0 – No AI Use	Not required	Not required	Not required	Optional
Level 1 – Support Tool	Recommended	Optional	Recommended	Optional
Level 2 – Cognitive Assistant	Required	Recommended	Required	Recommended
Level 3 – Learning Partner	Required	Required	Required	Recommended
Level 4 – Object of Learning	Required	Required	Required	Recommended

The appropriate AI Use Level should always be communicated explicitly within the course syllabus, assessment brief, or activity instructions. The selection of a specific level should be determined by the intended learning outcomes rather than by the technological capabilities of the AI system itself. Different learning activities within the same course may therefore legitimately adopt different AI Use Levels, provided that expectations and documentation requirements are communicated transparently.

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