Teaching Across Difference

A Research Synthesis on Transdisciplinary Education in the Technology-Art-Humanities Space

TransINNOVATE
Bridging Disciplines for Innovation

D2.1 — Research Report with Collection of Best Practices

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About this Report

This report presents the findings of the research phase of the TransInnovate project, a European Erasmus+ cooperation partnership examining how transdisciplinary education — teaching and learning that genuinely crosses the boundaries between Technology, Arts, and Humanities Who this report is for. The primary audience is the TransInnovate course development team, who will use the findings to design the project's training course, micro-credential standard, and AI-supported learning application.

The report will also be useful to:

- Educators and curriculum developers looking for an evidence base on what makes transdisciplinary teaching work, what barriers practitioners typically encounter, and what existing programmes in the Technology–Arts–Humanities space look like;
- Institutional leaders and policy makers in higher education and vocational training who are considering how to create conditions for transdisciplinary education in their contexts;
- Researchers working on interdisciplinary and transdisciplinary pedagogy, competency frameworks, and the role of AI in educational settings.

How to use this report. Readers with a specific focus may go directly to the relevant chapter. Chapters 1–4 can be read independently; Chapter 5 is the integrative synthesis and is the recommended starting point for readers who want the research conclusions without the full detail. The appendices contain the complete design prompt document for course developers (Appendix A) and the full analytical protocols for the seventeen programmes surveyed (Appendix B).— can be strengthened in higher education and vocational training settings.

The report draws on four complementary research activities conducted between January and April 2026: a review of 56 academic and policy sources; a quantitative survey of 135 educators and practitioners across the Czech Republic, Lithuania, and Slovenia; 30 in-depth expert interviews; and a documentary analysis of 17 transdisciplinary educational programmes across Europe and beyond. A concluding chapter synthesises findings across all four instruments.

List of Abbreviations

The following table consolidates all abbreviations used across this research report. Note that TAH appears in two distinct senses: as the name of a project partner organisation, and as the epistemological triad Technology–Arts–Humanities. Context makes the intended sense clear in each case.

Abbreviation / Code	Explanation
AHSS	Arts, Humanities, and Social Sciences
ANR	Agence Nationale de la Recherche (French national research funding agency)
CPD	Continuing professional development
ECTS	European Credit Transfer and Accumulation System
GenAI	Generative artificial intelligence
HE	Higher education
H-VET / HVET	Higher vocational education and training
ID	Interdisciplinarity / interdisciplinary
KG	Knowledge graph
LLM	Large language model
MOOC	Massive open online course
PBL	Problem-based learning / project-based learning
RAG	Retrieval-augmented generation
RRI	Responsible Research and Innovation
SHAPE-ID	EU H2020 project on SSH in interdisciplinary and transdisciplinary research
STARTS	Science, Technology and the Arts (European Commission initiative)
TAH	Technology–Arts–Humanities (as epistemological triad)
TCP	Transdisciplinary Course Program (University of Tübingen, Case 12)
TD	Transdisciplinarity / transdisciplinary
TDR	Transdisciplinary research
td-net	Network for Transdisciplinary Research, Swiss Academies of Arts and Sciences
VSD	Value Sensitive Design
WITAC	Inclusive Wellbeing Through Arts and Culture in the Baltics

Research Design and Document Structure

This report consolidates the four research activities conducted in Work Package 2 of the TransInnovate project, together with a cross-source synthesis chapter. Each chapter was produced as a standalone analytical working document and underwent internal peer review before being incorporated here. The content of each chapter has been preserved without modification; only structural elements — page numbering, the abbreviations table, reference consolidation, and appendix organisation — have been adjusted for the combined document.

The report is organised as follows:

Chapter 1: Literature Synthesis. An analytical review of 56 sources addressing transdisciplinary pedagogy and didactics, TAH-specific epistemological integration, competency frameworks and assessment, institutional implementation of TD approaches, and the role of AI in transdisciplinary education.

Chapter 2: Quantitative Survey Analysis. Analysis of 135 survey responses collected across Lithuania, Slovenia, and the Czech Republic (December 2025 – March 2026), examining practitioner perceptions of TD competencies, pedagogical preferences, institutional barriers, and AI usage.

Chapter 3: Expert Interview Analysis. Analytical evaluation of 30 expert interviews with educators, institutional leaders, arts and design practitioners, humanities scholars, interdisciplinary researchers, and cross-sector facilitators.

Chapter 4: Best Practices Evaluation. A cross-case analysis of 17 transdisciplinary courses and educational programmes at the Technology–Arts–Humanities intersection, covering 14 European countries plus calibration cases from the United States and Hong Kong.

Chapter 5: Cross-Source Synthesis of Findings. A triangulation of findings across all four research activities, identifying convergent conclusions, tensions, and design implications for the WP3 course and AI application.

Appendix A: Design Prompts for WP3 Course Development. A consolidated list of design prompts derived from all four research activities, grouped by analytical dimension and labelled with source instruments.

Appendix B: Best Practices Desk Research Protocols. Full analytical protocols for all 17 programmes included in the course analysis corpus (Chapter 4), providing the underlying documentary evidence for the cross-case findings.

Literature Review

Key Findings

- **Transdisciplinary competence is architectural, not additive.**
- **The separation between intellectual and social competence does not hold.**
- **TAH integration works best when arts and humanities are upstream.**
- **No consolidated TAH-specific methodology yet exists.**
- **TD pedagogy is a pedagogy of orchestration.**
- **Assessment remains the weakest link.**
- **Institutional barriers are structural, not incidental.**
- **AI facilitates TD process infrastructure; it does not replace TD judgement.**
- **Context is constitutive, not supplemental.**

1. Literature Review

Context and Methodology

This document presents the analytical findings of the literature review conducted as part of WP2 of the TransInnovate project. The literature review examined sources selected to inform five areas of inquiry relevant to the project: transdisciplinary pedagogy and didactics, TAH-specific epistemological integration, competency frameworks and assessment, institutional implementation of TD approaches, and the role of AI in transdisciplinary education.

This document has a specific and bounded role. It does not attempt to answer all questions relevant to TransInnovate – that would overstate what a literature review alone can provide. Its contribution is theoretical and conceptual: it establishes the knowledge base, identifies where existing scholarship is strong, and maps where gaps remain that must be addressed by other research instruments – expert interviews, the quantitative survey, and the course analysis.

The review corpus comprises sources to reflect the current state of the field. Sources were selected through purposive sampling aligned with the five thematic clusters, with particular attention to studies explicitly engaging with the Technology–Arts–Humanities (TAH) intersection, transdisciplinary competency development, and AI's role in TDR-educational contexts.

No source in the corpus fully addresses the T–A–H triad as a distinct epistemological configuration.

Key Findings

The ten findings below distill the most stable cross-source conclusions from the literature corpus, before those findings are redistributed across the six analytical dimensions.

1. **Transdisciplinary competence is architectural, not additive.** The literature describes a compound of epistemic, relational, and action-oriented capacities that must develop together. Humility, trust-building, knowledge integration, and normative reflection are constitutive of TD practice, not soft extras beside technical skill.
2. **The separation between intellectual and social competence does not hold.** Successful TD work depends on cognitive work with and through others. Trust and appreciation are not preconditions for integration; they are part of how integration happens.
3. **TAH integration works best when arts and humanities are upstream.** Arts and humanities contribute distinct epistemic functions — reframing problems, surfacing values, making alternative futures imaginable. These contributions become meaningful only when they shape problem framing at the outset, not at the communication or dissemination stage.
4. **No consolidated TAH-specific methodology yet exists.** Despite growing practice in STARTS-derived residency formats and European innovation lab models, no single standardised method for triadic arts–technology–humanities collaboration has achieved broad adoption. TransInnovate is working at the frontier of a field still constructing its own methodological infrastructure.
5. **TD pedagogy is a pedagogy of orchestration.** Pedagogical quality lies in the design of interactions: who meets whom, around what object, under what rules, with what feedback loops. Learning climate — mutual respect, safety, and trust — is a structural precondition, not a secondary concern.
6. **Assessment remains the weakest link.** The literature describes what to assess in considerable detail but provides far fewer robust instruments for doing so. The translation from virtues and dispositions to assessable learning evidence remains underdeveloped.
7. **Institutional barriers are structural, not incidental.** Silos, rigid funding, narrow reward systems, and publication-centred career criteria are the primary barriers — not individual resistance. TD education depends on invisible coordination and facilitation work that is rarely recognised or resourced.
8. **AI facilitates TD process infrastructure; it does not replace TD judgement.** AI can support sense-making, synthesis, and weaker forms of knowledge integration. It cannot replace value negotiation, trust-building, or final meaning-making. Hybrid architectures with human review at consequential points are the emerging best-practice pattern.
9. **Context is constitutive, not supplemental.** TD education changes when institutional mission, actor mix, and legitimacy conditions change. The evidence base for HVET-specific and TAH-specific configurations remains thin.
10. **The literature opens questions it cannot close.** The corpus is strongest on conceptual scaffolding and weakest on design certainty — which course elements produce which outcomes, and how TD pedagogy scales beyond protected formats. Those gaps are precisely where the project's empirical instruments are positioned to add the most value.

Analytical Report

Dimension 1 – Competencies and Assessment

(a) What the literature shows

Across the corpus, transdisciplinary competence is not treated as a narrow bundle of transferable skills. It is consistently framed as a compound of epistemic, relational, and action-oriented capacities. The epistemic strand includes knowledge integration, common-ground building, critical reflection, and the ability to relate heterogeneous forms of evidence. The relational strand includes trust, appreciation, empathy, communication, generosity, and humility. The action strand includes applying integrated knowledge to complex real-world problems, often in collaboration with societal actors. This is visible in the convergence between virtue-oriented literature, assessment rubrics, and empirical teacher-education studies: they differ in vocabulary, but they point to the same core architecture of competence.

A second strong pattern is that the literature does not separate 'intellectual' competence from 'social' competence in any stable way. Vanney et al. (2023) explicitly identify 'interpersonal intellectual virtues' such as intellectual empathy, respect, trust, and generosity, making the point that successful interdisciplinary or transdisciplinary work depends on cognitive work with and through others rather than alongside them. Straub, Kulin & Ehmke (2021) reinforce this empirically: trust and appreciation do not sit beside knowledge integration; they help produce it, mainly via mutual learning.

The literature also suggests that competencies should be read developmentally. The Design Guide's Know/Do/Be structure and proficiency levels (Transdisciplinary Training Collaboratory, 2025) imply that TD competence is learned through a progression from orientation and participation to design and implementation. Nguyen et al. (2025) similarly link competence growth to repeated cycles of inquiry, presentation, peer review, critique, and revision. This matters for WP3 because it implies that competence frameworks should not be treated only as outcome lists; they are also sequencing devices.

Drawing on converging signals across multiple sources, it is possible to sketch a TAH-specific competency profile for each actor type in a transdisciplinary team. The table below maps explicitly stated or strongly implied competencies to each TAH position, alongside the typical contribution that position makes to shared work, the characteristic friction it generates, and the sources from which the profile is drawn. This is a working synthesis, not a validated taxonomy; its function is to make disciplinary asymmetries visible as a design input for WP3 and the competency framework in D2.2.

Table 1. *Comparison of transdisciplinary competency frameworks: core components and emphases*

Framework / school	Core competencies	Main emphasis	Sources
Process-oriented integration	Disciplinary grounding, perspective taking, common-ground building, integration, reflection, application	Transdisciplinarity as a sequence of learnable and partly assessable integration steps	Blom et al. (2020); Pohl et al. (2021); Nguyen et al. (2025)
Virtue-based	Reflexivity, openness, humility, flexibility, courage, generosity, trust, empathy	Transdisciplinarity as a matter of intellectual and interpersonal disposition, not only skill	Vanney et al. (2023); ten Hagen & Horn (2024)
Multi-dimensional integration	Epistemic, social, and organisational integration; mutual learning; trust; appreciation; collective ownership	Good integration is not only cognitive but also relational and organisational	Straub et al. (2021)
Meta-competence line	Domain-specific, inter-relational, intrapersonal, normative competences	Complex real-world problems require combined epistemic, relational, self-reflexive, and ethical capacities	Transdisciplinary Training Collaboratory (2025); related meta-competence literature
Assessment / curriculum line	Rubrics, progression levels, competency components, task design, evidence of integration	Translating transdisciplinary competence into course design, assignments, and evaluation	Blom et al. (2020); Nguyen et al. (2025); Transdisciplinary Training Collaboratory (2025)
Art Thinking / art-science research	Creative questioning, 360-degree observation, futures envisioning, prototyping, public dialogue, iterative learning	Art as a method for framing essential questions before solution design; a transdisciplinary process linking inspiration, envisioning, prototyping, and public feedback	Ars Electronica Futurelab (n.d.-a); Ars Electronica Futurelab (n.d.-b)

For assessment methodology, Blom, Scager and Wiegant (2020) make the most practically useful contribution: they distinguish Cognitive Advancement (genuine knowledge integration) from Laundry-Listing (presenting disciplinary knowledge in parallel without genuine synthesis – a common failure mode). This distinction is directly applicable as an evaluative criterion for TransInnovate's course and micro-credential assessment design. Their Assessment Matrix (Appendix E of the source) provides a modular tool for selecting rubric criteria based on specific learning goals.

Straub, Kulin and Ehmke (2021) provide validated Likert-scale instruments for measuring three dimensions of TD collaboration: Epistemic Integration (knowledge co-construction), Social Integration (trust and appreciation), and Organisational Integration (shared goals). This is one of the few sources offering ready-to-use pre/post survey instruments for evaluating whether a course improved learners' TD collaboration capacity.

Horn et al. (2024) address the hardest assessment challenge directly: how to assess attitudinal change (TD Attitude) rather than only procedural competence (TD Action). Written Reflections targeting 'eye-opener moments' are proposed as one method. Importantly, Horn et al. also provide an empirical finding that this review's earlier framing understated: attitude transformation cannot be forced or reliably engineered. Their data show that the same experiences produced a genuine mindset shift in some students while leaving others unaffected. This places high demands on facilitators to recognise and respond to unpredictable moments of disorientation, and has direct implications for what the TransInnovate micro-credential can legitimately claim.

(b) Cross-cutting finding

The most important cross-source insight is that TD competence in a TAH setting is best understood as a capacity to move across difference without erasing it. The competent learner is not simply versatile or creative. They can hold technical, artistic, humanistic, and societal perspectives in tension long enough to produce a shared problem understanding, a normatively defensible direction, and a workable response. The three types of knowledge heuristic (Buser & Schneider, 2021) makes this visible: competence is not only about understanding 'what is', but also negotiating 'what ought to be' and 'how to act'.

The literature broadly agrees that assessing transdisciplinary learning cannot focus only on final outputs, but must capture the quality of knowledge integration, the quality of collaboration, and, where possible, shifts in students' attitudes or mindset.

(c) Tensions and open questions

There is a productive tension between virtue language and assessment language. Virtue studies (Vanney et al., 2023; Ten Hagen & Horn, 2024/2025) describe TD competence in terms such as humility, openness, reflexivity, and generosity, while assessment-oriented texts (Blom, Scager & Wiegant, 2021; Nguyen et al., 2025) push toward rubrics, scales, and behavioural indicators. The field needs both, but the translation between them remains weak. When virtues are turned into checklists, they risk losing their contextual and relational character; when competencies remain purely dispositional, they become difficult to assess or teach transparently.

A second tension is between consensus and over-stabilisation. Ten Hagen & Horn (2024/2025) show that ITD virtue discourse has become historically saturated. That stabilisation helps institutionalisation, but it also risks canonising a limited set of desirable traits and underexamining whose dispositions are being rewarded. This is especially relevant for TAH, where artistic, technical, and humanistic traditions may value different forms of rigour, dissent, or experimentation.

A third gap is empirical: the evidence base for competencies is much stronger in HE, sustainability, and teacher education than in HVET or explicitly TAH-specific settings. The literature therefore offers a strong generic TD competence language, but a relatively weak basis for saying which competencies are most decisive for mixed HE/HVET TAH cohorts.

(d) Design prompts

- Which competencies in WP3 should be treated as course outcomes, and which should be treated as conditions of collaborative work?
- How can support evidence of knowledge integration, reflexivity, and respectful disagreement without flattening them into simplistic scores?
- Which TAH-relevant competencies are missing from generic TD taxonomies — especially around value articulation, interpretation, aesthetic judgement, and ethical framing?
- At what points should learners produce evidence not just of what they know, but of how they learned across differences?

Dimension 2 – Transdisciplinary Pedagogy and Didactics

(a) What the literature shows

The literature is remarkably consistent on pedagogy, even where the evidence is uneven. Effective TD learning is described as experiential, challenge-based, iterative, dialogic, and stakeholder-facing. It relies on real-world problems, mixed teams, cycles of design and revision, structured reflection, and facilitation that supports both collaboration and conflict. Sandler et al. (2025), the Design Guide (Transdisciplinary Training Collaboratory, 2025), the Toolkit on TD Education (Philipp et al., 2022), and the teacher-education studies all converge on this point. TD pedagogy is less a single teaching method than a deliberately constructed learning ecology.

The corpus also makes clear that the learning climate is not secondary. Mutual respect, safety, openness, and trust are presented as preconditions for participants to risk uncertainty, expose partial understanding, and work through disagreement. A related concept reinforces this point directly: the learning edge — the zone in which learners are sufficiently challenged to venture beyond their established disciplinary frame, yet sufficiently supported not to be cognitively or emotionally blocked. Unlike a comfort zone, the learning edge is productive precisely because it involves genuine disorientation; unlike overwhelming challenge, it remains navigable because conditions of safety, trust, and mutual respect hold. This matters because TD learning requires people to confront the limits of their own disciplinary or professional frames. Pedagogy therefore has to manage not only cognition but also vulnerability.

A further pattern is the importance of iterative scaffolding. Sandler et al. (2025) formalise this through staged cycles of preparing, performing, and improving innovation labs. Nguyen

et al. (2025) show a similar micro-structure at classroom level through research, discussion, reporting, peer review, and consensus-building. The implication is that TD pedagogy works through repeated passes between inquiry, articulation, feedback, and redesign, rather than through linear delivery.

Visscher (2024) provides the most operationally complete example using the artistic method - acting: Theatrical Technology Assessment (TTA), a role-play simulation combining Constructive Technology Assessment, improvisational theatre, and sociological analysis, evaluated empirically with 38 students across seven technology cases.

These pedagogical principles find concrete operational expression in a growing family of documented collaboration methodologies, particularly within the European STARTS ecosystem. The STARTS Residency Wheel (STARTS Consortium, 2025) structures collaboration through six explicit phases — Identify, Connect, Speculate, Showcase, Educate, Accelerate — with an Expert Group maintaining continuity across phases. The MUSAE Design Futures Art-Driven method extends this through alternating divergent and convergent modes across Immerse, Horizon Scanning, Visioning, Ideating, and Prototyping phases (STARTS Consortium, 2025; MUSAE). The Re-FREAM Art Tech Toolbox (Re-FREAM Consortium, 2020) proposes an Envision–Empathize–Experience structure designed as a shared epistemic 'playspace' where hierarchical discipline identities are deliberately de-emphasised. Art Thinking, developed by Ars Electronica Futurelab, treats public engagement as integral to the learning cycle — Inspiring, Envisioning, Prototyping — and positions artistic questioning as upstream to design solutions rather than downstream dissemination (Ars Electronica Futurelab, 2023).

These method frameworks are complemented by mature instrumentation from adjacent fields. STIR/midstream modulation (Schuurbiers, 2011) offers a protocol for embedding socio-ethical reflection inside ongoing technical work through structured decision traces. Value Sensitive Design (Friedman & Hendry, 2019; Hendry, Friedman & Ballard, 2021) provides tools for operationalising values into stakeholder analysis, value scenarios, and design requirements without reducing them to checklists. Research through Design (Zimmerman, Stolterman & Forlizzi, 2010) formalises how prototypes and installations can function as knowledge outputs with explicit claims. These frameworks are not TAH-specific, but they supply the methodological rigour that residency-style pedagogies often leave implicit.

A critical cross-cutting lesson from the methods literature is that intermediary roles — facilitators, mentors, innovation catalysts, studio partners — are essential infrastructure, not optional add-ons. The S+T+ARTS 4 Water II Innovation Catalyst Mentoring Toolkit (S+T+ARTS4WaterII Consortium, 2025) makes visible the hidden labour of triadic collaboration by formalising intermediary work through a six-step design process covering skills assessment, guiding principles, format design, topic selection, session design, and implementation. Hungry EcoCities (2022–2026) similarly demonstrates that explicit 'core team' design — with designated studio, technical, and innovation partners — prevents the default assumption that artists and technologists can self-organise without facilitation support (Hungry EcoCities Deliverables, 2023).

(b) Cross-cutting finding

The strongest cross-source finding is that TD pedagogy is fundamentally a pedagogy of orchestration. What matters is not just using wicked problems or multidisciplinary teams, but how the course sequences roles, encounters, facilitation, and reflection. The literature repeatedly suggests that pedagogical quality lies in the design of interactions: who meets whom, around what object, under what rules, with what feedback loops, and at what degree of openness. The methods literature reinforces this by showing that the most successful collaboration frameworks are those that combine an operational wrapper — phased, schedulable, artifact-driven — with embedded ethical and interpretive instrumentation. The gap across the strongest existing methods is not a lack of procedures, but a lack of integration between operational scaffolding (residency toolkits) and knowledge/ethics instrumentation (STIR - Socio-Technical Integration Research, VSD - Value Sensitive Design, RRI - Responsible Research and Innovation), with explicit humanities roles and outputs remaining structurally under-specified.

(c) Tensions and open questions

The literature is much clearer about principles than about causal design effects. It tells us that co-creation, challenge-based work, reflection, and stakeholder engagement matter, but much less about which combinations work best for which learners, which timeframes, or which institutional constraints. Sandler et al. (2025) themselves note that the design elements of TD courses remain underreported.

There is also tension between openness and structure. Toolkits celebrate reduced teacher control, plural knowledge paths, and embracing failure, but empirical settings still require rubrics, timelines, and coordination. Too much openness risks confusion or superficiality; too much structure risks reimposing disciplinary closure. The literature recognises this tension but does not resolve it.

A further tension emerges from the methods literature: many of the strongest documented methodologies come from residencies, innovation labs, or special programmes that presuppose high motivation, dedicated facilitation, and institutional support. Scale remains unresolved — large-class teacher education appears possible under specific conditions, but much of the most convincing TD pedagogy literature is based on highly supported formats. That leaves a gap around mainstream HE delivery and especially HVET environments with tighter schedules and stronger applied-training pressures.

Finally, across the documented methods, the humanities contribution remains structurally under-guaranteed. Many toolkits include ethics sessions and societal impact framing, but they do not specify a humanist role with dedicated deliverables such as interpretive protocols, cultural discourse analysis, or pedagogical co-design. This can lead to 'society' being reduced to evaluation or outreach rather than knowledge production.

(d) Design prompts

- Which elements of WP3 need to be highly scaffolded, and where should the course deliberately preserve ambiguity?
- How can we best implement challenge based, interactive pedagogical formats alongside easy accessible online content for WP3?
- How will facilitation in WP3 calibrate the learning edge — ensuring learners are sufficiently challenged to venture across disciplinary boundaries, without being so exposed that they shut down?
- What kinds of boundary objects will support dialogue between technology, arts, humanities, and external stakeholders?
- Which parts of the learning sequence require human facilitation, and which could be reliably scaffolded?
- How will intermediary roles (facilitation, mentoring, brokerage) be made visible in the course architecture rather than left implicit?

Dimension 3 – TAH Integration

(a) What the literature shows

The sources in this dimension address the deeper conceptual challenge of what integration means when the knowledge systems involved operate according to fundamentally different logics. This is precisely where arts and humanities become analytically important, since the strongest sources show that they contribute distinct epistemic functions: reframing problems, surfacing values, questioning assumptions, creating intersubjective meaning, and making alternative futures imaginable. SHAPE-ID (2020) is particularly useful here, because it shows that arts/humanities relations to STEMM are multiple and often conflictual: expression versus utility, intersubjective reality, unstated contributions, and broader art-science-technology hybridity.

STARTS Consortium (2025) materials push this further by treating artists not as communicators of finished innovation but as active contributors to human-centred, ethically alert, exploratory innovation processes. The insistence that artists should be involved already in challenge formulation is analytically important: it suggests that TAH integration becomes meaningful when it shapes problem framing upstream, not only downstream dissemination.

A concern – raised by multiple sources in this dimension, though not from a common origin – is the risk that integration processes reduce one knowledge system to raw material for another. Pohl, Klein et al. (2021) note in passing that consensus-seeking can feel ‘akin to assimilation’ for minority knowledge communities – a brief but significant observation.

The three types of knowledge concept (Buser & Schneider, 2021) is especially useful for a TAH reading of TD integration. It prevents technology-heavy framings from collapsing the course into systems analysis and reminds us that target knowledge and transformation knowledge are equally necessary. In a TAH setting, this opens a stronger place for humanistic interpretation, normative disagreement, and artistic speculation as legitimate knowledge work.

(b) Cross-cutting finding

The key cross-source insight is that TAH integration works best when arts and humanities are treated as modes of inquiry, not as sectors or add-ons. Across SHAPE-ID (2020), STARTS (2025), S+T+ARTS4WaterII (2025), and the toolkit literature, the most promising integrations are those in which technical, artistic, and humanistic logics remain distinct enough to create friction, but are made to work on a shared societal challenge through iterative translation.

A consolidated TAH method should explicitly encode the patterns that recur across the strongest triad-oriented practices:

- **Challenge-based framing with boundary objects.**

STARTS methods repeatedly begin by defining a challenge and mapping stakeholders/objectives, then using prototypes/hybrid creations as shared objects through phases. (STARTS 2025).

- **Intermediary roles are essential, not optional.**

Innovation Catalysts, expert groups, studio partners, and facilitators are repeatedly formalized where projects scale; methods that omit these roles implicitly shift coordination work onto artists/technologists, which is a known failure point. (STARTS4WaterII 2024; Hungry EcoCities 2023).

- **Two-speed collaboration: exploration + consolidation.**

Methods like DFA and Residency Wheel alternate divergent exploration and convergent consolidation phases. This is conducive to integrating humanities because interpretive work often expands the problem space early, then helps justify constraints later. (STARTS 2025).

- **Public/stakeholder engagement as co-interpretation.**

Art Thinking and ReSilence treat public engagement as part of the research cycle and as a source of iteration, not merely dissemination. (Ars Electronica Futurelab 2023; ReSilence 2025).

- **Ethics and values work must be operationalized.**

RRI and VSD provide tested structures for articulating values and responsiveness, while STIR provides decision-level instrumentation for day-to-day work. (Stilgoe 2013; Schuurbiers 2011; Friedman & Hendry 2019).

(c) Tensions and open questions

The literature repeatedly oscillates between a transformative and an instrumental view of TAH. On the one hand, it claims that arts and humanities can change the very terms of inquiry. On the other hand, many institutional or innovation documents still position them as enablers of creativity, outreach, or critical reflection around fundamentally technological agendas. This tension is not a weakness of the literature; it is one of its most important findings.

A second unresolved question concerns the humanities more than the arts. In practice, many 'TAH' examples are more convincingly art-tech than humanities-tech. The humanistic contribution often appears indirectly through ethics, critique, or contextualisation, but the literature offers fewer clear models for stable humanities integration in curricular settings. SHAPE-ID (2020) makes this visible through the ambiguity surrounding AHSS roles.

A third gap is that many of the strongest TAH examples come from residencies, special programmes, or innovation labs, not from routineised courses within HE/HVET. That makes them inspiring, but it also means they may overstate what can be sustained in standard teaching conditions.

(d) Design prompts

- Where in WP3 will arts and humanities be allowed to reshape the question, rather than merely enrich the answer?
- Which assignments could make visible the movement between systems, target, and transformation knowledge?
- How will the course distinguish between productive friction and simple misunderstanding across T, A, and H?
- What should count as legitimate evidence in a TAH task: prototype, interpretation, narrative, critique, model, scenario, or some deliberate combination?

Dimension 4 – AI Applications

(a) What the literature shows

The literature supports a qualified rather than maximalist view of AI in TD education. Keil & Stein (2025) provide the clearest framework: AI appears most promising when used to support literature search, text analysis, transcription, process design, stakeholder communication, visualisation, and certain forms of weak knowledge integration. The same report is equally explicit that this does not amount to AI performing strong TD integration in the human sense.

In educational terms, Aliabadi, Singh & Wilson (2023) support an AI use case that is highly relevant to TransInnovate: AI should be integrated across curriculum and community rather than taught as an isolated technical object. This aligns well with the project's facilitation

hypothesis, because it implies that AI is most valuable when it mediates connections across domains rather than reinforcing siloed expertise.

El Moussaoui & Kofler (2025) add a useful TAH inflection. They show AI not only as a productivity tool but as a site where questions of authorship, originality, workflow, ethics, and human-centred design become pedagogically and institutionally salient. This is important because it suggests that in a TAH course AI should be both used and critically interrogated.

A systematic mapping by Keil & Stein (2025) organises AI contributions to transdisciplinary research into three functional domains — knowledge integration, participation, and science communication — and maps specific AI architectures to TD tasks across a five-phase workflow (problem framing → co-design → knowledge integration → action and decision support → evaluation and learning). Large language models are positioned primarily at the problem-framing and communication phases; retrieval-augmented generation and knowledge graphs at the integration phase; digital twins and multi-agent systems at the action and scenario phase; and evaluation analytics at the learning phase.

(b) Cross-cutting finding

The most robust cross-source pattern is that AI is best understood as a facilitator of TD process infrastructure, not as a substitute for TD judgement. It can accelerate searching, sorting, summarising, representing, and drafting. But the literature does not support delegating the normatively and relationally dense parts of TD work — problem definition, value negotiation, trust building, or final meaning-making — to AI. Where hybrid architectures are used (generation grounded in retrieval, outputs anchored in explicit knowledge structures, human review at consequential decision points), legitimacy and accountability are better preserved (Keil & Stein, 2025; Gao et al., 2023; Norström et al., 2020).

Across the literature, AI contributions to transdisciplinarity cluster into a small set of functions:

- **Problem framing and translation** (rapid synthesis, re-expression across vocabularies, multilingual support, drafting of boundary objects).
- **Evidence integration with provenance** (retrieval, semantic alignment, traceable synthesis).
- **Participatory facilitation** (workshop design support, stakeholder communication, visualization, accessible language).
- **Scenario building and decision support** (digital twins, simulation, multi-agent scenario exploration).
- **Monitoring and evaluation** (integration indicators, process telemetry, auditability).

The most referenced technical families supporting these functions are LLMs, RAG, multi-agent architectures, KGs/ontologies and semantic web approaches, and hybrid LLM–knowledge base systems (Gao et al. 2023; Guo et al. 2024; Yang et al. 2025).

Tab 2: *AI tools/techniques vs transdisciplinary functions and limitations (2020–2026 synthesis)*

AI tool / technique	Transdisciplinary functions it can support	Key limitations in TDR contexts
Large language models (LLMs)	Drafting shared problem frames and boundary objects; translating across disciplinary and stakeholder language; rapid summarization; facilitation support and communication drafts (Keil and Stein 2025; Zhang et al. 2025)	Hallucination and *overgeneralization bias* in science summarization; "manufactured consensus"; opacity can shift power toward model outputs (Peters and Chin-Yee 2025; Bender et al. 2021)
Retrieval-augmented generation (RAG)	Evidence-grounded synthesis; living knowledge bases; traceable answering if provenance is enforced; domain updates through retrieval (Gao et al. 2023)	Retrieval bias (what is indexed/available); weak provenance can produce "citation laundering"; prompt injection and data leakage risks if deployed via third parties (Gao et al. 2023; Keil and Stein 2025)
Knowledge graphs (KGs) + ontologies + semantic standards	Interoperability; explicit conceptual alignment; provenance and explainability; durable integration backbone across institutions (Scholz et al. 2024a; Shang et al. 2024)	High upfront modeling cost; "ontology politics" (whose categories count); maintenance burden; risk of reifying contested concepts as fixed (Scholz et al. 2024a; Manuel-Navarrete et al. 2025)
Hybrid LLM + knowledge base (KG-grounded LLMs, LLM-KB integration)	Natural language accessibility + structured traceability; better factuality and controllability; supports negotiation of shared concepts through structured representations (Yang et al. 2025)	Engineering and governance complexity; errors can be hard to localize (retrieval vs KG vs generation); inherits bias from both training data and schemas (Yang et al. 2025)
LLM-based multi-agent systems	Structured exploration of perspectives; scenario generation; role-based decomposition (policy analyst, domain expert, stakeholder proxy); coordination support (Guo et al. 2024)	Evaluation still immature; agents can simulate authority without accountability; can intensify adversarial framing if stakeholder representation is poor (Guo et al. 2024)
ML for multimodal / cross-sector data integration	Integrating sensor, administrative, environmental, clinical data; anomaly detection; predictive components for decision support platforms (Sohail et al. 2024)	Dataset shift and spurious correlation; equity concerns; difficult validation when data spans domains and contexts (WHO 2021)
Visualization + digital twins + interactive analytics	Boundary objects for negotiation; shared situational awareness; scenario exploration in urban/climate systems (Sohail et al. 2024; Terrado et al. 2022)	Model ownership can centralize power; uncertainty communication remains hard; usability gaps can exclude stakeholders (Terrado et al. 2022)
AI-supported evaluation analytics (integration scales, SNA, audit trails)	Process steering and reflexive learning; measuring knowledge integration; collaboration patterns; accountability (Belcher and Claus 2025; Fischer et al. 2025; Steelman et al. 2021)	Metrics can be gamed; measurement can crowd out unmeasured values; requires normative agreement on "success" (Belcher and Claus 2025)

(c) Tensions and open questions

The literature is much stronger on opportunity/risk mapping than on demonstrated TD-educational outcomes. Keil & Stein (2025) provide careful risk analysis, but there is still little evidence showing how AI concretely improves TD learning over time. Aliabadi, Singh & Wilson (2023) is useful, but it comes from a primary and secondary education context and therefore transfers only partially.

There is also a central tension between efficiency and legitimacy. AI may help represent, synthesise, or communicate complex material, but in TD settings these gains can be offset if stakeholders perceive AI as opaque, biased, or misaligned with their values. Keil & Stein (2025) explicitly note the TDR-specific risk that AI may discredit participation itself. That is directly relevant

A further blind spot is that the literature frames human–AI collaboration almost exclusively as a cognitive-procedural exchange, leaving the bodily, attentional, and affective effects of sustained (co)work with AI structurally invisible — even though TAH traditions of somatic, performative, and phenomenological practice are precisely positioned to address them.

Finally, the literature remains context-sensitive about where AI belongs in the TD workflow. Phase-sensitive frameworks suggest different architectures suit different moments — generative tools at problem framing, structured knowledge infrastructures at integration, evaluation analytics at learning — but no single configuration transfers reliably across institutional settings (Keil & Stein, 2025; Scholz et al., 2024). Governance context further constrains what is possible in practice: institutional rules, confidentiality requirements, and regulatory frameworks such as the EU AI Act (Regulation (EU) 2024/1689) shape which AI practices are permissible within specific collaborative research ecosystems (NIST, 2023; UNESCO, 2021).

(d) Design prompts

- Which AI functions should be designed as support for reflection and translation, and which should be explicitly prevented from acting as authority?
- How will the application expose source provenance, uncertainty, and human review in ways learners can understand?
- In what parts of TD learning could AI productively scaffold weak integration without pretending to perform strong integration?
- What forms of embodied practice could be introduced into WP3 to ground the bodily, attentional, and affective effects of (co)working with AI — and where in the learning sequence are they most needed to sustain presence, discernment, and intersubjective sensing?
- How will WP3 build learners' capacity to recognise — in real time — when AI is shaping their judgement, taste, or authorial voice, rather than only the content of their output?

- Which moments in the course should be deliberately designed AI-free, so that learners can calibrate their own perception, sensibility, and discernment against AI-mediated work?

- How can the application help users surface differences rather than prematurely smoothing them over?

Dimension 5 – Barriers and Drivers

(a) What the literature shows

The literature is strikingly consistent that the main barriers to TD education are structural before they are pedagogical[1]. Organisational silos, rigid funding, narrow reward systems, lack of time, publication-centred career criteria, weak institutional networks, and insufficient policy support all recur across Williams et al. (2024), SHAPE-ID (2020), Philipp et al. (2022), and Sandler et al. (2025). In other words, the difficulty of TD education lies not only in designing good courses but in building conditions under which such courses can exist and survive.

The literature also shows that drivers are similarly multi-level. Effective leadership, mentoring, boundary-spanning roles, trusted intermediaries, distributed ownership, stable funding, collaborative culture, and clear evaluation frameworks all matter. TD does better where institutions create dedicated spaces, recognise non-traditional outputs and labour, and support longer-term collaboration across academic and societal actors.

A major insight from Straub, Kulin & Ehmke (2021) is that barriers and drivers are not only institutional abstractions. They appear inside teams as uneven workload, asymmetrical decision-making, and partial ownership of goals. This shifts the discussion from 'institutional barriers' in the abstract to concrete collaborative design questions.

(b) Cross-cutting finding

The clearest cross-source insight is that TD education depends on invisible infrastructure: coordination work, translation work, facilitation work, brokerage, mentoring, documentation, and relationship maintenance. Much of the literature on innovation labs (Sandler et al., 2025), residencies (STARTS, 2025; S+T+ARTS4WaterII, 2025), and mentoring toolkits effectively documents this hidden labour. The implication for TransInnovate is that course design cannot assume collaboration will emerge spontaneously once the topic is 'interesting enough'.

(c) Tensions and open questions

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[1] The corpus reflects a structural selection bias: its authors are predominantly experienced TD practitioners. The perspective of educators encountering transdisciplinary approaches for the first time — for whom the *how* of implementation remains unresolved — is systematically underrepresented. The findings are valid, but they speak most directly to those who are conceptually prepared yet institutionally constrained, which is a narrower group than WP3's intended participants.

A core tension runs between the rhetoric of shared ownership and the reality of unequal labour. Many TD models celebrate co-creation, but empirical and toolkit sources show that coordination, moderation, reporting, and administration often fall disproportionately on researchers or facilitators. That tension is especially relevant if the AI-app is expected to reduce coordination burdens.

A second tension concerns recognition. Institutions increasingly value TD rhetorically, yet reward systems still often privilege disciplinary publishing over stakeholder engagement, teaching innovation, or translational labour. Williams et al. (2024) make this problem especially visible, but the literature provides fewer strong examples of institutions that have solved it at scale.

A third open question is whether barrier-removal should happen through integration into mainstream curricula or through special protected formats such as labs, residencies, and honours-style programmes. The corpus contains good examples of the latter, but much weaker evidence for durable mainstreaming.

Existing practice does, however, offer at least partial counter-evidence. A number of universities have embedded TD elements into standard curricula rather than confining them to special programmes: the Universities of Auckland and Aix-en-Provence have structured at least one TD element into the pathway of all enrolled students; ETHZ, TU Sydney, and Goethe-Universität Frankfurt have developed challenge- and project-based TD course formats within regular academic offerings. These examples — not yet fully documented in peer-reviewed sources, but substantiated by practitioner accounts - suggest that mainstreaming is feasible when institutional leadership and curriculum design align..

(d) Design prompts

- Which barriers should WP3 treat as external assumptions, and which should the course design actively mitigate?
- What forms of facilitation, mentoring, or brokerage need to be visible in the course architecture rather than left implicit?
- Which collaborative tasks could the AI-app realistically lighten, and which are too relationally sensitive to automate?
- How will the project recognise and distribute the labour of coordination, reflection, and translation?
- Should we integrate a module in WP3 on institutional factors for institutional leaders and coordinators? Like ´improving structures for TD education (and research) in your institution´

Dimension 6 – Context and Target Group

(a) What the literature shows

The corpus strongly rejects any one-size-fits-all model. Training needs vary by region, institution, sector, learner stage, and actor constellation. Krebs & Vilsmaier (2025) show clear differences in terminology, infrastructure, organisational leadership, and desired target groups across world-regions. The Design Guide (Transdisciplinary Training Collaboratory, 2025) similarly insists on contextual and audience-sensitive design, while Sandler et al. (2025) show that even within Europe, institutions differ substantially in readiness for TD innovation labs.

At the same time, the empirical base is uneven. Most of the stronger evidence comes from higher education, teacher education, sustainability, and research-training contexts. There is much less robust material on HVET, short-cycle vocational formats, or mixed learner groups that combine academic and applied-professional logics. This does not make the literature unusable for TransInnovate, but it does mean the project will need to test whether HE-derived assumptions hold in HVET environments.

The corpus also broadens the idea of 'target group'. TD education is not only for enrolled students. Many texts assume some combination of researchers, practitioners, policymakers, funders, communities, and intermediaries. In Krebs & Vilsmaier (2025), even underrepresented and non-human perspectives are explicitly named as missing but relevant. This expands the design challenge for WP3: the course may have primary learners, but it sits within a wider ecology of actors.

(b) Cross-cutting finding

The strongest cross-source insight is that context is constitutive, not supplemental. TD education changes when the institutional mission changes, when the actor mix changes, when the regional vocabulary changes, and when the legitimacy of arts/humanities or societal knowledge changes. A TransInnovate course therefore cannot simply be 'adapted' to context after design; context has to enter the design logic from the beginning.

(c) Tensions and open questions

The main tension is between global frameworks and local legitimacy. Toolkits and guides are valuable because they stabilise concepts and practices, but Krebs & Vilsmaier (2025) warn against conceptual domination and vocabulary homogenisation. This is especially relevant for a European project working across multiple national and institutional settings.

There is also a tension between elite/protected formats and inclusive access. Many strong TD examples come from honours programmes, residencies, or special labs that presuppose unusually high motivation, institutional support, or selection. Yet the project's ambitions point toward broader access across HE and HVET. The literature does not yet show clearly how to reconcile ambition, depth, and inclusivity at scale.

Finally, the corpus is still relatively weak on TAH-specific learner segmentation. It tells us much about context sensitivity in general, but less about which combinations of technical, artistic, and humanistic prior knowledge create the most productive learning conditions.

(d) Design prompts

- Which learner profiles are primary in WP3: HE students, HVET learners, mixed cohorts, educators, or facilitators?
- What needs to differ between an HE and an HVET delivery beyond level of complexity — pace, task format, assessment, stakeholder role, digital support?
- How will TransInnovate avoid imposing a single TD vocabulary where different partners use different traditions?
- Which external actors must be treated as peripheral participants, and which should shape the course from the outset?
- The contextual dependency hints towards an opportunity to offer a module of WP3 on designing a specific course in their context (in person, not more than 3 course-projects per trainer)
- How will WP3 structure the involvement of practitioners — from public administration, industry, or civil society — not as guest contributors but as co-participants in the TD learning process? What roles, moments, and accountability structures make their knowledge contribution legible and reciprocal?

Cross-Cutting Observations

The strongest finding of the literature as a whole is that transdisciplinary education in a TAH context is not best understood as interdisciplinary content mixing. It is better understood as the design of processes that enable plural knowledge to become jointly usable without collapsing difference. Across competency, pedagogy, integration, AI, barriers, and context, the same structure keeps reappearing: complex real-world problems require not only multiple domains of expertise, but also intentional work on trust, mutual understanding, reflection, shared ownership, and institutional support.

As a source of evidence, the literature is strongest where the project needs conceptual scaffolding: defining integration, naming competence dimensions, identifying enabling conditions, clarifying TAH contributions, and mapping AI opportunity/risk space. It is weaker where the project needs design certainty: which precise course elements produce which outcomes, how TD pedagogy scales beyond protected formats, which TAH configurations work best in HVET, and how AI actually changes learning quality in real TD classrooms over time. Those are precisely the areas where interviews, the survey, and course analysis are likely to add the most value.

The literature opens, but does not close, several questions that are central for course and AI-app: how to assess relational-intellectual qualities without trivialising them; how to keep arts and humanities upstream in problem framing rather than downstream in presentation; how to mainstream TD beyond labs and residencies; and how to design AI that supports plural, reflexive collaboration without claiming false epistemic authority.

The practical implication is that every framework imported from the literature must be actively reconstructed for the TAH context, not passively applied. This includes i.e.: adapting the Weaving mechanism (Pohl et al., 2021) to address the specific friction between quantitative-technical and interpretive-aesthetic knowledge systems; testing the Systems–Target–Transformation mapping onto the TAH triad (proposed by this review) through course analysis and interviews; validating the TD Action/Attitude distinction (Horn et al., 2024) against TAH-specific empirical data; and examining whether the 8-competency framework (Redman & Wiek, 2021) captures the aesthetically embodied and normatively interpretive knowing that is unique to Arts and Humanities.

The literature review can establish the conceptual vocabulary and the theoretical reference points. It cannot, by itself, generate the TAH-specific competency framework that is the central innovation of TransInnovate. That framework must be induced from the full research dataset.

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Quantitative Survey

Key Findings

- **The sample speaks from a demand-side position, not a supply-side one.**
- **Most respondents understand transdisciplinarity as interdisciplinarity.**
- **The TAH triad is not the natural unit of cross-disciplinary work.**
- **Competency demand is procedural, not epistemic.**
- **Near-universal agreement that TD education matters, paired with near-universal lack of infrastructure.**
- **Practitioners do not know what already exists.**
- **The strongest pedagogical preference is for facilitated, interactive, in-person formats.**
- **Designing TD teaching is harder than delivering it.**
- **AI is used generically, not for TD-specific functions.**

2. Quantitative Survey

Sample Profile and Interpretive Framework

This section describes the composition of the survey sample and identifies the interpretive boundaries it imposes on all subsequent findings. The survey was administered through KoboToolbox in three language versions (English, Slovenian, Lithuanian) between December 2025 and March 2026. It collected 135 valid responses against a project target of 200, representing 67.5% of the planned sample size. While this falls short of the quantitative target set in the project application, the sample is analytically usable for identifying patterns, tendencies, and distribution signals across the six dimensions — provided its composition is understood and its limitations are not overstated.

The respondent pool is dominated by educators and managers working in higher education and higher vocational education. Teachers and lecturers constitute the largest group (58.5%), followed by institutional or project managers (22.2%) and researchers (10.4%). PhD students, future educators, and policy makers are marginal (collectively 5.2%). This means the survey primarily captures the perspective of mid-career to senior teaching and management staff; the student and early-career voice is largely absent, as is the policy-making perspective.

Primary role	n	%
Teacher / Educator / Lecturer	79	58.5
Manager (Institutional / Project)	30	22.2
Researcher	14	10.4
Other (CEO, Vice-Rector, etc.)	5	3.7
PhD Student	3	2.2
Future Educator	3	2.2
Policy Maker	1	0.7

Institutionally, the sample splits almost evenly between HE (43.7% exclusively HE) and HVET (38.5% exclusively HVET), with a small group in both. Geographically, 77.0% of respondents are based in the three partner countries: Lithuania (42.2%), Slovenia (18.5%), and Czech Republic (16.3%). The remaining 23.0% come from the UK, other European countries, and non-European countries including Australia, Brazil, Ecuador, and Turkey. The Lithuanian dominance reflects strong partner-network mobilisation but introduces a distributional asymmetry that limits cross-country comparison. The sample skews female (68.9%), is concentrated in the 40–59 age range (60.0%), and is educationally advanced: 81.5% hold a Master's or Doctorate.

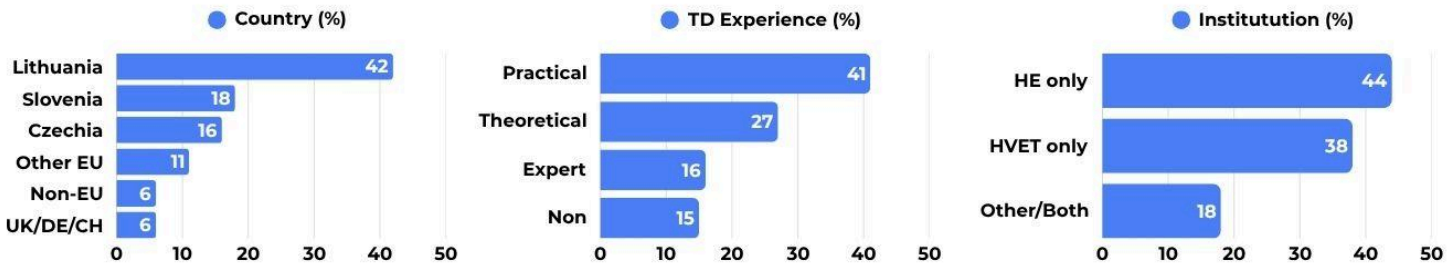

Figure 1. Sample composition: country, TD experience, institutional context.

A critical finding for interpreting all subsequent data is the distribution of transdisciplinary experience. Only 16.3% of respondents identify as experts who actively lead TD projects or courses. The majority report practical experience (40.7%) or only theoretical familiarity (27.4%), while 14.8% report no experience at all. This means the survey captures predominantly a demand-side perspective — people interested in or beginning to engage with transdisciplinarity, rather than established practitioners.

In terms of disciplinary coverage, Social Sciences (57.0%) and Technology (54.8%) are the most commonly combined fields, followed by Arts (33.3%), Humanities (26.7%), and Natural Sciences (21.5%). Only 12.6% of respondents combine all three TAH domains, while 10.4% report purely disciplinary work. This confirms that the full T–A–H intersection remains a minority practice.

Calibration: How Respondents Understand Transdisciplinarity (Q30)

Open-ended responses to Q30 (see appendix of this chapter) reveal that the majority of respondents define transdisciplinarity in terms closer to interdisciplinarity — as the combination or integration of different disciplines. Formulations such as 'connecting different fields', 'combining knowledge from multiple disciplines', and 'integration of different subjects' dominate. Fewer responses reference the distinguishing features of transdisciplinarity: the involvement of non-academic actors, the focus on complex societal problems, or reflexive engagement with values and assumptions. This calibration matters: when respondents answer questions about TD competencies, barriers, or pedagogies, they are often thinking about interdisciplinary rather than transdisciplinary work.

Interpretive Limitations

Four limitations constrain the interpretive weight of this dataset. First, the sample is a convenience sample recruited through partner networks, not a probability sample. Second, the Lithuanian over-representation means aggregate patterns are partially a Lithuanian pattern. Third, the low share of respondents with full TAH experience limits the survey's ability to speak about TAH-specific dynamics. Fourth, the conceptual gap visible in Q30 means the survey measures attitudes toward cross-disciplinary work in general, not necessarily toward transdisciplinarity in the strict sense.

Key Findings

The findings below summarise what the survey corpus of 135 responses shows before those findings are redistributed across the six D2.1 dimensions.The findings below are descriptive summaries of the survey's main signals, not interpretive conclusions.

1. **The sample speaks from a demand-side position, not a supply-side one.** Only 16.3% identify as TD experts. The survey captures what practitioners perceive they need, not what experienced implementers know works.
2. **Most respondents understand transdisciplinarity as interdisciplinarity.** Open-ended definitions describe combining disciplines. The distinguishing features of TD — societal actor involvement, knowledge co-production, reflexivity — appear only in a small expert minority. All subsequent answers should be read through this filter.
3. **The TAH triad is not the natural unit of cross-disciplinary work.** Only 12.6% combine Technology, Arts, and Humanities. The dominant pairing is Technology–Social Sciences. The course must construct the triad's value from scratch.
4. **Competency demand is procedural, not epistemic.** Respondents prioritise integration methods, stakeholder communication, and team structuring — not aesthetic judgement, normative reasoning, or holding divergent knowledge systems in productive tension.
5. **Near-universal agreement that TD education matters, paired with near-universal lack of infrastructure.** 91.9% rate TD training as important; the top barriers are disciplinary structures (45.9%), limited resources (43.0%), and closed curricula (40.7%). The bottleneck is architecture, not motivation.
6. **Practitioners do not know what already exists.** 79.3% are unaware of any published TD frameworks or resources — both a barrier and an opportunity for TransInnovate's outputs.
7. **The strongest pedagogical preference is for facilitated, interactive, in-person formats.** 70.4% prefer workshops; AI-supported applications rank last (31.1%).
8. **Designing TD teaching is harder than delivering it.** The most cited challenge is format design (53.3%), followed by method/tool selection (40.7%). Respondents lack pedagogical frameworks, not subject-matter knowledge.
9. **AI is used generically, not for TD-specific functions.** Respondents use AI for literature search and content generation. No one reports using AI for integration facilitation, boundary-crossing dialogue, or value negotiation.
10. **The TAH triad sub-group (n=17) is qualitatively different.** Respondents who work across all three TAH domains are more experienced (35.3% experts vs. 13.6%), more geographically diverse, and define TD in terms closer to the academic literature. Their needs are relational and institutional (recognition, funding, convincing sceptical colleagues), not methodological. They are closer to the project's peer group than its typical target participant.

Analytical Report

Dimension 1 – Competencies and Assessment

(a) What the data show

The competency priorities expressed by respondents form a clear hierarchy. Engaging with multiple disciplines and societal actors (60.7%), bridging and integrating knowledge (53.3%), and grasping the complexity of systems and change processes (50.4%) are the three most frequently selected competencies. These cluster around what the literature synthesis identified as the epistemic and integration strand of TD competence. The next tier — addressing societal challenges (40.7%), designing interaction processes (38.5%), and leadership (38.5%) — corresponds to the action and facilitation strand. Social learning processes (28.1%) and common good orientation (35.6%) are selected less frequently.

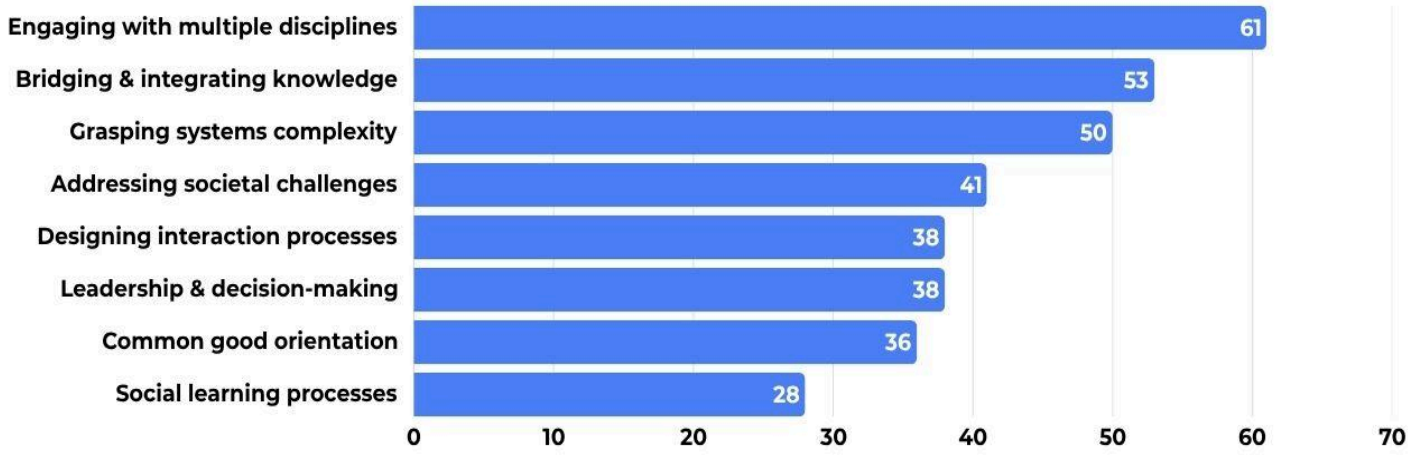

Figure 1. Key competencies selected by respondents in % (Q14, multiple select, n=135).

The open-ended responses to Q21 (missing skills) reinforce this pattern. The most frequently mentioned gap is methods for knowledge integration, cited across multiple countries and institutional types. Stakeholder communication is the second most common need, followed by team structuring. Notably, very few respondents identify aesthetic judgement, value articulation, or interpretive skills as missing — the gaps they perceive are primarily procedural and organisational rather than epistemic or normative.

When asked about their interest in further training (Q19–20), 82.2% rate it as rather or highly important. The dominant interest profile is becoming able to participate in TD projects or contribute to courses, rather than to lead them.

(b) Cross-cutting finding

The survey reveals a competency demand primarily oriented toward process competencies (integration methods, facilitation, stakeholder engagement) rather than domain-specific TAH competencies. Respondents want to know how to organise and manage cross-disciplinary work — they do not articulate the need for competencies specific to the T–A–H intersection such as navigating between optimisation logic and interpretive reasoning, or holding aesthetic and ethical judgement alongside technical analysis. The implication for D2.2 is that the competency framework cannot simply mirror what respondents ask for; it must also address what they do not yet recognise as a need.

(c) Tensions and open questions

There is a tension between the broad endorsement of integration competencies and the narrow practical demand for methods and tools. Respondents agree in principle that TD requires complex capacities (systems thinking, bridging knowledge, engaging societal actors), but when asked what they concretely lack, they request toolkits, templates, and step-by-step procedures. This echoes the literature review's warning that translating virtue-based competence descriptions into operational assessment without trivialising them remains an unsolved challenge.

This creates a specific challenge for the project: the course and framework must meet respondents where they are (providing accessible methods, tools, and structured guidance) while also stretching them toward where the project's innovation lies. The form of this stretching matters. The survey shows that respondents request templates and step-by-step procedures even for capacities — systems thinking, holding divergent knowledge in tension, engaging societal actors — that resist being templated. The implication is not to refuse procedural scaffolding, since that would deny learners the institutional legibility they need, but to design scaffolding that is *meant to be exceeded*: tools whose own limits become visible to learners at the moment when the practice can no longer be reduced to them.

(d) Design prompts

- How can the course offer scaffolds that meet respondents' demand for procedural guidance while being designed to be exceeded — so that learners encounter the limits of procedure as part of acquiring TD competence, rather than as a frustration with the course?

- Should D3.2 adopt a tiered proficiency structure that allows entry at the participation level where most respondents are, rather than assuming readiness for TD leadership?

- Where in the course sequence should knowledge integration shift from a procedural step to an epistemic challenge — the point where learners must negotiate across differences rather than apply a method?

Dimension 2 – Transdisciplinary Pedagogy and Didactics

(a) What the data show

For respondents whose institutions offer TD-related courses (Q10: 28.1% Yes, 37.0% No, 34.8% Don't know), the dominant teaching formats are lectures, problem-oriented courses, and workshops. Among those personally involved in TD teaching (approx. 22%), problem-oriented formats and workshops are the most frequently used, with in-person delivery strongly preferred. The preference for interactive workshops is even more pronounced when respondents are asked about future training resources (Q28): 70.4% select interactive workshops as their preferred format, followed by methodological guidelines/handbook (43.0%), online self-paced courses (33.3%), and AI-supported learning applications (31.1%).

The most frequently cited teaching challenges (Q24) are designing TD teaching formats (53.3%) and finding/selecting appropriate methods and tools (40.7%). These are design challenges, not delivery challenges: respondents struggle more with what to teach and how to structure it than with managing classrooms or keeping participants engaged (31.1%).

(b) Cross-cutting finding

The strong preference for workshops and facilitated formats reinforces the emphasis on learning climate, orchestration, and iterative scaffolding. However, the data also show a gap: while respondents prefer interactive formats, the institutional reality is still dominated by lectures and traditional seminars. The high 'Don't know' rate on Q10 (34.8%) is itself analytically significant — it suggests that even when TD courses exist at an institution, they may be poorly visible or integrated.

(c) Tensions and open questions

The tension between wanting interactive, experiential pedagogy and operating within institutions organised around lectures and disciplinary structures runs throughout the data. A related tension: respondents strongly prefer in-person delivery, but the project's international format will require significant online components. How the WP3 course negotiates this preference is a critical design question.

A second-order tension lives inside the workshop preference itself. Workshops in teaching contexts tend to function well as encounter and transformation — opening perspectives, surfacing assumptions, generating first contact with unfamiliar epistemic styles — but are weaker as vehicles for cumulative, structured knowledge that learners can later mobilise independently. Research workshops, where participants are co-producers of knowledge rather than learners of it, work differently and are not directly comparable. If respondents are reporting a preference for workshops because that is the format in which TD most often felt *alive* to them, the design implication is not that the course should be workshop-dominant, but that workshop episodes need scaffolding around them that consolidates what they open up.

(d) Design prompts

- Designing TD formats is the single greatest reported challenge (53.3%). Should D2.2 section B1 provide modular templates that can be assembled into different course architectures within existing curricula, rather than prescribing a single course structure?

- Respondents prefer facilitated workshops but operate in lecture-dominated institutions. Which modules can work as embedded components within existing disciplinary courses, and which require a dedicated TD space?

- Workshops are the format respondents most strongly associate with TD, but in teaching contexts workshops often function as encounter rather than as knowledge consolidation. How should the course sequence workshop episodes alongside other formats (structured reading, reflective writing, iterative applied work) so that what a workshop opens up is consolidated into transferable competence rather than left as a one-off insight?

Dimension 3 – TAH Integration

(a) What the data show

The survey's contribution to this dimension is primarily structural. The field-combination data (Q9) show that Technology and Social Sciences are the most commonly combined fields, while Arts (33.3%) and Humanities (26.7%) are less frequently part of respondents' actual work. Only 12.6% of the sample combines all three TAH domains.

Several respondents from artistic or humanistic backgrounds report difficulty in convincing colleagues from technology or hard sciences to engage with cross-disciplinary work. This directional asymmetry — arts and humanities seeking integration while technology remains structurally dominant — is consistent with the literature's finding that the humanities contribution often remains structurally under-guaranteed.

(b) Cross-cutting finding

The TAH triad is not the natural configuration of the sample's cross-disciplinary work. Most respondents combine two domains at most, and the dominant pairing is Technology–Social Sciences, not Technology–Arts–Humanities. This means the TransInnovate course cannot assume that participants arrive with intuitions about TAH integration; it must actively construct the triad as a meaningful frame and show why the three-way configuration produces something that pairwise combinations do not.

(c) Tensions and open questions

The main tension is between the project's TAH framing and the sample's actual practice, which is largely bilateral. The Humanities are the least represented of the three TAH poles (26.7%), confirming the literature's observation that humanities contributions often appear

indirect. The question of how to make the humanities contribution visible, structural, and non-reducible remains as open in the survey data as it is in the literature.

(d) Design prompts

- The 87.4% who do not work across the full TAH triad reflect structural conditions more than attitudinal resistance — their contexts have not yet asked for it. How can the course construct that context from within: designing problems or projects that cannot be adequately addressed through bilateral pairings, so that the third pole becomes methodologically necessary and the triadic configuration emerges from the work as the learner's own conclusion?

Dimension 4 – AI Applications

(a) What the data show

The AI-related data (Q27) reveal a sample that is actively but narrowly engaged with AI in educational contexts. The most common uses are AI for literature search and analysis (45.9%) and reflecting with students on AI's potentials and dangers (40.7%). Content generation with AI is used by 31.1%. More specialised uses — AI for selecting TD methods (18.5%), gaining TD knowledge (16.3%), or grading student work (10.4%) — are practised by minorities. Notably, 16.3% express interest in using AI but do not yet do so, while only 5.9% state they will not use AI at all.

When asked about preferred training formats (Q28), AI-supported learning applications are selected by 31.1% — the lowest of the four options offered. The preference hierarchy is clear: human-facilitated interaction first, structured written guidance second, self-paced learning third, AI-supported tools fourth.

(b) Cross-cutting finding

The survey confirms the literature's qualified view of AI in TD education. Respondents use AI primarily as a productivity tool and as a topic of critical reflection. They do not report using AI for the tasks most relevant to AI-app's design hypothesis: facilitating knowledge integration, supporting boundary-crossing dialogue, or scaffolding transdisciplinary collaboration.

(c) Tensions and open questions

There is an implicit tension between respondents' critical stance toward AI (40.7% reflect on its potentials and dangers with students) and their actual usage patterns, which are predominantly instrumental. The project builds an AI-supported learning application, but this is the least preferred training format in the sample. AI-app must demonstrate clear value that respondents do not yet recognise, rather than confirming an existing demand.

(d) Design prompts

- The preference data for AI-supported formats (31.1%) reflect current exposure rather than stable disposition — respondents cannot prefer AI uses they have never seen done well. How can the course expand learners' imagination of what AI can do in TD work, treating the preference baseline as a starting point to be moved rather than a design brief to be followed? And how should AI-app be embedded within the modules so that learners encounter it in use before they are asked to adopt it independently?

- AI-app enters a context where learners' default AI habits are generic and productivity-oriented. Which moments in the course should do explicit work to prevent TD-specific AI functions from being assimilated to existing habits — and how does the course build the critical vocabulary learners need to recognise when AI is shaping their collaborative judgement rather than supporting it?

Dimension 5 – Barriers and Drivers

(a) What the data show

The barrier landscape is consistent across the sample and strongly confirms the literature's findings. The top institutional barriers (Q25) are: organisation of teaching in disciplinary structures (45.9%), limited resources for interactive courses (43.0%), and curricula not open to TD teaching (40.7%). These are followed by lacking institutional support (31.1%), lack of credit-point recognition (29.6%), accreditation difficulties (23.7%), and scepticism toward TD approaches (20.7%).

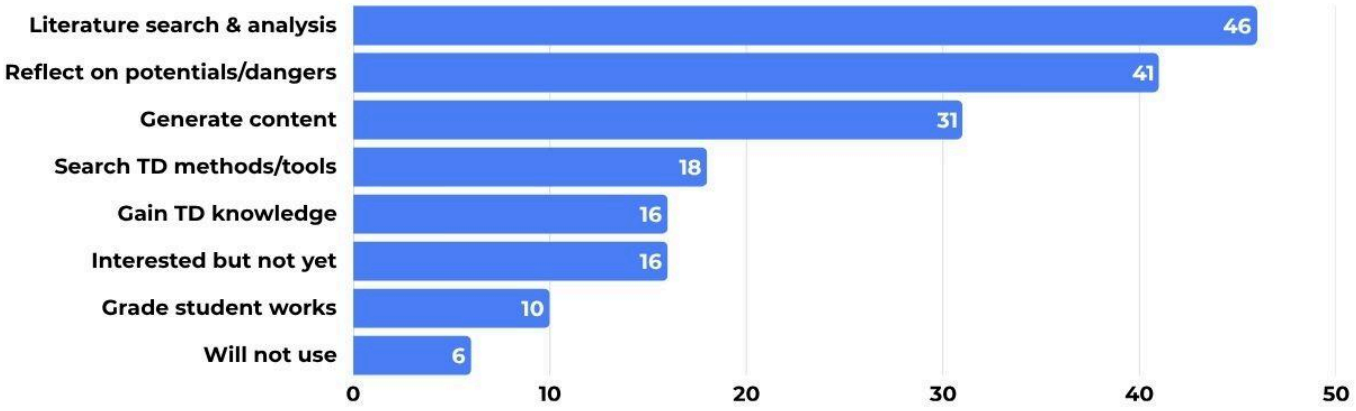

Figure 5. Institutional barriers to implementing TD approaches (Q25, multiple select, n=135).

On the driver side, the survey provides strong evidence of perceived value. 91.9% of respondents rate it as rather or highly important for students to receive TD training (Q22). A striking finding: 79.3% of respondents are not aware of existing methodologies, frameworks, or resources for teaching TD competencies (Q26). Even among those with practical experience, awareness of published TD frameworks is low.

(b) Cross-cutting finding

The survey's most powerful finding is the combination of three signals: high perceived importance of TD education (91.9%), high structural barriers to implementation (disciplinary structures, closed curricula, limited resources), and very low awareness of existing resources (79.3% unaware). This triad describes a field where motivation substantially exceeds infrastructure. The literature review identified invisible infrastructure as the critical enabler of TD education. The survey now confirms empirically that this infrastructure is indeed absent or invisible to most practitioners.

(c) Tensions and open questions

The main tension is between the rhetoric of institutional value and the reality of institutional support. Respondents overwhelmingly believe TD education matters, yet their institutions lack the structures, incentives, and resources to support it. This is not a contradiction but a diagnostic: the barrier is not attitudes but architecture.

(d) Design prompts

- The top barriers are structural (disciplinary organisation, closed curricula, limited resources). Should the modules be explicitly designed to be insertable into existing disciplinary courses as components, rather than requiring a new standalone programme?

- 79.3% are unaware of existing TD resources. Should the course go beyond a repository model toward a guided-entry model where educators are matched to resources based on their background and experience level?

- If the barrier is structural, which competencies of institutional change-making — building allies among sceptical colleagues, sequencing advocacy, leveraging student demand, making the case to institutional leaders — belong in the course? And how does the course prepare educators to participate in changing the architecture, not only to work within it?

- The 79.3% unawareness of existing TD resources reads as a community-infrastructure problem as well as a discoverability one — practitioners are isolated, and resources travel through relational ties that the field currently lacks. Should the course and AI-app be designed to produce a community of practice — connection, peer support, sustained network among graduates — rather than only delivering content into isolated sites?

- Should D2.2 section B4 include a concrete workload model for TD facilitation, so that institutional leaders can see what enabling TD teaching actually costs in time and resources?

Dimension 6 – Context and Target Group

(a) What the data show

The survey confirms that the sample is heterogeneous along multiple axes. The HE/HVET split is nearly balanced (43.7% vs. 38.5%), which is analytically useful but also means the course must serve two populations with different institutional logics, timeframes, assessment cultures, and degrees of applied orientation. Experience levels vary substantially: the sub-group of experts (16.3%) differs qualitatively from the rest of the sample, providing richer open-ended responses and more specific needs.

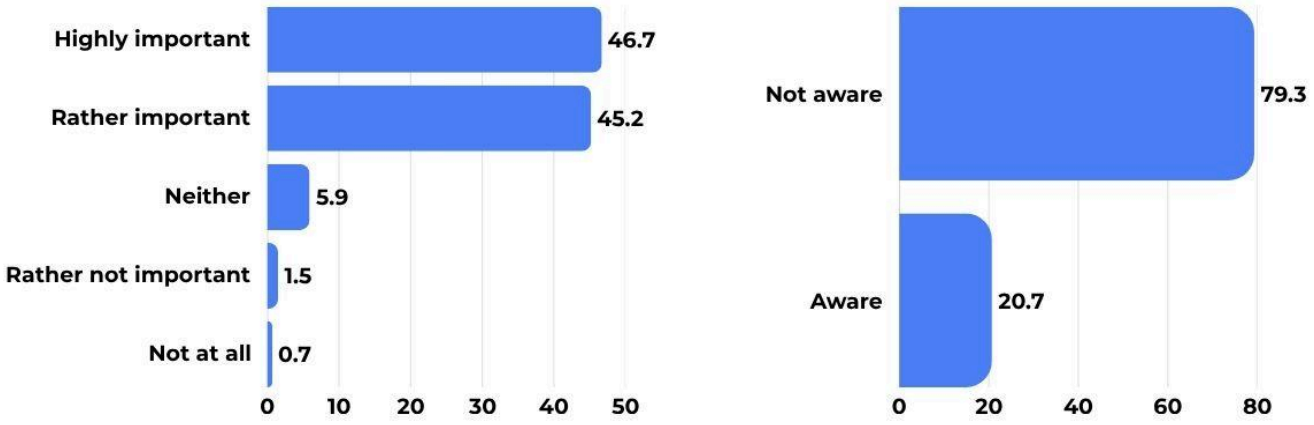

Figure 6. Perceived importance of TD for students (Q22) and awareness of existing frameworks (Q26), in %

The interest data (Q19–20) show high demand for continued education across all sub-groups, but the desired level varies: experts want to lead TD projects, mid-level practitioners want to participate, and beginners want foundational knowledge. This progression maps directly onto the developmental competency model identified in the literature.

(b) Cross-cutting finding

The most important contextual finding is that the target group is not a single population. It is at least three: (1) HVET educators with limited TD experience who need accessible, practically oriented entry points; (2) HE teaching staff with some cross-disciplinary exposure who want structured methods and integration tools; and (3) a smaller group of experts and institutional leaders looking for advanced frameworks, international exchange, and evidence-based validation.

(c) Tensions and open questions

The primary tension is between depth and inclusivity. A single course format risks being too basic for experts and too demanding for beginners. The geographic concentration in Lithuania raises a question about generalisability: some patterns may reflect Lithuanian institutional culture more than a European-wide tendency.

(d) Design prompts

- The target group spans beginners in HVET to experts in HE. Should the course use a shared core plus differentiated pathways, and if so, what determines the branching point — experience level, institutional context, or disciplinary background?
- HVET respondents more often cite closed curricula and credit-point barriers; HE respondents cite scepticism and recognition. Should D2.2 section B4 include separate implementation checklists for each sector?

Supplementary Analysis: The TAH Triad Sub-Group

This section is outside the six-dimension framework. It examines the 17 respondents (12.6%) who indicated that they currently combine Technology, Arts, and Humanities in their work — the population closest to TransInnovate's target profile.

The TAH triad sub-group differs from the rest of the sample in several analytically significant ways. First, they are markedly more experienced: 35.3% identify as experts (vs. 13.6% in the rest of the sample), and only 5.9% report no TD experience (vs. 16.1%). This suggests that working across all three TAH domains is a practice that correlates with — and possibly requires — higher levels of TD expertise.

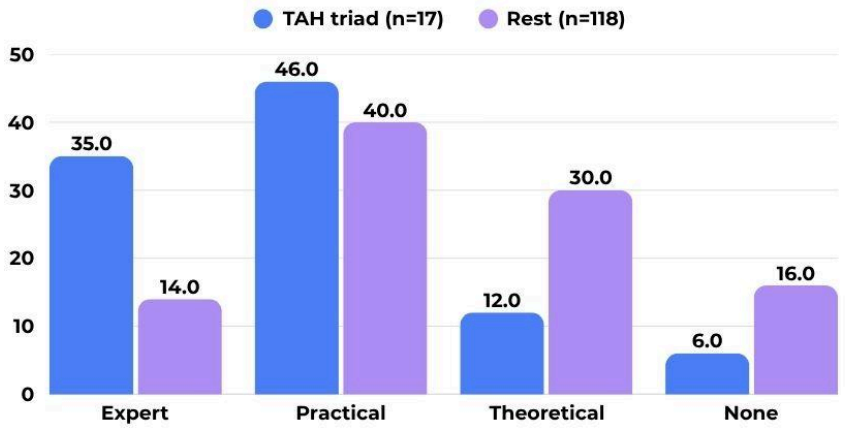

Figure 7. TD experience distribution: TAH triad sub-group (n=17) vs. rest of sample (n=118).

Second, the TAH sub-group is geographically and institutionally different. It is disproportionately based in the Czech Republic (6 of 17) and the UK (3 of 17), rather than Lithuania or Slovenia. Most are affiliated with universities or NGOs rather than HVET. Their disciplinary backgrounds are more often classified as Interdisciplinary or Arts and Humanities than as Engineering or Business. This profile suggests that TAH integration is currently practised more in environments with greater institutional flexibility and stronger traditions of cross-disciplinary experimentation.

Third, the sub-group's open-ended responses are qualitatively different from the majority. Where the broader sample tends to define TD in terms of 'combining fields' or 'integration of disciplines', TAH respondents more frequently reference the co-production of knowledge, the role of societal actors, the need for reflexivity, and the importance of different forms of knowing. One respondent defines TD as work that 'goes beyond disciplinary boundaries, integrating academic knowledge with non-academic forms of knowing to co-create new frameworks'; another describes it as 'the ability to grasp, navigate, connect, and work within diverse range of contexts'. These formulations are closer to the academic TD literature than the majority's definitions.

Fourth, the sub-group's stated needs differ. While the broader sample primarily requests methods, tools, and step-by-step procedures, TAH respondents more often articulate needs around stakeholder communication, institutional barriers (funding, career progression, recognition), and the challenge of convincing other disciplines to participate. Their barriers are relational and institutional rather than methodological — they already have methods, but they lack the conditions under which those methods can be sustained.

The implication for TransInnovate is twofold. On one hand, the TAH sub-group validates the project's core hypothesis: the T–A–H intersection is a meaningful and productive configuration that generates specific competencies and challenges. On the other hand, these 17 respondents are clearly not the project's typical target participant. They are closer to being the project's peer group or advisory constituency. The course will need to serve the much larger population of respondents for whom TAH is not yet a lived practice, while drawing on the insights of those for whom it already is.

What the Survey Adds to the Literature Review

The literature synthesis (March 2026) explicitly identifies areas where its evidence base is insufficient and where other research instruments are expected to contribute. This section maps the survey's specific contributions to those gaps.

On competencies: empirical grounding for HVET and non-expert populations

The literature review notes that 'the evidence base for competencies is much stronger in HE, sustainability, and teacher education than in HVET or explicitly TAH-specific settings.' The survey partially addresses this gap by providing competency priority data from a sample that is nearly 40% HVET-based. It shows that HVET respondents endorse the same top-level competencies as HE respondents (engagement, integration, systems thinking), but with a

stronger emphasis on practical application and leadership, and a weaker emphasis on social learning processes and common good orientation. This does not resolve the gap — the survey cannot tell us which competencies are most decisive for mixed HE/HVET TAH cohorts — but it provides the first empirical signal about HVET educators' competency priorities in a cross-disciplinary context.

On pedagogy: demand-side evidence for format preferences

The literature review observes that 'the design elements of TD courses remain underreported' and that evidence on 'which combinations work best for which learners, which timeframes, or which institutional constraints' is weak. The survey adds demand-side data: it shows which formats practitioners prefer (workshops over lectures, facilitated over self-paced, in-person over online) and which design tasks they find most difficult (format design, method selection). It does not tell us which designs work, but it tells us which designs are wanted and where the design bottlenecks lie. This is useful input for the D2.2 guidelines, which need to be both evidence-based and adoptable.

On TAH integration: confirming the humanities gap

The literature review identifies as a key finding that 'many TAH examples are more convincingly art-tech than humanities-tech' and that 'the literature offers fewer clear models for stable humanities integration in curricular settings.' The survey provides direct empirical confirmation: Humanities is the least combined field in the sample (26.7%), and open-ended responses suggest that the humanities' role is often perceived as indirect (ethics, contextualisation, critique) rather than as a primary knowledge-producing position. The survey adds a practitioner-level data point to what the literature identified as a structural pattern.

On AI: baseline of current practice

The literature review notes that 'there is still little evidence showing how AI concretely improves TD learning over time' and that the evidence base is 'much stronger on opportunity/risk mapping than on demonstrated TD-educational outcomes.' The survey adds a baseline picture of current AI usage in TD teaching contexts. It shows that AI is used primarily for generic academic tasks (search, content generation) and as a topic of discussion (potentials and dangers), but not yet for TD-specific functions (integration facilitation, boundary-crossing dialogue, value negotiation). This baseline is essential for AI-app's design: it establishes the starting point from which the application must move users.

On barriers: quantifying the infrastructure gap

The literature review identifies 'invisible infrastructure' as the critical enabler of TD education and notes that 'the difficulty of TD education lies not only in designing good courses but in building conditions under which such courses can exist and survive.' The survey now quantifies this: 45.9% cite disciplinary structures, 43.0% cite limited resources, 40.7% cite closed curricula. Combined with the finding that 79.3% are unaware of existing TD

frameworks, the survey provides the empirical weight behind the literature's conceptual argument. This is the survey's single strongest contribution to D2.1: it translates a theoretical observation about structural barriers into distributional evidence.

On context: the HE/HVET and experience-level differentiation

The literature review observes that 'there is much less robust material on HVET, short-cycle vocational formats, or mixed learner groups that combine academic and applied-professional logics.' The survey contributes the demographic and experiential structure that makes this differentiation possible. It shows that the target group is not uniform — it spans from beginners in HVET to experts in HE, from disciplinary teachers in Lithuania to intersectoral leaders in Switzerland — and that the course design must account for this heterogeneity rather than assuming a single learner profile.

Cross-Cutting Observations

The survey's strongest overall contribution is establishing the demand-side landscape for transdisciplinary education across the TransInnovate partnership. It shows a population that values TD education highly, experiences significant structural barriers, lacks awareness of existing resources, and wants practical, facilitated, interactive training formats. The competency needs it expresses are primarily procedural rather than epistemically transformative.

This creates a specific challenge for the project: the course and framework must meet respondents where they are (providing accessible methods, tools, and structured guidance) while also stretching them toward where the project's innovation lies (TAH-specific competencies, genuine transdisciplinarity rather than polished interdisciplinarity, AI as integration support rather than productivity tool). The survey provides the entry-point map; the interviews, course analysis, and literature review provide the destination map. The cross-source synthesis in D2.1 will need to negotiate the distance between these two.

The survey is strongest as a source of breadth-level data: how prevalent are certain attitudes, which barriers are most commonly cited, what formats are preferred, how widespread is AI adoption. It is weaker as a source of depth: it cannot tell us why certain competencies matter more than others, how integration actually works in practice, or what distinguishes successful from unsuccessful TD teaching. Those are precisely the areas where the interviews and course analysis are expected to add the most value.

Several signals from the survey point directly to questions that the cross-source synthesis should explore: whether the expert sub-group's competency priorities differ from the majority's; whether HVET and HE contexts produce genuinely different barrier profiles; whether awareness of existing frameworks correlates with more nuanced definitions of TD; and whether AI usage patterns differ between those with and without practical TD experience. These segmentation analyses can deepen the survey's contribution to D2.1 if the data are analysed with these questions in mind.

Respondents articulate needs that are predominantly procedural — methods, templates, format guidance, resource visibility, and AI as a productivity tool. The course that simply meets these needs will be adequate. The course that TransInnovate intends to build must do more: it must gently exceed what respondents have asked for, without abandoning what they need as an entry point. Concretely, this means:

1. offering practical tools and format structures while designing them to reveal their own limits at the moment when the practice can no longer be reduced to procedure;
2. moving respondents from an interdisciplinary to a genuinely transdisciplinary conception of collaborative work — not by correcting them, but by designing experiences in which the distinction becomes live and consequential;
3. constructing the value of the TAH triad from scratch, since most participants arrive with bilateral pairings as their default;
4. demonstrating that AI can function as a facilitative instrument in TD work, not only as a writing and search tool.

Expert Interviews

Key Findings

- **The sample speaks from a demand-side position, not a supply-side one.**
- **Most respondents understand transdisciplinarity as interdisciplinarity.**
- **The TAH triad is not the natural unit of cross-disciplinary work.**
- **Competency demand is procedural, not epistemic.**
- **Near-universal agreement that TD education matters, paired with near-universal lack of infrastructure.**
- **Practitioners do not know what already exists.**
- **The strongest pedagogical preference is for facilitated, interactive, in-person formats.**
- **Designing TD teaching is harder than delivering it.**
- **AI is used generically, not for TD-specific functions.**

3. Expert Interviews

Context and Methodology

This document presents the analytical evaluation of the expert interviews conducted in WP2 of the TransInnovate project. Its purpose is not to repeat the interview material descriptively, but to clarify what the interviews contribute when read in relation to the current literature synthesis, the current survey analysis, and the architectural logic of D2.1 and D2.2.

The document therefore occupies an intermediate analytical position. It remains a Phase 1 interview analysis, but it is written with the Phase 2 cross-source synthesis in mind. In practical terms, this means that the interview evidence is interpreted through the same six analytical dimensions used across WP2, while also making explicit where the interviews confirm, sharpen, complicate, or correct the patterns emerging from the literature and survey inputs.

A final scope note is necessary. This document situates the interviews primarily against the literature synthesis and the survey analysis currently available in the shared file set. The course-analysis strand is referenced only indirectly through the D2.1 and D2.2 planning logic and should further refine several findings at the full D2.1 synthesis stage.

Profile of the interview sample

The interview corpus should be read as a deliberately heterogeneous expert sample rather than as a single professional community. It combines institutional leaders, programme managers, adult-education specialists, design and media educators, artist-researchers, philosophers, policy and governance scholars, digital-humanities researchers, and practitioners who work as facilitators or brokers across disciplinary boundaries. Across the named transcripts and the SKUPNOST sub-sample, respondents come from higher vocational education, arts academies, cultural organisations, and non-formal learning settings; many occupy hybrid positions that combine teaching, research, curriculum design, institutional coordination, and external collaboration. This matters analytically: the interviews do not capture one stable “TD educator” profile, but a spectrum of actors who encounter transdisciplinarity from different entry points — pedagogy, institutional governance, artistic practice, policy, adult learning, or cross-sector innovation.

Table 2. *Survey respondents by primary professional role (n = 135)*

Expert profile in the sample	No. of interviewees	Typical roles represented
Institutional leaders and academic managers	6	deans, vice-deans, deputy directors for studies, principals, heads of interdisciplinary cooperation, coordinators of study processes or practical training
Higher education and HVET educators	7	lecturers, teachers, programme contributors, communication and management educators, design-thinking experts, adult-education specialists
Arts, design, and media educators/practitioners	9	experts in visual arts, design, music, dance, cinema, media, performance, artistic research
Humanities and philosophy-based experts	3	philosophers, ethics-oriented scholars, reflective practitioners, humanities-based facilitators
Interdisciplinary researchers and transdisciplinary method specialists	3	digital humanities scholars, challenge-based learning researchers, governance/policy-oriented TD researchers
Cross-sector / non-formal culture-tech facilitators	2	educational leads in hybrid cultural organisations, cross-sector brokers outside standard HE/HVET structures
Total	30	—

Key Findings

The ten interview-level findings from the previous memorandum are intentionally preserved here. They remain the most stable summary of what the interview corpus says before those findings are redistributed across the six D2.1 dimensions.

1. **Transdisciplinarity is defined pragmatically rather than doctrinally.** Across the interviews, the emphasis falls on shared problem-solving, implementation, and usable collaboration rather than on policing conceptual boundaries between multi-, inter-, and transdisciplinarity.
2. **The unit of teaching is the problem, not the discipline.** Respondents repeatedly organise learning around complex challenges, practical cases, external partners, and real-world tasks that cannot be adequately handled from a single field.
3. **Disciplinary expertise remains essential.** The interviews do not support a post-disciplinary model. They consistently assume that high-quality integration depends on participants knowing both what they contribute and where their competence ends.
4. **Shared language is a central pedagogical task**, but terminological convergence is not always its goal. Collaboration fails when teams mistake superficial agreement on terms for genuine understanding across epistemic cultures.
5. **Process design matters as much as content.** Team composition, facilitation, coaching, stakeholder engagement, reflection, and iterative structure repeatedly appear as decisive design variables rather than peripheral logistics.
6. **The most important competencies are partly dispositional.** Openness, humility, curiosity, trust-building, tolerance for ambiguity, and ethical awareness are treated as constitutive conditions of TD work, not as soft extras beside technical skill.
7. **Assessment remains underdeveloped.** Many respondents recognise that conventional grading captures only a fraction of transdisciplinary learning and that process, reflexivity, and integration quality remain difficult to assess systematically.
8. **Institutions are the main bottleneck.** Rigid curricula, siloed departments, weak incentives, limited time, procurement constraints, and low recognition for collaborative labour emerge more consistently than individual resistance.
9. **AI is treated as useful but secondary.** Interviewees generally accept AI as a support tool for drafting, search, analysis, or organisation, but not as a substitute for judgement, ethical reasoning, stakeholder dialogue, or integrative oversight.
10. **The work is explicitly value-laden.** The corpus consistently connects TD education with responsibility, social relevance, democratic understanding, sustainability, human-centred design, and public usefulness.

Analytical Report

Dimension 1 – Competencies and Assessment

(a) What the interviews show

The interviews describe transdisciplinary competence as a compound of epistemic, relational, and action-oriented capacities. Respondents repeatedly foreground the ability to work on a shared problem across differences, to translate between disciplinary languages, to preserve the specificity of expertise while integrating perspectives, and to move from analysis toward implementation. They also make unusually strong claims about the "Be" dimension: openness to uncertainty, humility, trust-building, adaptability, ethical awareness, and the willingness to leave disciplinary comfort zones are treated as necessary conditions of serious TD work rather than as optional personal traits.

At the same time, the interview corpus is highly explicit that competence cannot be reduced to general versatility. Good transdisciplinary practitioners are expected to know what they bring, what they do not know, and when another knowledge position must reshape the task. Several interviewees also link competence to developmental progression: broad exposure first, then more deliberate collaboration, then more integrated and responsibility-bearing forms of practice[2].

Two additional competency clusters emerge distinctively from practitioners working at the frontier of arts-science and cross-sector innovation. First, facilitators at advanced levels describe a capacity to help groups generate *future imaginaries* — to move beyond current-state analysis toward shared visions of societal possibilities, building what one respondent frames as collective pictures of tomorrow that push toward genuinely bigger-picture thinking. Second, IP management for collaborative projects is identified as a structurally underestimated technical-legal competency, particularly where creative, technological, and humanities contributions converge and where project outcomes have commercial or public-interest stakes. Both areas extend the competency map into territory that standard educational curricula rarely address.

Assessment appears as one of the least stabilised areas in the corpus. Some interviewees report process-sensitive practices such as staged feedback, self-assessment, peer assessment, oral defence, developmental assessment, and evaluation of collaboration quality. Others remain tied to seminar papers, exams, or output-focused grading and openly

[2] Authors' note: One worked example of this orchestration logic at scale is the challenge-based curriculum design developed at ETHZ under Christian Pohl's direction and in related formats at the Universities of Auckland and Aix-en-Provence: programmes beginning from the first year with a real-world case study involving actual external stakeholders, with student groups coached intensively throughout.

acknowledge that these methods fail to capture integration, reflection, and collaborative learning adequately.

(b) Cross-cutting finding

Read against the literature and survey, the interviews occupy a crucial middle position. The literature offers a strong conceptual architecture of TD competence as epistemic, relational, and action-oriented; the survey shows that practitioners primarily ask for procedural support such as methods, tools, and facilitation templates. The interviews confirm both layers but also complicate them. They show that process competencies are indispensable, yet insufficient without deeper dispositional and epistemic work. In other words, the interviews argue that the project cannot stop at "how to run collaboration"; it must also address what kind of judgement, reflexivity, and orientation are required to sustain collaboration across TAH difference.

This makes the interviews especially important for D2.2 A3 and B3. They are one of the clearest empirical sources showing that the competency framework must include both visible practice elements and less visible conditions of collaborative work, and that assessment must treat process outcomes as real educational outcomes rather than side effects.

(c) Tensions and open questions

The central tension concerns translation between virtue language and assessable evidence. Interviewees strongly validate the literature's emphasis on openness, trust, humility, and tolerance of ambiguity, but they also expose how difficult these are to evaluate without trivialising them.

A second tension lies between developmental assessment and institutional grading: respondents often want to assess progress, reflection, and uneven starting points, yet operate within systems that reward standardised outputs.

A third open question concerns TAH specificity. The interviews clearly suggest that technical, artistic, and humanistic competencies do not combine symmetrically, but the precise competency architecture for mixed HE/HVET TAH cohorts still requires further codification in D2.2.

A fourth tension — distinct from educational assessment — concerns programmatic and long-horizon impact measurement. Practitioners working with arts-science collaboration frameworks (including those operating under EU STARTS-type logics) argue that project evaluation cycles of one to two years are structurally inadequate for capturing genuine collaborative innovation impact. Meaningful assessment, in their account, requires extended timeframes, non-economic indicators including societal transformation and environmental leverage effects, and process-driven frameworks rather than output-focused metrics.

(d) Design prompts

- Which competencies in the TransInnovate framework should be framed as explicit course outcomes, and which should be framed as enabling conditions for collaborative work?
- How can assessment capture integration quality, reflexivity, and respectful disagreement without reducing them to superficial checklists?
- Which TAH-relevant competencies remain under-recognised by practitioners because they currently ask mainly for methods and tools rather than for epistemic and normative capacities?
- Which elements of D3.1 should be explicitly designed to develop dispositional capacities — openness, tolerance of ambiguity, epistemic humility — rather than only to assess them? Which practices from embodied, contemplative, or artistic-research pedagogies are transferable to the TransInnovate course format?
- At what points in WP3 should learners produce evidence not only of what they know, but of how they learned across differences?
- Should IP management for collaborative projects and capacity to facilitate future-scenario thinking be treated as standalone competency areas in the framework, or embedded within existing categories — and what does each choice imply for course design?

Dimension 2 – Transdisciplinary Pedagogy and Didactics

(a) What the interviews show

The interviews are highly consistent in their description of pedagogy. Effective TD teaching is repeatedly organised around challenge-based, project-based, or problem-based structures; mixed teams; iterative feedback; real or quasi-real external stakeholders; and facilitation that supports both collaboration and conflict. Several interviewees insist that the teaching process itself must model transdisciplinarity. This includes co-teaching or close staff cooperation, explicit alignment between objectives, methods, and assessment, and awareness of how each subject contributes to the larger educational profile.

The pedagogical centre of gravity is therefore not content delivery but orchestration. Respondents pay close attention to group composition, boundary work, coaching, workshop design, staged project structures, reflection moments, and shared tasks that force participants to negotiate meaning in action. A recurrent insight is that collaboration should not be left to happen spontaneously. Students often need structured scaffolding to move from parallel disciplinary contributions toward actual co-construction.

The interviews also place unusual weight on trust, psychological safety, and the relational climate of learning. This is especially visible in respondents working in arts, media,

therapeutic, and human-centred settings, but it also appears in more technical contexts where the problem is framed as power balance, legitimacy, or the risk that stronger disciplines will define the terms of engagement.

(b) Cross-cutting finding

The interview corpus strongly confirms the literature's core pedagogical claim: TD pedagogy is a pedagogy of orchestration rather than a single method. It also confirms the survey's diagnosis that the greatest practical challenge lies in designing TD formats, not in delivering pre-existing content. What the interviews add is the lived micro-logic of that orchestration. They show in practical terms that boundary work, trust-building, role clarification, intermediate feedback, and facilitation of unequal voices are not secondary refinements but core pedagogical acts.

For D2.2, this gives the interviews particular weight in A4 and B2. The literature can state principles and the survey can show demand for workshops and structured resources, but the interviews reveal what facilitation actually has to do in TAH settings: make differences visible, prevent collapse into disciplinary dominance, and help learners move between open exploration and convergent decision-making.

(c) Tensions and open questions

A first tension runs between openness and structure. Many interviewees value emergent leadership, exploratory work, and learner autonomy, but they also recognise that weak structure often produces superficiality, poor coordination, or unequal participation. A second tension runs between authentic challenge-based learning and institutional timetabling, credit, and staffing constraints. A third concerns transferability: some of the most convincing pedagogical practices appear in highly motivated, flexible, or project-rich settings, raising the same scaling question already visible in the literature.

(d) Design prompts

- Which elements of WP3 need strong scaffolding, and where should the course deliberately preserve ambiguity and exploratory space?
- What kinds of boundary objects will help participants work across TAH vocabularies without prematurely flattening difference?
- Which pedagogical tasks require human facilitation, and which could be reliably supported by D3.4?
- How will the course make visible the labour of facilitation, brokerage, and coordination rather than treating it as background work?
- How can we best implement challenge based, interactive pedagogical formats alongside easy accessible online content for WP3?

Dimension 3 – TAH Integration

(a) What the interviews show

The interviews do not treat technology, arts, and humanities as parallel sectors to be represented symbolically. Their strongest formulations treat them as distinct modes of inquiry that generate productive friction when they meet around a shared problem. Technical perspectives contribute modelling, optimisation, or implementation logics; artistic perspectives often contribute reframing, experimentation, prototyping, and alternative ways of sensing and imagining; humanistic perspectives contribute interpretation, ethical and cultural framing, meaning-making, and attention to language, values, and context.

Importantly, the interview corpus repeatedly warns against two weak versions of TAH integration: decorative interdisciplinarity, where one field merely illustrates another, and assimilative integration, where one dominant knowledge logic sets the agenda and others appear only as enrichment or critique. Several respondents explicitly argue that TAH collaboration becomes meaningful when arts and humanities enter upstream problem framing rather than appearing only at the communication or reflection stage.

At the same time, the corpus acknowledges that full TAH integration is demanding and unusual. Many respondents come from hybrid or bridge positions and can articulate the value of triadic work, but they also describe how hard it is to make these contributions visible and structurally legitimate inside institutions still organised around bilateral or disciplinary pairings.

(b) Cross-cutting finding

Here the interviews are especially valuable because they sit exactly where the literature and survey leave an open gap. The literature argues that arts and humanities are often under-guaranteed and that many supposedly TAH examples are in fact art-tech or ethics-around-tech. The survey confirms that most respondents work across only two domains and that the humanities remain the weakest pole of the triad. The interviews sharpen this into a more precise cross-source conclusion: TAH integration will not emerge naturally from general cross-disciplinary goodwill. It must be designed so that arts and humanities do recognisable epistemic work and are not reduced to atmosphere, dissemination, or post hoc ethical commentary.

This makes the interview layer particularly important for D2.2 A2, A3, and A4. It provides empirical language for describing what each TAH pole contributes, where the frictions lie, and why the project's triadic framing cannot be assumed as self-evident for learners or educators.

(c) Tensions and open questions

The first tension is between the project's TAH ambition and the realities of practice. Even among committed practitioners, fully triadic work remains rare. The second tension

concerns the humanities more than the arts: the interviews strongly validate the humanistic role in interpretation, ethics, language, and contextual critique, but stable curricular models for giving that role equal structural status remain underdeveloped. A third question concerns symmetry. The interviews do not suggest that every TAH project must allocate equal time or weight to each domain; they suggest instead that each must have the power to reshape the problem under at least some conditions.

(d) Design prompts

- Which early WP3 activities should help participants discover what each disciplinary and professional position can contribute to a shared problem — and which problem structures make the TAH configuration genuinely necessary, rather than asserting its value in advance?
- Which assignments will require arts and humanities to act as knowledge-producing forces in their own right, not merely as context, ethics, or communication support?
- How will the course distinguish between productive epistemic friction and simple misunderstanding?
- What should count as legitimate evidence in a TAH task: prototype, interpretation, critique, scenario, model, narrative, or some deliberate combination?

Dimension 4 – AI Applications

(a) What the interviews show

Across the interview corpus, AI is treated as useful, unavoidable, and pedagogically relevant, but not as the centre of transdisciplinary intelligence. Respondents see value in AI for search, drafting, organisation, preparatory analysis, visual support, technical conversion, scenario support, and certain forms of process assistance. At the same time, they are remarkably consistent that AI must not displace foundational expertise, critical judgement, value negotiation, or responsibility for the meaning of the work.

Several interviewees go beyond general caution and describe concrete practices for maintaining integrative overview: requiring students to defend outputs orally, verifying sources, differentiating disciplinary contributions explicitly, structuring the process before using AI assistance, restricting AI in high-stakes final work, or treating AI outputs as material for critique rather than authority. Others point to the need for more advanced educator training so that staff understand the underlying logic and limitations of AI rather than merely using it as a prompt engine.

The interviews also add a distinctly TAH concern: AI is not only a support tool but also a site where questions of authorship, originality, workflow, ethics, human relationship, and pedagogical legitimacy become unavoidable. In this sense, AI is both instrument and object of critical inquiry. The corpus also surfaces a developmentally important distinction between

AI applications for individual research and AI for group collaboration. Widespread adoption of AI for individual tasks contrasts sharply with the nascent state of tools designed for multi-perspective group sense-making. A concrete exception is the *C-lab* (Challenge Lab), developed by Slovenian partners (Marko Damiš, Youth Centre Velenje / konS), in which spoken contributions from an interdisciplinary group are assembled by AI into semantic grids displayed on interactive screens. Participants can reposition the resulting thought-map, identify micro-locations of shared ideas, and have them instantly visualised or elaborated — with an innovation catalyst mediating between disciplinary languages throughout. The current corpus position is that no fully convincing off-the-shelf group-collaboration AI product yet exists, but that this frontier is maturing, and that AI's systematic capacity to surface unexpected connections across disciplines could eventually scale what cross-disciplinary encounters currently produce only informally and at small scale.

(b) Cross-cutting finding

The interview layer strongly confirms the literature's qualified position and the survey's baseline picture. All three sources converge on the same broad pattern: AI is most credible when it supports process infrastructure, translation, and weak forms of integration, and least credible when it is treated as a substitute for human judgement in normatively dense parts of TD work. The interviews add the operational texture missing from the other sources. They show what integrative oversight actually looks like in teaching practice and why legitimacy depends on visible human review, source transparency, and preservation of disciplinary differentiation.

The interviews imply that the project's AI application will succeed only if it helps users do work they already recognise as difficult — especially translation across vocabularies, structuring multi-perspective problems, and keeping track of differentiated contributions — while avoiding the appearance of synthetic authority.

(c) Tensions and open questions

A key tension lies between current demand and project ambition. The survey shows limited current demand for AI-supported TD learning tools as such, while the interviews suggest both scepticism and conditional openness. A second tension concerns training level: some respondents need basic responsible-use guidance, while others argue for much more advanced forms of AI literacy. A third open question is how far AI can support translation and coordination without reinforcing manufactured consensus or shifting power toward the tool.

(d) Design prompts

- Which AI-app use cases should foreground translation, traceable synthesis, and process support rather than generic content generation?
- How will the application preserve clear differentiation of perspectives instead of smoothing them into false agreement?

- What forms of provenance, uncertainty signalling, and human review need to be visible to users?
- How should TransInnovate stage AI literacy so that beginners receive accessible entry points while more advanced users can explore stronger forms of knowledge infrastructure?
- How should the course help learners notice and reflect on what sustained AI use does to *them* — to their cognition, authorship, aesthetic sensibility, and the experience of being the producer of work — alongside the existing focus on managing AI as an external instrument?

Dimension 5 – Barriers and Drivers

(a) What the interviews show

The interviews are unambiguous that the main barriers to TD education are structural before they are pedagogical[3]. Respondents repeatedly mention disciplinary silos, rigid curricula, timetable constraints, procurement and administrative slowness, weak incentives, lack of time, limited funding for interactive work, and poor recognition of collaborative labour. Even where there is rhetorical support for interdisciplinarity, institutions often continue to reward disciplinary productivity and leave coordination work invisible.

The interview corpus is especially strong on the internal mechanics of these barriers. It shows that what appears institutionally as “lack of support” is lived pedagogically as unpaid coordination, weak co-teaching conditions, misaligned course goals, difficulty bringing in external partners, unequal authority inside teams, and the recurrent burden of translation falling on a few committed individuals.

Drivers are also described in concrete rather than abstract terms: leadership that authorises experimentation, flexible formats such as micro-credentials or protected project spaces, intermediary roles, team teaching, stable partner relations, psychologically safe collaboration, and visible workload recognition for facilitation and brokerage.

One cross-sector practitioner interview introduces a structurally distinct observation: that the field currently lacks any formal professional formation pathway for transdisciplinary facilitators and innovation catalysts. In this account, expertise is acquired almost entirely through experience, with scarce knowledge transfer between practitioners — a gap that the respondent, echoing feedback from European partner networks, describes as the most significant structural need in the field, prior to and distinct from curriculum or resource constraints.

[3] Authors' note: The prominence of structural over pedagogical barriers in the interview corpus is partly a sample artefact: experienced TD educators — who form the majority of interviewees — have already navigated pedagogical challenges.

One further structural mismatch reported consistently in design-science collaboration research concerns temporal asymmetry: design disciplines typically operate in short iterative cycles, while scientific fields such as biology, or materials research work across substantially longer timeframes. Practitioners identify this as a concrete coordination problem that requires explicit acknowledgement and negotiation at the outset of any collaboration — not a soft cultural difference, but a structural feature of how different knowledge communities organise their work.

One time-specific learner-context factor emerges from practitioners working with current student cohorts: young adult learners who grew up with screens and experienced the COVID period in conditions of enforced individual learning show measurably reduced capacity for spontaneous group engagement. Practitioners describe this not as lack of motivation but as a structural disposition toward individual work that requires more deliberate warm-up, psychological scaffolding, and trust-building before collaborative modes become productive. This factor is particularly relevant for online and blended course delivery, where the default environment reinforces rather than counteracts individual isolation.

(b) Cross-cutting finding

The interviews strongly reinforce the literature's claim that TD education depends on invisible infrastructure and the survey's finding that motivation exceeds available support. What the survey quantifies as disciplinary structures, closed curricula, limited resources, and low framework awareness, the interviews translate into practice-level diagnosis. They show that the infrastructure gap is not an abstract institutional deficit; it is the missing architecture of coordination, facilitation, translation, recognition, and protected time.

This gives the interviews particular value for D2.2 B4. They provide the qualitative detail needed to turn generic barrier categories into organisational design considerations, including workload, co-teaching conditions, facilitation support, and institutional readiness indicators.

(c) Tensions and open questions

A central tension runs between mainstreaming and protection. Many of the strongest interview examples emerge in flexible or project-rich spaces that are partially shielded from ordinary institutional constraints, yet the project's long-term ambition points toward broader curricular uptake. A second tension concerns recognition: institutions increasingly praise TD rhetorically while continuing to reward disciplinary outputs. A third concerns labour distribution: co-creation rhetoric can conceal unequal burdens carried by facilitators, translators, and coordinators.

(d) Design prompts

- Which barriers should WP3 treat as external assumptions, and which should the course design actively mitigate?
- Should we integrate a module in WP3 on institutional factors for institutional leaders and coordinators? LIke 'improving structures for TD education (and research) in your institution´
- What workload model is realistic for TD facilitation, co-teaching, and stakeholder engagement?
- Which organisational supports should D2.2 B4 make visible for institutional leaders: time, staffing, reward recognition, cross-faculty coordination, or all of these together?
- Which parts of the coordination burden could AI-app realistically lighten, and which are too relationally sensitive to automate?
- How should the course help participants explicitly negotiate temporal workflow differences between disciplines — for instance, between design's short iterative cycles and science's long research timelines — as a structural precondition of effective collaboration rather than a problem to solve mid-process?

Dimension 6 – Context and Target Group

(a) What the interviews show

The interview corpus presents a highly heterogeneous ecology of contexts and learners. Respondents work across higher education, higher vocational education, adult and continuing education, arts schools, design programmes, technical fields, policy-oriented environments, and research-intensive institutions. Their target groups range from first-cycle undergraduates to adult professionals, mixed-level cohorts, highly motivated honours-style participants, and educators themselves.

This heterogeneity matters because interviewees repeatedly adjust transdisciplinary design to institutional mission, learner maturity, prior disciplinary formation, and local professional expectations. Some contexts support exploratory, long-form project work; others require tighter scaffolding, more explicit role clarity, and lower-threshold entry points. Several interviews also broaden the idea of target group beyond enrolled students to include institutional leaders, external partners, communities, and intermediary actors.

The corpus therefore rejects any one-size-fits-all format. It suggests instead that context enters at the level of pacing, challenge complexity, degree of facilitation, assessment logic, online-offline balance, and the kind of stakeholder relationship that can realistically be sustained.

(b) Cross-cutting finding

The interviews strongly validate the literature's claim that context is constitutive rather than supplemental and align with the survey's picture of at least three target populations: beginners seeking orientation, mid-level practitioners seeking structure, and advanced actors seeking more sophisticated frameworks and exchange. What the interviews add is a richer sense of why these populations differ and how institutional logics shape pedagogy. They therefore help move the project from generic audience sensitivity toward more explicit learner segmentation and delivery logic.

This is particularly relevant to D2.2 A3, B1, and B4. The interviews imply that competency progression, facilitation intensity, and institutional implementation guidance cannot be written as if HE and HVET, or beginners and advanced practitioners, were pedagogically interchangeable.

(c) Tensions and open questions

The main tension is between depth and inclusivity. A single course risks being too advanced for beginners and too generic for experts. A second tension concerns transferability across institutional cultures and national vocabularies; the interviews reinforce the literature's warning against assuming a single stable TD language. A third question concerns primary audience. The corpus suggests that TransInnovate may need to serve not only learners but also educators, facilitators, and institutional enablers.

(d) Design prompts

- Should WP3 adopt a shared core with differentiated pathways, and if so, should branching happen by experience level, sector, disciplinary background, or institutional role?
- What needs to differ between HE and HVET delivery beyond difficulty level: pace, task format, stakeholder role, assessment, or digital support?
- Which actors should be treated as primary learners and which as enabling participants around the course?
- How will the project avoid imposing a single TD vocabulary across partner contexts that already use different traditions and institutional languages?

Cross-Cutting Observations

The interview corpus makes its strongest contribution in the areas where the literature is conceptually rich but practically underdetermined, and where the survey is diagnostically useful but less able to explain why the observed patterns occur. In particular, the interviews add decisive value on five fronts: what facilitation actually has to do; how shared language and boundary work are built in practice; why assessment remains unstable; how invisible infrastructure is experienced by practitioners as real labour rather than as abstract institutional deficiency; and — distinctively from recent practitioner experience — what structural dispositions current learner cohorts bring to collaborative work, including reduced capacity for spontaneous group engagement following screen-heavy and COVID-period individual learning conditions.

Taken together, the three currently available evidence layers create a coherent analytical picture. The literature defines the conceptual destination: transdisciplinary education as the design of processes that enable plural knowledge to become jointly usable without collapsing difference. The survey defines the entry-point conditions: a motivated but method-seeking field with strong structural barriers and limited awareness of existing frameworks. The interviews define the practical bridge: they show what serious TD teaching and collaboration look like when people actually try to enact them inside institutions, under constraints, with unequal power, and increasingly in the presence of AI.

This makes the interviews especially important for the move from D2.1 to D2.2. They do not replace the literature's conceptual work or the survey's distributional evidence. Rather, they specify how the competency framework should remain genuinely TAH-specific, how pedagogical principles should be written as facilitation principles rather than abstract commitments, how institutional implementation must acknowledge hidden labour, and how AI guidance should preserve human integrative oversight, and how course design must treat temporal workflow asymmetries between disciplines — not as interpersonal friction, but as a structural coordination variable.

In analytical terms, the interviews therefore function as the project's most practice-near source of normative realism. They preserve the ambition of transdisciplinarity, but they also show what that ambition costs in design, labour, judgement, and institutional support. That is precisely why they are indispensable to the full D2.1 synthesis.

Best Practices

Key Findings

- **No single pedagogical framework dominates the field.**
- **Integration happens especially when it is credited.**
- **Team-teaching is a structural requirement, not a decorative feature.**
- **A shared public-facing object/ output holds the TAH triad together.**
- **Effective design pairs an integrative engine with a reflective instrument.**
- **AI is omnipresent as subject matter and nearly absent as a didactic tool.**
- **Educators continuing professional development in the TAH space are an under-served audience.**
- **The humanities corner of the triad is the most structurally fragile.**
- **Durability is an institutional translation problem before it is a pedagogical one.**

4. Best Practices

Context and methodology

This document presents the analytical findings of the best-practices research conducted within Work Package 2 of the TransInnovate project. The evidence base is a corpus of seventeen courses and educational programmes based on the transdisciplinary way of collaboration and situated at the Technology–Arts–Humanities (TAH) intersection, ranging from full master's degrees through short modules, micro-certificates and one open online course. The corpus covers fourteen European countries plus three calibration cases from the United States and Hong Kong, and spans programmes formally self-described as transdisciplinary as well as programmes that operate with a transdisciplinary logic under an interdisciplinary label.

The role of this analysis is analytical, not descriptive. Its task is to identify what the seventeen cases, read together, reveal about transdisciplinary education in the TAH space — specifically in relation to the six analytical dimensions that structure Deliverable D2.1: (i) competencies, (ii) pedagogy, (iii) TAH integration, (iv) AI application, (v) barriers and drivers, and (vi) context and target group.

Corpus construction

The seventeen cases were selected to cover four variables of interest to the project: (i) level and format (from bachelor's through master's degree, short module, micro-certificate and open online course); (ii) geographical spread, with priority to European programmes; (iii) orientation of the TAH triad (arts-led, technology-led, humanities-led, and balanced configurations); and (iv) institutional type, including specialised arts academies, technical universities, comprehensive universities, and consortia. The selection is a purposive qualitative sample designed to surface design patterns, not a statistically representative one.

For each case, primary documentation was collected from institutional websites, curriculum documents, programme handbooks, accreditation records and, where available, evaluation studies of the programme itself (the full source list is provided in Section 10). Each case was coded against a structured protocol covering six fields: understanding of transdisciplinarity; TAH triad composition; pedagogy, methods and frameworks; competencies and assessment; AI as a didactic tool; and transferable lessons. The present analysis then re-reads the seventeen coded cases through the six D2.1 dimensions.

Analytical strategy

The analysis follows the four-part structure specified in the D2.1 Research Synthesis Plan: for each dimension, (a) what the corpus shows — a distillation of the cross-case evidence; (b) cross-source finding — the insight that emerges only when all cases are read together; (c) tensions and open questions — points where evidence is ambiguous or insufficient; and (d) design prompts for TransInnovate — interpretive pointers for the TransInnovate course development team, not directives.

The "design prompts" are calibrated explicitly to the format of the TransInnovate course — blanded with occasional synchronous online sessions and a partly asynchronous rhythm, targeted at educators in higher vocational education and training (H-VET) and higher education (HE). This is a different format from most of the courses in the corpus, which are multi-year on-site degrees.

Scope limitations

The analysis is bounded in three ways. First, document analysis describes intended rather than enacted practice; the lived reality of classroom delivery is accessible only through interviews and direct observation, which lie outside the scope of this task. Second, the seventeen cases overrepresent master-level higher education and underrepresent H-VET, and educator professional development relevant to the TransInnovate pilots. Third, documentation for programmes in this field is typically weak on assessment rubrics, workload and funding arrangements, and informal teaching practices, so those aspects are systematically under-evidenced in the corpus. Each of these limits is addressed further in Section 7.

Tab 3. *Overview of the 17 analysed transdisciplinary programmes*

#	Course name	Institution & country	Type / duration	Level & language	Dominant archetype
01	ArTeC — Master Recherche-Création	EUR ArTeC (Paris 8 / Paris Nanterre), FR	MA, 2 yrs, 120 ECTS	HE master; French	I — Research-creation
02	Cross-Disciplinary Strategies (CDS)	Univ. of Applied Arts Vienna, AT	MA, 2 yrs, 120 ECTS	HE master; English	I → II — Research-creation / PBL
03	MA in Transdisciplinary Studies in the Arts	ZHdK — Zurich Univ. of the Arts, CH	MA, 3–4 sem., 90 ECTS (Major)	HE master; DE / EN	I — Research-creation
04	Master ArtScience	Royal Conservatoire & Royal Academy of Art The Hague, NL	MA, 2 yrs, 120 ECTS	HE master; English	I with impact — Research-creation +
05	Media Arts Cultures (MediaAC)	Erasmus Mundus consortium (AT, DK, PL + partners)	MA, 2 yrs, 120 ECTS	HE master; English	II — Wicked-problem PBL
06	International Design Business Management (IDBM)	Aalto University, FI	MA/MSc, 2 yrs, 120 ECTS	HE master; English	II — Wicked-problem PBL
07	Design Informatics	Univ. of Edinburgh, UK	MA, 1 yr, 90 ECTS equiv.	HE master; English	II — Wicked-problem PBL
08	MA in Digital Humanities	TU Dresden, DE	MA, 2 yrs, 120 ECTS	HE master; DE / EN	II / III — PBL + service-learning
09	BASc (Hons) Arts and Technology	Hong Kong Baptist University (HKBU), HK	BASc, 4 yrs, 128 units	HE undergraduate; English	II — Wicked-problem PBL
10	Media Arts and Technology (MAT)	UC Santa Barbara, USA	MS + PhD, 2–5 yrs	HE graduate; English	I — Research-creation
11	Partnering for Change (MOOC)	Univ. of Basel + td-net Swiss consortium, CH	MOOC, ~30 hours	Open / mixed; English (+ DE)	IV — Reflexive / meta-TD
12	Transdisciplinary Course Program (TCP)	Univ. of Tübingen, DE	Certificate / modules, 2–6 ECTS each	HE all levels; DE / EN	III + IV — Service-learning + reflexive
13	Media Arts and Sciences (MAS)	MIT Media Lab, USA	MS + PhD, 2+ yrs	HE graduate; English	I — Research-creation
14	Certificate in Transdisciplinary Studies (Self-Designed)	Antioch University Online, USA	Graduate certificate, 9 mo., ~26 ECTS	Graduate / professional; English	III / IV — Service-learning + reflexive
15	Culture and Health — Cross-Sectoral Initiatives	Baltic consortium (LV, EE, LT) — WITAC / Erasmus+	Micro-certificate, 10 mo., 10 ECTS	Mid-career professionals; English	III — Service-learning / impact
16	The City as Laboratory	TU Berlin, DE	Module (2 courses), 6 ECTS total	HE master/doctoral; English	II + III — PBL + service-learning
17	Art, Science & Technology: Transdisciplinary Connections	Leiden University, NL	Module, 13 weeks, 5 or 10 ECTS	HE master; English	I — Research-creation

Characterisation of the corpus

The seventeen cases distribute across the descriptive axes as summarised below. The composition is deliberately heterogeneous; the analytical value of the corpus lies in the variance it captures, not in the representativeness of any single axis.

Table 4. *Corpus composition by TD classification, delivery mode and institutional type*

Axis	Distribution	Notes
Qualification type	11 MA degrees, 1 MA+PhD, 1 BA, 1 BASc, 1 MOOC, 1 graduate certificate, 2 modules, 1 micro-certificate (totals exceed 17 because some programmes span multiple qualification levels)	Master-level higher education dominates; short-cycle formats directly comparable to TransInnovate (MOOC, micro-certificate, modular certificate) are represented by four cases (Cases 11, 12, 15, 16).
Delivery mode	13 on-site, 2 hybrid, 1 fully online, 1 on-site with strong mobility	Fully online transdisciplinary teaching is scarce in the corpus, mirroring the field.
Duration	Mostly 2 years (120 ECTS); 2 intensive modules (3–6 ECTS each); 1 micro-certificate (10 ECTS); 1 MOOC (~30 hours)	Only four cases sit within the 3–30 hour range the TransInnovate MOOC will occupy.
Language	English dominant (14 cases); French, German and Baltic languages in the remainder	The English-dominance of the field will need to be compensated for in the TransInnovate dissemination plan.
Geography	14 European (AT, CH, CZ, DE, DK, FI, FR, LT, LV, NL, PL, UK, and the cross-Baltic consortium), 2 USA, 1 Hong Kong	Appropriate for an Erasmus+ project; the Baltic case (Case 15) partially mirrors the TransInnovate national context.
Target learner	Primarily HE master; one BA; two cases explicitly for working professionals; three open to mixed audiences; zero primarily for educator continuing professional development (CPD)	The absence of educator-CPD programmes in the corpus is not a selection artefact; it reflects the state of the field.

Three observations about the corpus as a whole are worth stating before the dimension-by-dimension analysis begins.

First, a persistent gap exists between the language programmes use to describe themselves and the operative logic of what they do. Several programmes label themselves

"interdisciplinary" while operating with a transdisciplinary logic (notably Cases 04, 06 and 10), and a smaller number label themselves "transdisciplinary" while operating largely within the academic sphere (Cases 01, 03, 13, 17). This inconsistency is not a defect of individual programmes; it mirrors the broader conceptual fluidity documented in the literature (Vilsmaier, Merçon & Meyer, 2023; SHAPE-ID, 2020). For the present analysis, classification follows the operative logic, not the self-description — specifically, whether non-academic actors are structurally involved as co-producers of knowledge.

Second, courses that are unambiguous exemplars of transdisciplinarity share three common mechanisms irrespective of disciplinary entry point: a structurally embedded engagement with non-academic actors; an assessment model that weights process and integration alongside product; and either a long time horizon or a deliberately compressed intensive format. These recurrences structure much of what follows.

Third, the corpus is almost silent on two of the six D2.1 dimensions. Evidence on barriers and drivers (Dimension 5) is scarce in programme documentation because such material tends to circulate through informal and policy channels rather than through published curricula. Evidence on H-VET and educator CPD contexts (Dimension 6) is scarce because such programmes are themselves rare. These silences are reported in the respective sub-sections and flagged for the interview and survey work (Tasks 2.1 and 2.2) that is better positioned to address them.

Key Findings

The ten findings below summarise what the corpus of seventeen courses shows. They are drawn from documentary evidence and therefore describe the architecture of transdisciplinary education rather than its lived practice.

1. **No single pedagogical framework dominates the field.** Research-creation, wicked-problem PBL, service-learning and reflexive meta-TD coexist without hierarchy across the corpus, and named methods (design thinking, three-knowledge, tri-lectic, spiral curriculum, Culture-for-Health) each claim only a partial footprint.
2. **Integration happens only when it is credited.** Every clearly transdisciplinary programme in the corpus includes an integrative slot — a named lab, project or module — that carries a disproportionate share of the credit load (often 25–50 per cent).
3. **Team-teaching is a structural requirement, not a decorative feature.** Every transdisciplinary exemplar in the corpus delivers content through at least two-teacher or multi-institutional instruction. Programmes that fail to institutionalise team-teaching tend to slide into parallel disciplinary exposure rather than genuine integration.
4. **A shared public-facing object/ output holds the TAH triad together.** The pedagogically strongest cases are organised around a tangible, public-facing artefact or output — exhibition, prototype, community intervention, curated showcase etc. Programmes without a shared object compensate with expensive co-location and long time-scales that are not portable to short or online formats.
5. **Effective design pairs an integrative engine with a reflective instrument.** Study journals, learning journals and portfolios are the scalable mechanism that turns the experience of integration into legible learning evidence. Programmes with only the engine feel outcome-rich but process-opaque; programmes with only the reflection feel thoughtful but disconnected from action.
6. **AI is omnipresent as subject matter and nearly absent as a didactic tool.** Fourteen of seventeen cases teach AI as content; only one documents AI used to facilitate the transdisciplinary process itself, and even that case uses it for individual exploration rather than team-level dialogue. The gap the TransInnovate AI application is designed to address is empirically real.
7. **Educators continuing professional development in the TAH space are an under-served audience.** None of the seventeen cases is primarily designed for educator CPD; the closest analogues are open to educators but not targeted at them. The TransInnovate course is filling a documented absence, not duplicating existing provision.
8. **The humanities corner of the triad is the most structurally fragile.** In arts-led and tech-led configurations (nine of seventeen cases), humanities enter as a single ethics module, an aesthetics layer or a seminar series rather than as a co-equal epistemic lens.
9. **Durability is an institutional translation problem before it is a pedagogical one.** The most enduring programmes solve a workload, credit and cross-departmental funding problem as the price of admission for their pedagogy. The corpus strongly suggests that educators need advocacy resources for their own institutions alongside methodological tools.
10. **Desk research reveals the architecture; only interviews and survey reveal the lived practice.** Documentary evidence is systematically strong on intended design and systematically weak on assessment rubrics, workload arrangements, informal teaching and barriers.

Analytical Report

Each sub-section follows a four-part structure: (a) what the corpus shows; (b) cross-source finding; (c) tensions and open questions; (d) design prompts for the TransInnovate course, calibrated to its open online format with occasional synchronous sessions.

Dimension 1 – Competencies and Assessment

(a) What the corpus shows

Competency statements across the seventeen cases vary markedly in their degree of formalisation. Three styles coexist. A first group publishes explicit competency inventories in the curriculum itself (Cases 02, 07, 15, 16). A second group signals competencies implicitly through project-based assessment criteria without a standalone inventory (Cases 01, 04, 13). A third group adopts philosophical or dispositional framings — for example, an "attitude of curiosity and openness" (Case 03) or the capacity to "navigate ambiguity with grace and confidence" (Case 14).

When the explicitly named competencies across the corpus are clustered, four families recur.

Table 4. *Recurrent competency families across the 17-programme corpus*

Competency family	Typical formulations	Most explicit in
Translation and mediation	Transfer of discourses into a common medium (Case 03); acting as a translator between disciplinary contexts (Case 02); identifying "nomadic concepts" that travel between fields (Case 11); communicating across disciplinary divides (Case 13).	Cases 02, 03, 11, 13
Integrative thinking and synthesis	Integrative thinking (Case 06); designing collaborative processes (Case 03); recognising transfer opportunities between cultural, educational and intermediary institutions (Case 08).	Cases 06, 03, 08
Navigating ambiguity and epistemic humility	Navigating ambiguity (Case 14); questioning established divisions of labour (Case 03); distinguishing between embodied, performative and experiential knowledge resources (Case 16).	Cases 14, 03, 16
Impact and stakeholder competences	Initiating and designing professional integration activities (Case 04); social impact assessment and ethical conduct in cross-sector work (Case 15); planning and implementing collaborations (Case 16).	Cases 04, 15, 16

Two of the clearer transdisciplinary exemplars in the corpus articulate competencies in a compound form that links cognition, disposition and action. Case 12 uses the four-part formulation *Wissen — Fähigkeiten — Haltungen — Handlungen* (knowledge — skills — attitudes — actions)[4], and Case 11 teaches the related three-knowledge framework drawn from transdisciplinary research methodology: Systems knowledge (facts), Target knowledge (values) and Transformation knowledge (agency)[5]. The compound structure matches the architectural account of transdisciplinary competence in the literature (Vanney et al., 2023; Pohl et al., 2021; Straub et al., 2021), in which epistemic, relational and action-oriented capacities are not additive extras but constitutive of competence itself.

Assessment architecture is thinner than competency articulation. Three mechanisms recur across the corpus and warrant specific mention: the reflective journal (Cases 02, 14, 15), the multi-supervisor thesis or committee examination (Cases 02, 10, 13), and public-facing final output such as an exhibition or curated presentation (Cases 01, 03, 07, 17). The most precise assessment architecture in the corpus is that of Case 15, which grades pilot-project implementation at 50 per cent, project plan at 20 per cent, reflective journal at 10 per cent, and the remaining 20 per cent across concept understanding and methods.

(b) Cross-source finding

Almost no case in the corpus treats transdisciplinary competencies as purely cognitive. Every formal competency frame pairs a cognitive element ("integrate", "translate", "analyse") with a relational or attitudinal element ("lead heterogeneous teams", "navigate ambiguity", "act as an honest broker"). Read alongside the literature, this convergence suggests that transdisciplinary competence in the TAH context is inseparable from dispositions and from a capacity to act in a specific context (Vanney et al., 2023; Horn et al., 2024; Bates et al., 2022). A course architecture that teaches cognitive content alone — as many CPD offers do — is therefore a structurally insufficient response to the needs the project is addressing.

(c) Tensions and open questions

Explicit versus implicit competencies. The programmes with the most elaborate project work (Cases 01, 03, 04, 13) also have the least explicit competency grids. Whether this is a structural feature of studio-based pedagogies or a deliberate refusal of competency-based framing cannot be resolved from documentation alone.

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[4]The compound Wissen–Fähigkeiten–Haltungen–Handlungen frame is common in German-speaking continuing education and corresponds closely to the Know–Do–Be structure used by the Transdisciplinary Training Collaboratory (Matson et al., 2025). See Tübingen TCP course brochure, uni-tuebingen.de/de/182278.

[5]Introduced by Pohl & Hirsch Hadorn (2007), the three-knowledge model distinguishes Systems knowledge (descriptive: what is), Target knowledge (normative: what ought to be) and Transformation knowledge (practical: how to move from one to the other). See Buser & Schneider (2021), i2insights.org/2021/02/11/three-types-of-knowledge.

Assessability of dispositions. Competencies such as "navigating ambiguity", "epistemic humility" and attitudinal change are widely named but rarely operationalised. Horn et al. (2024) document empirically that attitudinal transformation cannot be reliably engineered by course design, which places a ceiling on what any competency framework — including TransInnovate's — can legitimately claim.

H-VET translation. All competency frames in the corpus are stated at master level. No evidence is available for how they translate to H-VET teacher CPD, which is the project's primary target audience.

(d) Design prompts

- A compound competency backbone. The Wissen– Fähigkeiten– Haltungen– Handlungen or Systems– Target– Transformation compound is a consistent signal across exemplars. A comparable four-part competency backbone would give the TransInnovate course a defensible architecture and would differentiate it from knowledge-only CPD offers.
- A lightweight reflective instrument. The reflective learning journal is the only mechanism across the corpus that demonstrably captures process-level learning and is at the same time cheap, scalable and compatible with asynchronous online delivery.
- Explicit naming of navigating ambiguity. Naming ambiguity as a learning outcome in its own right (as in Case 14) is a distinctive marker of transdisciplinary-aware design.

Dimension 2 – Transdisciplinary Pedagogy and Didactics

(a) What the corpus shows

Five pedagogical macro-formats recur across the corpus. They are not mutually exclusive — most programmes combine two or three — but the dominant format is usually clear.

Table 5. *Pedagogical macro-formats across the corpus: occurrence and characteristics*

Macro-format	Description and characteristic cases	Typical duration
Project-based learning (PBL)	Student-led projects, frequently multi-semester, with group or individual delivery. Characteristic of the Aalborg tradition in Case 05; cross-school in Case 06 (the eight-month Industry Project); module-embedded in Case 07 (the Design Informatics Project) and Case 02 (the Cross-Disciplinary Capabilities Lab).	Semester to multi-semester
Research-creation / studio	Hybridisation of theoretical inquiry and artistic production as a legitimate research output (Cases 01, 03, 04, 10, 13).	Continuous, full programme
Service-learning and real-world laboratory	Academic credit awarded for structured engagement with non-academic partners (NGOs, municipalities, communities). Characteristic of Cases 12, 15 and 16.	Module to ten months
Apprenticeship / lab-embedded learning	Learner is embedded in an ongoing research group with an advisor; progression is defined by participation in the lab's live work (Cases 10, 13, and, partly, 04).	Programme-long
Case-based and seminar learning	Intensive engagement with a small number of richly documented cases. The open online course in Case 11 uses five anchor projects; Case 17 uses controversies in medical science.	Module or short course

Named pedagogical frameworks used across the corpus include research-creation (Cases 01, 04, 10, 13)[6], Design Thinking and Research-through-Design (Cases 06, 07, 16), the spiral curriculum common to the Aalborg tradition (Case 05)[7], the tri-lectic heuristic of

[6] "Research-creation" refers to a mode of inquiry in which artistic or creative production is itself the research method and the research output, not an illustration of research conducted in another modality. See Manning, E., & Massumi, B. (2014). Thought in the Act: Passages in the Ecology of Experience. University of Minnesota Press.

[7] "Spiral curriculum" refers to an architecture in which learners return to the same core ideas at successively deeper levels rather than encountering them once in linear sequence. Introduced by Bruner, J. S. (1960). The Process of Education. Harvard University Press.

cultural–technical–commercial framing (Case 07)[8], the three-knowledge framework (Case 11), the Culture-for-Health framework (Case 15), and service-learning architectures with a structured reflective return (Cases 12 and 15)[9]. Case 12 additionally uses the Betzavta method for conflict resolution in heterogeneous groups[10].

The teacher role is strikingly consistent across the corpus: facilitation, mentoring, and team-teaching dominate; lecturing is marginal. Team-teaching is institutionalised as the default format in Case 01, named in the curriculum as a core instructional format in Case 02, delivered across two different schools in Case 07, and structured as a cross-department committee in Cases 10 and 13. The same Aalborg-PBL tradition that shapes Case 05 also underpins the pedagogical rationale for team-taught modules in Cases 06 and 12.

(b) Cross-source finding

Two patterns emerge only when the cases are read together. First, the pedagogically stronger exemplars combine an integrative engine with a reflective instrument. The integrative engine is a high-credit, long-running component where the TAH domains have to actually meet — the Cross-Disciplinary Capabilities Lab (Case 02), the Industry Project (Case 06), the Master Project (Case 04), the Pilot Project (Case 15). The reflective instrument is a lower-credit but mandatory mechanism that makes the integrative process legible to both the learner and the assessor — the study journal, the learning journal, the portfolio. Programmes with only the engine (Case 10) or only the reflection (Case 14) feel incomplete in comparison. This mirrors the literature's observation that transdisciplinary pedagogy is "a pedagogy of orchestration" (Matson et al., 2025) rather than a pedagogy of content delivery.

Second, team-teaching is a structural requirement of transdisciplinary teaching. Every unambiguous transdisciplinary case in the corpus uses at least two-teacher or multi-institutional delivery as a matter of default. Programmes that fail to institutionalise team-teaching tend to slide towards parallel disciplinary exposure (multidisciplinarity) rather than genuine integration — a pattern also documented in the field literature on transdisciplinary institutionalisation (Williams et al., 2024).

(c) Tensions and open questions

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[8]The "tri-lectic" is a pedagogical heuristic developed within the Edinburgh Design Informatics programme: every project is examined through three lenses — the cultural context, the technical parameters and the commercial or industrial application. See programme description at designinformatics.org.

[9]Service-learning combines structured community engagement with academic credit and guided reflection (Jacoby, B., 2015, Service-Learning Essentials, Jossey-Bass).

[10]Betzavta ("Together") is a democracy and conflict-resolution method developed at the Adam Institute, Jerusalem, designed to surface and work through conflicts of interest within groups. See adaminstitute.org.il/en/betzavta-method.

Duration paradox. The corpus is overwhelmingly long-form (two-year masters). Yet three of the four most distinctive transdisciplinary examples — the MOOC in Case 11 (~30 hours), Case 15 (10 months, 10 ECTS), and Case 16 (6 ECTS modular) — are short or medium-length. Transdisciplinarity does not require 120 ECTS; but every short-form case in the corpus compensates with intensive engagement (blocks, weekends, community pilots). Whether that intensity scales to a part-time online format for working educators is an open question for the interview and survey evidence.

Framework pluralism. Each programme uses its own named pedagogical framework. Adopting any single one risks alienating educators from the other families, especially in a blended course context where learners arrive from heterogeneous starting points.

Online delivery. Only two cases (11 and 14) are fully online. Their pedagogical solutions are modest — case studies, asynchronous forums, quizzes and peer-shared mind-maps. The corpus does not contain a strong model for fully online transdisciplinary teaching with high stakeholder engagement, which is precisely the space the TransInnovate course will enter[11].

(d) Design prompts

The TransInnovate course is, by design, a blended learning programme combining online and in-person elements. The pedagogical mechanisms of on-site long-form programmes cannot be transplanted wholesale; the prompts below identify the portable elements.

- Compress the integrative engine + reflective instrument pairing into the courses's internal rhythm. A short, live integrative task (for example, a cross-disciplinary lesson plan or mini-intervention that participants design during the course) paired with a lightweight reflective journal is the smallest form of the pattern that still preserves its pedagogical function. The in-person or synchronous online sessions are the natural home for the integrative task; the online asynchronous components can carry the reflective journal.
- Keep the framework menu plural. Rather than forcing a single named framework, the course can present a compact menu (research-creation, three-knowledge, tri-lectic, service-learning) as lenses participants can choose from depending on their own teaching context. This matches the heterogeneity expected in a blended course audience and reflects the corpus's own pluralism.
- Model team-teaching in the course's own delivery. Since the corpus evidence strongly associates team-teaching with genuine transdisciplinary integration, the course about transdisciplinarity should itself be visibly team-taught — ideally with facilitators from the T, A and H domains of the consortium. In a blended format, team-teaching across in-person and online sessions is also a straightforward way to model the disciplinary translation work the course asks learners to perform.

[11] Note: reaching higher TD competence levels required to design and lead TD/TAH courses is unlikely to be feasible without direct in-person interaction — the online/in-person mix is therefore a structural question, not only a logistical one.

- Treat the lack of strong blended TD models as a design opportunity, not a gap to fill in haste. The corpus is frank about the current weakness of fully online transdisciplinary formats, and blended programmes combining online reach with in-person depth remain rare. This is consistent with the TransInnovate innovation claim and implies the course should be positioned, in its own communication, as part of the attempt to fill a space that the field has not yet settled.

Dimension 3 – TAH Integration

(a) What the corpus shows

Across the corpus the three domains — technology, arts and humanities — are almost never balanced by accident. Each programme has an entry lens: the faculty, programme director or institutional context that hosts the course. The other two domains are attached through specific architectural devices. Four configurations recur.

Table 6. *TAH domain configurations: T-, A- and H-led programme types*

Configuration	Cases	Characteristic architecture
Arts-led triad	Cases 01, 02, 03, 04, 05, 15	An arts or applied-arts school hosts the programme; technology and humanities enter through technology labs, technology-heavy modules, or ethics/policy frames. The arts function as what Case 02 explicitly calls a "common language" into which T and H are translated.
Design/arts × tech balanced	Cases 06, 07, 09	A formal inter-school or inter-faculty agreement creates structural equality between arts and technology; humanities enters more diffusely through ethics, business strategy or cultural critique.
Tech-led triad	Cases 10, 13, 16	An engineering or tech-heavy institution hosts the programme; arts and humanities enter through explicit partner units and named modules (aesthetics, affective computing and ethics, embodied and experiential knowledge).
Humanities-led triad	Cases 08, 11, 12, 14, 17	A humanities faculty or programme hosts the initiative; technology enters through digital methods, data literacy and digital archiving; arts enters through cultural-heritage practice, curatorial work or arts-based intervention.

A recurring architectural device is the **integrative slot** — a named module, lab or project where the three domains are required to actually meet. The Innovative Educational Modules in Case 01, the Cross-Disciplinary Capabilities Lab in Case 02, the Master Project in Case 04, the Media Arts Cultures Lab in Case 05, the Industry Project in Case 06, the Design

Informatics Project in Case 07, the Transdisciplinary Collaboration modules in Case 09, the Transvergence Projects in Case 10, the Certificate Project in Case 14, the Pilot Project in Case 15, and the digital exhibition proposal in Case 17 all serve this function. These slots typically carry a disproportionate share of the credit load: fifty per cent of the major at Case 03; twenty-five per cent of the programme at Case 06; fifty per cent of the grade at Case 15. The institutional message is consistent: if integration is not credited, it does not happen.

(b) Cross-source finding

Reading the cases together suggests a scaling rule for TAH integration: the more structurally integrated a triad, the more the programme is organised around a *shared object* that all three domains can recognise. The shared object is never "knowledge" in the abstract; it is always something concrete and — crucially — public-facing. The public exhibition (Cases 01, 03, 07); the industry-brief prototype (Case 06); the cultural intervention with a community (Case 15); the curated digital exhibition for a museum audience (Case 17); the Festival of Creative Learning (Case 07). Programmes without a shared public object (Cases 10, 13) compensate with very high levels of co-location, shared specialised infrastructure and long time-scales — a strategy that is expensive and not portable to an online CPD format.

This echoes the literature's observation that arts and humanities contributions to transdisciplinary work are most effective when they shape problem framing upstream rather than being attached at the communication or dissemination stage (Re-FREAM Consortium, 2020; El Moussaoui & Kofler, 2025). When the three domains are oriented around a shared public-facing object, arts and humanities have structural reason to be present from the beginning; when they are not, A and H tend to drift into decorative or closing roles.

(c) Tensions and open questions

Dominance versus balance. Dominance versus balance. Most programmes are honest about their dominant lens. Rather than treating balance as the default ambition, the course should build in structured reflection on participants' primary disciplinary lens — making their dominant perspective legible and pedagogically workable rather than masking it behind a nominal commitment to the full triad.

Humanities underweighting. In arts-led and tech-led triads (nine of seventeen cases), the humanities corner is often thinner than the other two: ethics as a single module, aesthetics as a "layer", societal context as a seminar series. The humanities leg of the triad is empirically the most fragile corner.

Inter- versus trans- in practice. Programmes in the field use "interdisciplinary" and "transdisciplinary" interchangeably or invert them. Whether this is a vocabulary problem, a strategic one or a genuine conceptual confusion cannot be determined from documentation alone; the expert interviews (Task 2.2) are better placed to test this.

(d) Design prompts

- Organise the course around a shared object. For educators, the natural shared object is a small teaching unit, cross-disciplinary lesson plan or pilot intervention they design during the course. A final "showcase" — asynchronous, published on the One-Stop-Shop — would turn the course's integrative work into a public-facing artefact, giving the TAH triad structural reason to meet.

- Integrate humanities upstream: Rather than reserving a protected humanities slot, how can the course design problems or projects where normative, interpretive, or value-based questions arise as methodologically necessary — so that the H perspective enters the integrative work at the point where the problem itself demands it, not because the course structure mandates it?

- Credit integrative work explicitly in the micro-credential. The corpus is clear that uncredited integration does not happen reliably. The TransInnovate micro-credential standard should allocate specific weight to integrative outputs rather than only to T-, A- and H-specific content.

Dimension 4 – AI Applications

(a) What the corpus shows

The distinction between AI as content (a subject of study or a tool for artistic production) and AI as a didactic tool (a tool that scaffolds or facilitates the transdisciplinary process itself) is, across the seventeen cases, almost binary.

Table 7. *AI usage classification across the corpus: content vs. didactic tool*

Status of AI in the course	Number of cases	Typical manifestations
AI as content	14 of 17	Critical AI Literacy, Machine Learning, Creative Coding (Case 02); Design with AI-Based Processes (Case 02); Computing for Creatives (Case 09); Affective Computing and Ethics, AI for Mental Health (Case 13); AI for business transformation (Case 06); AI for biodiversity (Case 16); AI in life sciences (Case 17).
AI absent from course design	2 of 17	Cases 14, 15.
AI as didactic tool	1 confirmed, 1 emerging	Case 12 uses generative AI tools (ChatGPT, Perplexity, Microsoft Copilot) in the "Sustainable AI?" module as an exploratory instrument for learners' own investigation of the seminar theme. Case 06 uses AI for scaffolding team collaboration in its virtual global projects, but this is not yet a documented core didactic element.

Across seventeen courses and hundreds of individual modules, the corpus contains no established, widely replicated model in which AI is used as a facilitator of transdisciplinary dialogue, translation, synthesis or team collaboration. The only explicit case (Case 12) uses generative AI for individual exploratory research — an important use case but not, on its own, a transdisciplinary one. The distance between this state of practice and the current technical capability of multi-agent, retrieval-augmented systems is substantial[12].

(b) Cross-source finding

This finding directly corroborates what the TransInnovate literature review identifies as an open question at the frontier of the field: AI can support sense-making, synthesis and weaker forms of knowledge integration, but the current practice of higher education has not yet

[12] Authors note: This near-empty finding is real for this corpus — formal HE programmes with published curricula are where AI-as-didactic-tool would be hardest and slowest to surface. Practitioner-led work in non-formal and cultural-organisation contexts sits outside what was sampled, and some of it already treats AI as a facilitator of TD encounter (such as C-lab – Interactive collaborative platform, Marko Damiš, Slovenia). The finding should not be read as evidence that the field has not begun this work.

incorporated AI as a didactic facilitator of transdisciplinary work (Keil & Stein, 2025; Aliabadi et al., 2023). The corpus-level evidence is strong enough to report as a primary empirical result of the desk research, pending triangulation with the interview and survey data.

(c) Tensions and open questions

Coverage bias. Curriculum documents and programme handbooks describe content and structure rather than the tools teachers use day-to-day. Individual teachers may already use AI to scaffold group work, translate vocabulary across disciplines or draft facilitation plans, without this appearing in the curriculum. The interview round is better positioned to surface such informal practice.

Recency. Most documents consulted were produced between 2023 and 2025. The rapid post-2023 shift in generative-AI capability may simply not yet have entered formal curricula. The absence of AI as didactic tool may therefore be a temporal artefact as well as a design gap.

Normative caution. Several arts-led and tech-led programmes foreground critical AI literacy and the ethics of AI (Cases 02, 13). A didactic deployment of AI in a transdisciplinary course must be designed with the critical-literacy tradition already present in the target audience, not against it (Peters & Chin-Yee, 2025; Friedman & Hendry, 2019).

(d) Design prompts

Concrete use cases for the TransInnovate AI application will be defined later in WP3 (Task 3.4), after triangulation with the interview and survey evidence and against the project's pre-defined hypothesis list. The prompts below are therefore deliberately limited to the framing questions that the corpus evidence raises, not to use-case design.

- Report the finding prominently in D2.1. The near-complete absence of AI as a transdisciplinary-facilitating tool across seventeen chosen cases is a primary research output. It empirically validates the TransInnovate positioning.
- Frame AI carefully against the field's default. Learners arriving at a course about TAH integration will bring with them the field's dominant "AI as subject of study" framing. The course should explicitly contrast AI as content and AI as facilitator and position itself in the second, without dismissing the first.
- Anticipate the critical-literacy expectations of the audience. Any AI-facilitated component must accommodate, rather than bypass, the critical-AI literacy tradition visible in the corpus. That means transparency about model limitations, generalisation bias (Peters & Chin-Yee, 2025), and the non-substitutability of human judgement for value negotiation.
- What existing practitioner-led methodologies for AI-as-facilitator can the course learn from and translate into a formal curricular setting, rather than treating AI-app as inventing the category?

Dimension 5 – Barriers and Drivers

(a) What the corpus shows

Document analysis does not give direct access to barriers; these are articulated by educators and programme directors in interviews, not in curricula. What the corpus does reveal is the architecture of drivers — the institutional, financial, pedagogical and normative preconditions under which transdisciplinary programmes have managed to exist.

Four recurrent drivers are visible across the corpus:

External project or consortium funding. Case 01 is funded as an École Universitaire de Recherche by the French ANR; Case 05 is an Erasmus Mundus Joint Master Degree with EACEA funding; Case 15 is funded directly by Erasmus+; the Case 11 MOOC is supported by the Swiss Academies. Transdisciplinary education in the corpus rarely sustains itself on tuition income alone.

Inter-institutional or inter-school agreements. Case 06 rests on a formal three-school agreement; Case 07 is delivered jointly by two schools; Case 02 uses a cross-faculty structure; Case 08 operates a named network of partner institutions; Case 05 is delivered by an international consortium; Case 09 bypasses traditional faculty boundaries through a Transdisciplinary Hub.

Dedicated physical infrastructure. The 24/7 student studio at Case 03, the AlloSphere at Case 10, the Media Lab building at Case 13, the Toni-Areal at Case 03: shared specialised infrastructure is a powerful but expensive driver.

Senior institutional sponsorship. Every unambiguous transdisciplinary case connects to a senior strategic sponsor: the Knowledge Transfer Hub initiative in Austria (Case 02); the Berlin University Alliance (Case 16); the Coalition for the Common Good at Antioch (Case 14); the Transdisciplinary Hub strategy at HKBU (Case 09).

Barriers have to be inferred from what the documentation does not say. Four recur as gaps or opacities:

- Workload and funding arrangements for team-teaching — explicitly noted as opaque in Cases 02, 07 and 12.
- Assessment legitimacy — several cases describe the "unfair grading" problem in which a designer is graded by a scientist or vice versa (Cases 07, 10). Cross-program and cross-department committees are explicit attempts to address this.
- Entry thresholds — several programmes gate entry on aptitude, a personal project proposal or pre-existing disciplinary diversity (Cases 03, 08, 13). High entry thresholds protect quality but exclude the educators who would most benefit from transdisciplinary development.

- Durability — several initiatives depend on specific external funding streams with explicit end dates (Case 01 until 2028; Case 15 until June 2026). Durability beyond the funding horizon is a recurring concern.

(b) Cross-source finding

Transdisciplinary programmes in the corpus succeed when they solve an institutional translation problem — specifically, how to pay, credit and insulate team-teaching and cross-departmental delivery — and remain fragile when they do not. The most durable programmes (thirty years for Case 06; established in the late 1980s for Case 04; the mid-1980s for Case 13) have all built formal cross-unit agreements. This matches the literature's finding that institutional barriers to transdisciplinary work are structural, not incidental: silos, rigid funding, narrow reward systems and publication-centred career criteria are the primary barriers rather than individual resistance (Williams et al., 2024; SHAPE-ID, 2020).

(c) Tensions and open questions

Barriers are under-documented. Document analysis is systematically unable to capture what educators and programme directors actually struggle with; the interview work (Task 2.2) is essential for this dimension.

Institutional politics versus pedagogy. The corpus strongly suggests that the primary barrier to transdisciplinary work is institutional and financial, not pedagogical. A MOOC audience of educators is likely to need advocacy resources — templates, language and evidence — to use inside their own institutions, alongside pedagogical method.

Scale versus intimacy. The most successful transdisciplinary programmes in the corpus are relatively small. Scaling transdisciplinary pedagogy to a MOOC or blended audience without losing its characteristic intimacy is a challenge the corpus does not resolve.

(d) Design prompts

- Include an institutional advocacy strand. The corpus is emphatic that transdisciplinary work fails institutionally more often than pedagogically. A short module or a set of templates hosted on the One-Stop-Shop, giving educators the language and evidence to negotiate team-teaching, credit allocation and release time in their own institutions, is likely to be high-leverage — and is a feature the course itself can deliver asynchronously with little marginal cost.

- Design assessment to anticipate the unfair-grading problem. Peer review calibrated across disciplinary backgrounds risks remaining multi-disciplinary — multiplying disciplinary critiques — rather than transdisciplinary. The assessment design should specify how reviewers are guided to evaluate integrative quality and process, not only disciplinary correctness.

- Build durability into the design from the beginning. The micro-credential standard and the One-Stop-Shop are the TransInnovate-specific answers to the durability problem

the corpus documents. They deserve explicit framing in the communication course as continuity mechanisms, not only as dissemination outputs.

Dimension 6 – Context and Target Group

(a) What the corpus shows

The target-audience profile of the corpus is narrower than TransInnovate's. Nearly every case targets higher-education master-level learners with a first degree in arts, sciences or humanities[13].

Table 8. *Target audience and institutional context profiles across the corpus*

Target group	Cases	Notes
HE master-level learners	Cases 01, 02, 03, 04, 05, 06, 07, 08, 10, 13, 17	Dominant profile. Often with explicit pre-requisites in digital literacy, creative production or scientific method.
HE bachelor / undergraduate	Case 09	The only formally undergraduate case in the corpus.
Mid-career professionals	Cases 14, 15	The closest target profiles to the TransInnovate audience. Case 15 (the Baltic micro-certificate) is the structural analogue closest to the project's own intended course format and duration.
Mixed / open audiences	Cases 11, 12, 16	Case 11 (MOOC) is open to educators, researchers and practitioners; Case 12 is open to all faculties and levels; Case 16 admits learners with "diverse educational biographies".
Educator continuing professional development (CPD) as primary target	0 of 17	No case in the corpus is primarily designed for educator CPD in the TAH space. The closest analogues (Cases 11 and 12) are open to educators but not targeted at them.

Institutional context is likewise concentrated: most cases sit in well-resourced research universities or specialised arts academies.

(b) Cross-source finding

The TAH field has a developed model for transdisciplinary education with elite HE master students and, to a lesser extent, with mid-career professionals in specialised sectors. It has

[13] Authors note: A small number of examples closer to TransInnovate's target audience exist — including the TD Training Collaborative's train-the-trainer workshops and select university-internal educator trainings — but are either undocumented or their documentation is not externally available. Their absence from the corpus reflects accessibility constraints rather than absence from the field.

almost no established model for the audience TransInnovate actually addresses: H-VET and HE educators who need to integrate TAH perspectives into their own teaching, typically part-time, online, across heterogeneous disciplinary starting points, and in institutional contexts with limited transdisciplinary infrastructure. This is a second empirical gap that directly validates the project's rationale, alongside the AI-as-facilitator gap identified in Section 3.4.

(c) Tensions and open questions

H-VET invisibility. Higher vocational education is nearly absent from the corpus — a reflection of the field rather than of the selection.

(d) Design prompts for TransInnovate

- Treat the corpus as a source of structural ideas rather than direct templates. Because no case in the corpus targets the same audience or operates in the same institutional context, transferability must be case-by-case. The curated examples in Section 5 identify specifically which elements are portable and under what conditions.
- Use the survey and interviews to fill the gaps. The empirical weight on Dimension 6 in D2.1 should fall on interviews rather than on this corpus.

Cross-cutting typology of TD approaches

Read together, the cases in the corpus fall into four archetypes of transdisciplinary design. The archetypes are not mutually exclusive — most concrete programmes combine two of them — but they describe the dominant logic of each case and are useful for naming the shape of TransInnovate's own positioning.

Archetype I — research-creation transdisciplinarity

Representative cases: 01, 02, 03, 04, 10, 13.

Operative logic: transdisciplinarity as the hybridisation of theoretical inquiry and creative production. The shared object is typically an artistic or performative artefact (exhibition, installation, film, sonic work) that carries conceptual weight. The arts act as a common language for technology and humanities and social sicences. Strongest on conceptual innovation and aesthetic depth; weakest on demonstrable societal impact; most at risk of sliding from TD towards ID when the engagement with non-academic actors is not structurally required[14].

[14] Authors note: This operative logic is closer to Basarab Nicolescu's and Latin American traditions of transdisciplinarity, where transcendence — rather than engagement of societal

Archetype II — wicked-problem, project-based transdisciplinarity

Representative cases: 06, 07, 09, 16.

Operative logic: transdisciplinarity as structured problem-based engagement with a real, non-academic problem supplied by an external partner. The shared object is a prototype, design concept or implementation plan for a named client. Strongest on labour-market integration and on the clarity of the transdisciplinary negotiation; most at risk of reducing transdisciplinarity to "client service" when the problem framing is not critically examined.

Archetype III — service-learning and impact transdisciplinarity

Representative cases: 12, 15, 16, 14.

Operative logic: transdisciplinarity as credited, structured engagement with civic, community or third-sector partners, with explicit impact orientation. The shared object is a social intervention or service implemented with a community and evaluated in situ. Strongest on social impact and on capacity-building for disadvantaged groups; most at risk of sliding into well-intentioned volunteer work without academic rigour when the reflective architecture is weak.

Archetype IV — reflexive, meta-transdisciplinarity

Representative cases: 11, and elements of 03 and 14.

Operative logic: transdisciplinarity as the subject of rigorous conceptual and methodological reflection in its own right. The shared object is conceptual: a three-knowledge typology, a set of boundary objects, a theory of change. Strongest on intellectual clarity and on equipping learners to design their own transdisciplinary projects. The attitude dimension is addressed through heuristic concepts — however, the step of actually executing transdisciplinary work in practice sits outside what this course delivers by design.

Blended positioning and the TransInnovate course

Against these four archetypes, the TransInnovate course is most naturally positioned as a blend of Archetype IV (as conceptual foundation) with elements of Archetypes II and III (as applied practice), informed by selected mechanisms from Archetype I. In curricular terms this suggests a three-part rhythm — concept, practice (with the learner choosing whether their practice component follows a PBL or a service-learning logic), and reflective return to the concept — that fits a blended course architecture with occasional synchronous sessions well.

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actors — is the core characteristic. Its relationship to the European HE/HVET mainstream TD tradition should be flagged when drawing on this archetype for course design.

Curated collection of best practices

Sections 3 and 4 treat the seventeen cases analytically. This section distils a shorter list of eight cases whose specific mechanisms are most directly relevant to TransInnovate, with selection guided by three criteria: proximity to the TransInnovate audience and format; robustness of the underlying mechanism independently of the originating institution; and complementarity across the eight so that they cover different parts of the design space.

Each exemplar is presented as a short structured card. The mechanism of interest is described first, followed by what it reveals about transdisciplinary design in the TAH space, and finally by a short note on relevance for the TransInnovate blended course — with explicit attention to the gap between long-form on-site delivery (the corpus default) and an open online course with occasional synchronous sessions (the TransInnovate format). These notes are *considerations*, not recommendations; final design choices rest with the course development team in WP3.

Exemplar 1. Culture and Health — Baltic micro-certificate (Case 15)

Archetype: service-learning and impact transdisciplinarity.

Mechanism of interest. A 10-ECTS, ten-month hybrid micro-certificate for working professionals, organised around a mandatory real-life pilot project with a vulnerable community group. Assessment is weighted explicitly: 50 per cent on pilot implementation, 20 per cent on the project plan, 10 per cent on a reflective journal, and the remaining 20 per cent on concept understanding and methods. National teams work under a mentor drawn from the consortium.

What it reveals. This is the clearest operationalisation in the corpus of the principle that transdisciplinary work must be credited to happen. Weighting the pilot at half the grade is a structural choice that embeds the Wissen–Handlung link into assessment rather than leaving it to exhortation. The consortium mentoring model is also a rare example of how transnational delivery scales without losing national-context specificity.

Relevance for the TransInnovate course. Direct transfer of the ten-month pilot is hardly compatible with a blended format, but the logic of the assessment weighting and the consortium-mentor architecture are portable. A scaled-down version — a short integrative assignment heavily weighted in the micro-credential, with consortium-based tutoring — would preserve the mechanism in a blended context.

Exemplar 2. td-net MOOC — Partnering for Change (Case 11)

Archetype: reflexive, meta-transdisciplinarity.

Mechanism of interest. An open online course of roughly thirty hours' workload, built around five documented transdisciplinary projects and three conceptual frameworks: the three-knowledge typology (Systems, Target, Transformation), Theory of Change, and the integration methods (e.g. Sustainability Wheel). Delivered by a multi-institution Swiss consortium.

What it reveals. This is the corpus's most concentrated pedagogical source for conceptual scaffolding of transdisciplinary thinking. The three-knowledge frame, the "nomadic concepts" idea and the "Most Significant Change" reflection method are robust, field-tested and well documented.

Relevance for the TransInnovate course. Of all corpus cases, this is closest in format to TransInnovate — a blended course with a reflective rather than applied emphasis. Its conceptual apparatus is directly adoptable as the foundation for the TransInnovate course's first module. One of the TransInnovate consortium members was centrally involved in the blended course design; institutional memory can be drawn on directly.

Exemplar 3. IDBM — Aalto Industry Project (Case 06)

Archetype: wicked-problem, project-based transdisciplinarity.

Mechanism of interest. An eight-month industry project based on a live brief from an external partner, delivered by cross-tracked student teams (business, design, engineering) under coach-mentors, with the industry partner contributing to the final assessment.

What it reveals. The "live brief" mechanism is the most portable idea in the corpus for forcing immediate transdisciplinary negotiation among learners from heterogeneous backgrounds. It also makes assessment natively boundary-crossing, because the external partner's feedback is part of the grade.

Relevance for the TransInnovate. The eight-month rhythm is incompatible with the TransInnovate course structue. However, the analogue is available: each learner can bring their own current teaching challenge — a class, a programme, a curriculum issue — as their "brief", and the external voice can come from a colleague or local stakeholder they work with already. The structural principle (own-problem-as-brief, external-voice-in-assessment) is preservable.

Exemplar 4. Transdisciplinary Course Program — Tübingen (Case 12)

Archetype: service-learning and impact, plus reflexive.

Mechanism of interest. An umbrella programme bundling short intensive workshops (2–6 ECTS each) into certificates, organised around a four-part competency frame (Wissen–Fähigkeiten–Haltungen–Handlungen). The module "Sustainable AI?" is the only documented case in the corpus of generative AI deployed as a didactic instrument rather than as content.

What it reveals. Two distinct transfers. The workshop-bundle-to-certificate model is an institutional analogue to the TransInnovate micro-credential vision and demonstrates how short units can accumulate into a recognised qualification. The generative-AI-as-exploratory-instrument approach is the field's closest extant precedent for what TransInnovate's AI application is likely to become.

Relevance for the TransInnovate. The workshop-to-certificate architecture informs the micro-credential standard and the One-Stop-Shop. The "Sustainable AI?" approach is a useful reference point for the later AI application design work, alongside the pre-defined hypothesis list the project already maintains.

Exemplar 5. Cross-Disciplinary Strategies — Vienna (Case 02)

Archetype: research-creation moving towards wicked-problem TD.

Mechanism of interest. Two high-value mechanisms: the Cross-Disciplinary Capabilities Lab, a 10-ECTS integrative engine that runs through every semester; and the Study Journal, a mentored reflection tool that explicitly documents "failed" projects as part of the learning record. The master's thesis is supervised by a cross-disciplinary team of two to three instructors.

What it reveals. Two architectural ideas emerge here. First, the Study Journal demonstrates that valuing failure as a recorded learning outcome is possible and assessable — not merely rhetorical. Second, the multi-supervisor thesis institutionalises transdisciplinarity at the assessment level, not only at the teaching level.

Relevance for the TransInnovate. The 10-ECTS Lab is too large for a blended course. The Study Journal scales to any length and is the single most portable assessment mechanism for an online transdisciplinary course aimed at educators. The multi-supervisor principle can be approximated in a blended course through calibrated peer review by learners from different disciplinary backgrounds.

Exemplar 6. Design Informatics — Edinburgh (Case 07)

Archetype: wicked-problem, project-based transdisciplinarity.

Mechanism of interest. Three notable mechanisms: the tri-lectic design heuristic (cultural context × technical parameters × commercial or industrial application); the Festival of Creative Learning, a full week per year in which normal teaching is suspended for intensive off-curriculum exploration; and team-based assessment with cross-program committee scrutiny to mitigate disciplinary bias in grading.

What it reveals. The tri-lectic is a rare example of a simple, teachable heuristic that captures the TD orientation in three decision-points — and is therefore usable even by educators without prior transdisciplinary training. The Festival concept shows that one intensive interval can carry disproportionate pedagogical weight in an otherwise modular programme.

Relevance for the TransInnovate course. The tri-lectic is directly transferable to a TransInnovate course as a one-hour teaching element that learners can use indefinitely. For an educator audience, its "commercial" leg might be softened to "application context" or "stakeholder reality". The Festival logic is a template for an intensive synchronous online week within the broader course rhythm.

Exemplar 7. Master ArtScience — The Hague (Case 04)

Archetype: research-creation with mandatory impact orientation.

Mechanism of interest. Every master's project must include a "Professional Integration" component that connects the project to an external, non-academic audience or stakeholder. This is a graded requirement, not optional.

What it reveals. This case illustrates in a single mechanism the architectural difference between interdisciplinary and transdisciplinary programmes. The mandatory external contact is what moves the programme across the line, more than any rhetorical self-description could do.

Relevance for the TransInnovate course. In a blended course for educators, the analogue is a required step in which the participant shares or deploys their course output with a non-course audience — their own students, their own institutional colleagues, or a local community contact — and reports back. Keeping this step as a graded requirement of the micro-credential (rather than optional) preserves the mechanism's force.

Exemplar 8. The City as Laboratory — TU Berlin (Case 16)

Archetype: service-learning and impact, plus wicked-problem PBL.

Mechanism of interest. A curated inventory of partner institutions covering makerspaces (T), theatres and museums (A), and civic and social centres (H) as a menu of external transdisciplinary sites learners can select from. An explicit framework for valuing "embodied, performative and experiential" knowledge alongside scientific knowledge.

What it reveals. The partner-inventory idea gives operational form to the otherwise vague imperative to "engage with non-academic actors". The pluralistic-knowledge framework is one of the few places in the corpus that gives equal standing to embodied and experiential knowledge — a distinctively humanities-protective architectural move.

Relevance for the TransInnovate. The inventory logic offers a design inspiration for the One-Stop-Shop: rather than a centrally maintained European-scale list — which would require sustained dedicated resources beyond the project's capacity — the course could seed a community-curated directory of TD-ready partner sites, maintained by one of the project partner and collectively by course graduates and growing incrementally after the project ends.

Implications for TransInnovate Course

This section gathers the implications of the preceding analysis and reads them against the TransInnovate workplan and the project's stated innovation hypotheses. It is more directive than the earlier sections, but it is still an interpretive reading from desk research alone; final decisions will rest with WP3 after triangulation with the interview and survey evidence. Throughout, the reading is calibrated to the TransInnovate format (blended course) rather than to the long-form on-site programmes that dominate the corpus.

What the corpus confirms about the project's rationale

Three of the project's core claims find strong empirical support in the corpus.

- The gap around AI as a transdisciplinary facilitator is real. Across seventeen carefully selected cases and hundreds of modules, only one (Case 12) documents AI used as a didactic instrument, and even that case uses it for individual exploration rather than for genuinely transdisciplinary dialogue. The project's central innovation hypothesis is empirically corroborated at this level of evidence.

- The boundary between interdisciplinary and transdisciplinary practice is widely blurred. A substantial minority of programmes in the corpus operate within an interdisciplinary logic while self-describing as transdisciplinary, or vice versa. This confirms the project's claim that educators need concrete methodological frameworks that give them reliable tools to move beyond parallel disciplinary exposure and towards knowledge co-production.

- Educator CPD is an under-served audience. No case in the corpus is primarily designed for educators continuing professional development in the TAH space. The project's focus on H-VET and HE educators is therefore not a duplication of existing provision; it is the filling of a documented gap.

What the corpus refines

The analysis also suggests refinements to several implicit assumptions that a more generic interdisciplinary-education perspective would bring to the project.

Transdisciplinary work is as much an institutional problem as a pedagogical one. The most durable programmes in the corpus solve a workload and credit problem, not only a pedagogical one. The TransInnovate course can be more effective if it treats institutional advocacy as part of what it equips educators to do, rather than leaving that work implicit.

Competencies in this space must combine knowledge, skills, attitudes and actions. The cognition-only framing common in generic CPD courses is structurally inadequate. The TransInnovate competency backbone should follow the compound structure used by the clearest transdisciplinary exemplars in both the corpus and the literature.

Integration is only real when it is credited. The micro-credential standard should allocate specific weight to integrative outputs rather than only to domain-specific content.

A shared public object matters more than shared concepts. The TransInnovate course will be stronger if it is oriented around a tangible integrative output produced by the learner — a short teaching unit, a cross-disciplinary lesson plan, a small pilot intervention — that is shared with a non-course audience rather than graded privately.

What remains open

Three decisions cannot be resolved from desk research alone and should be carried forward explicitly to the interview and survey work.

The optimal size and rhythm of the course. Case 15 (10 ECTS, ten months) is the closest structural analogue to TransInnovate in the corpus, but whether its rhythm matches educator time constraints across the TransInnovate partner countries is a factual question for the survey.

The practical shape of AI as a facilitator of transdisciplinary work. The corpus confirms the gap but, by design, cannot propose specific use cases. Use-case design belongs to later work in WP3 (Task 3.4), after triangulation with the interviews and the survey and against the project's pre-defined hypothesis list.

The right balance of asynchronous and synchronous delivery. The corpus's fully online cases are few and pedagogically modest; the hybrid cases (12, 15) offer the most plausible templates. The suitability of a specific hybrid configuration for educators in the TransInnovate partner countries is again a factual question for the survey and interview evidence.

Limitations

Corpus-level limitations

Size and representativeness. Seventeen cases are sufficient for qualitative pattern identification but not for statistical generalisation. The findings are design patterns, not population-level claims.

Level and format bias. HE master level is overrepresented; H-VET, educator CPD and short-cycle online formats are thin. This reflects the field itself, not the selection; it is a structural constraint on transferability.

Geographic bias. Central and Eastern European contexts relevant to the TransInnovate pilots are under-represented.

Documentary bias. The evidence base is curriculum documents, programme handbooks, policy texts and published descriptions — which describe intended rather than enacted

practice. The lived reality of classroom delivery is not directly accessible through document analysis.

Analytical limitations

Classification sensitivity. The operative-logic test used here (structural involvement of non-academic actors) produces a defensible but not unique classification of borderline cases; reasonable analysts could disagree on several.

Dimensional cross-cutting. Some findings (for example, team-teaching as pedagogy and as institutional barrier) straddle dimensions; placement in this document follows the D2.1 template, with cross-references flagged in the text.

Recency. Post-2023 shifts in generative AI capability may not yet be visible in curricula published before that inflection point.

Information gaps to be addressed

Actual barriers and drivers at educator level — to be surfaced through the expert interviews (Task 2.2).

Target-audience time constraints, digital readiness and current transdisciplinary practice — to be surfaced through the quantitative survey (Task 2.1).

Informal or uncodified uses of AI by individual teachers — to be probed in the interviews.

Context-specific evidence from CEE H-VET and HE settings — to be triangulated across the survey, the interviews and consortium-partner reporting.

List of abbreviations

Abbreviation	Expansion
AI	Artificial intelligence
ANR	Agence Nationale de la Recherche (French national research funding agency)
BA	Bachelor of Arts
BASc	Bachelor of Arts and Science
CDC Lab	Cross-Disciplinary Capabilities Laboratory (Case 02, University of Applied Arts Vienna)
CEE	Central and Eastern Europe
CPD	Continuing professional development
D2.1, D2.2, D3.2, D3.4	TransInnovate deliverables: Research Report; Methodological Framework; Micro-credential Standard; AI Application
EACEA	European Education and Culture Executive Agency
ECTS	European Credit Transfer and Accumulation System
EUR	École Universitaire de Recherche (French "graduate school" funding instrument)
GenAI	Generative artificial intelligence
HE	Higher education
H-VET	Higher vocational education and training
ICST	Institute for Computer Music and Sound Technology (Zurich)
ID	Interdisciplinarity
IDBM	International Design Business Management (Case 06, Aalto University)
IEM	Innovative Educational Module (Case 01, EUR ArTeC)
LLM	Large language model
MA	Master of Arts
MAS	Media Arts and Sciences (Case 13, MIT Media Lab)
MAT	Media Arts and Technology (Case 10, UCSB)
MFA	Master of Fine Arts
MOOC	Massive open online course
MS	Master of Science
PBL	Problem-based learning
RAG	Retrieval-augmented generation

Abbreviation	Expansion
STARTS	Science, Technology and the Arts (European Commission initiative)
STEAM	Science, Technology, Engineering, Arts, Mathematics
TAH	Technology–Arts–Humanities
TCP	Transdisciplinary Course Program (Case 12, University of Tübingen)
TD	Transdisciplinarity
TDR	Transdisciplinary research
td-net	Network for Transdisciplinary Research, Swiss Academies of Arts and Sciences
UCSB	University of California, Santa Barbara
WITAC	Inclusive Wellbeing Through Arts and Culture in the Baltics (Erasmus+ project)
WP1, WP2, WP3, WP4, WP5	TransInnovate Work Packages
ZHdK	Zürcher Hochschule der Künste (Zurich University of the Arts)

References

Literature cited in this analysis

Sources cited in the narrative of Sections 1 to 7 are listed below in alphabetical order. The list is restricted to works explicitly referenced in the text; the broader corpus of the WP2 literature review is documented separately in the Literature Synthesis working document.

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Cross-Source Synthesis

Key Findings

- **Finding 1: The dominant constraint for TD education is structural, not motivational**
- **Finding 2: Practitioners request procedures for capacities that resist being procedurised**
- **Finding 3: The humanities gap is a question-design problem, not a representation problem**
- **Finding 4: The field understands TD pedagogy as orchestration — and lacks models for enacting it in distributed formats**
- **Finding 5: AI as a facilitator of transdisciplinary dialogue has emerged in artistic practice but has not yet entered formal educational programmes**
- **Finding 6: The course's target audience sits in a gap that the existing HVET has not fully addressed**

5. Cross-Source Synthesis of Findings

Introduction: the logic of triangulation

This chapter does not summarise the four research activities conducted in WP2. Each has produced its own analytical report — the literature review (56 sources), the quantitative survey (135 responses), 30 expert interviews, and a documentary analysis of 17 transdisciplinary programmes — and those reports precede this chapter. What follows is a different kind of reading: an attempt to identify what becomes analytically visible only when all four instruments are held simultaneously.

The four instruments occupy different epistemological positions. The literature establishes conceptual vocabulary and maps the structural conditions under which transdisciplinary work tends to succeed or fail. The survey captures distributional signals about what practitioners perceive, prefer, and report encountering in their institutional contexts. The interviews give access to the lived logic of TD work in practice — how facilitation actually functions, how invisible labour is experienced, how institutional constraints shape pedagogical decisions in real time. The course analysis describes the architectural patterns of existing programmes: what structural choices recur in the cases that work, and what is absent from those that do not. When findings from instruments operating this differently converge, the convergence carries evidential weight that no single source could provide. When they diverge, the divergence is the finding.

The chapter is organised around **findings rather than analytical dimensions** — around what the triangulation produces rather than around the six categories that structured each individual research activity. Six conclusions emerge from reading the four sources together. They are presented in roughly descending order of evidential robustness. A penultimate section draws on internal methodological observations produced during the WP2 peer-review process — analytical positions that belong to the design conversation rather than to the formal research record. The chapter closes with consolidated design prompts for WP3, grouped by theme rather than by dimension.

Key Findings of the Report

Finding 1: The dominant constraint is structural, not motivational

Across all four instruments and all six analytical dimensions, a structural mismatch recurs with sufficient consistency to constitute the synthesis's most robust finding: the primary barrier to transdisciplinary education is not a shortage of commitment or conceptual understanding, but a shortage of the institutional, relational, and material conditions that commitment requires in order to become sustainable practice.

The survey measures this gap in concrete terms. 91.9% of respondents rate TD training as important or highly important for their students. At the same time, 45.9% cite disciplinary teaching structures as a barrier, 43.0% cite limited resources for interactive courses, and 40.7% cite curricula closed to TD approaches. The most consequential finding is that 79.3% of respondents — many of them practitioners with hands-on TD experience — cannot name a single published methodology, framework, or resource for teaching TD competencies. The field is not short of believers; it is short of accessible infrastructure.

The literature arrives at closely related conclusions through a different route. Williams et al. (2024), SHAPE-ID (2020), and Sandler et al. (2025) are consistent in identifying silos, rigid funding, narrow reward systems, and publication-centred career criteria as the primary structural constraints — not individual resistance. What the literature adds, and what survey data cannot easily capture, is the observation that much of the enabling infrastructure of TD work is invisible in the institutional sense: coordination, translation, facilitation, brokerage, and relationship maintenance are essential functions that fall on specific people and are almost never recognised or compensated as such.

The interviews translate this structural diagnosis into its experienced form. Practitioners describe unpaid coordination work, weak co-teaching conditions, misaligned course goals across departments, and the translation burden falling disproportionately on a small number of committed individuals. Two observations from this corpus extend the analysis beyond what the survey or literature reaches. The field currently lacks any formal professional formation pathway for transdisciplinary facilitators: expertise accumulates through experience with almost no institutional mechanism for knowledge transfer between practitioners. And temporal asymmetry between disciplines — the short iterative cycles of design practice against the long timelines of scientific research — is not a soft cultural difference but a structural coordination problem that must be explicitly negotiated at the outset of any collaboration.

The course analysis approaches the same issue through programme architecture. The most durable transdisciplinary programmes in the corpus — some running for three decades — have all solved what the analysis calls the institutional translation problem: how to credit, fund, and protect team-teaching and cross-departmental delivery. Programmes that did not solve this problem have not lasted, regardless of their pedagogical ambition. Team-teaching itself emerges as a structural requirement rather than a pedagogical preference: every unambiguous transdisciplinary case in the corpus uses it as a default, and programmes that fail to institutionalise it tend to slide toward multidisciplinary parallel exposure.

The practical implication for course design runs in two directions. A course targeted at educators must equip them to work effectively within TD formats — but it must equally equip them to negotiate the institutional conditions that make such formats possible: workload recognition, cross-departmental credit, advocacy language for sceptical colleagues and institutional leaders. The One-Stop-Shop and the graduate community of practice deserve to be designed from the outset as responses to the infrastructure gap, not as dissemination outputs added at the end.

Finding 2: Practitioners request procedures for capacities that resist being procedurised

A consistent pattern runs through the survey data and becomes interpretively interesting when read against the literature and the interviews. When practitioners are asked which competencies matter for TD work, they select broad, integrative capacities: engaging with multiple disciplines and societal actors (60.7%), bridging and integrating knowledge (53.3%), grasping systems complexity (50.4%). When they are asked what they concretely lack, the register shifts: the dominant expressed need is for integration methods, stakeholder communication techniques, and team-structuring templates. The capacities they endorse and the support they request do not match.

The literature offers a framework for understanding this gap. Across virtue-based accounts of TD competence (Vanney et al., 2023; Ten Hagen and Horn, 2024), assessment-oriented rubrics (Blom et al., 2020), and empirical teacher-education studies (Horn et al., 2024), transdisciplinary competence is consistently described as a compound of epistemic, relational, and action-oriented capacities that must develop together and that cannot be disaggregated without losing something essential. The epistemic strand — knowledge integration, critical reflection, common-ground building — cannot function without the relational strand of trust, humility, and tolerance for genuine uncertainty; and neither produces anything without the action strand that applies integrated knowledge to concrete problems with real stakes. A course that develops one strand while leaving the others implicit

does not produce a partial TD practitioner; it produces a well-resourced interdisciplinary one.

The interviews provide the explanation for the procedural demand. Expert practitioners confirm the compound architecture strongly — and they also show why practitioners in standard institutional contexts ask for templates rather than epistemic frameworks. In contexts where TD work must be justified to curriculum committees, defended in accreditation processes, and fitted into timetabling structures, procedural language is the only currency that travels reliably. Requesting a method is institutionally legible in a way that requesting epistemic humility is not. Practitioners are responding rationally to the conditions the survey documents, not misunderstanding what TD requires.

The course analysis adds the architectural evidence. The clearest transdisciplinary exemplars in the corpus — the Tübingen Transdisciplinary Course Program, the td-net MOOC, the Baltic micro-certificate — articulate competencies in compound form that links knowledge, skills, attitudes, and actions as constitutive rather than additive. Their assessment architectures weight integrative output and reflective process as primary evidence of learning, not as supplements to disciplinary knowledge tests.

What the triangulation suggests is a specific design principle: the scaffolds — the methods, templates, and frameworks the course provides — should be constructed so that their own inadequacy becomes visible at the right moment in the learning sequence. When a learner reaches a point where the template does not tell them what to do next, and where the answer requires a kind of judgement the template cannot supply, that encounter with procedural insufficiency is not a course failure; it is the pedagogical event the course was designed to produce. Scaffolding designed to be exceeded is different from scaffolding designed to solve problems — and the distinction should be explicit in course design logic.

Finding 3: The humanities gap is a question-design problem, not a representation problem

A recurrent pattern across the WP2 data concerns the contribution of humanities disciplines to transdisciplinary work. The pattern is consistent enough across all four instruments to constitute a robust finding — but the finding requires careful formulation, because its significance depends on how it is read.

The distributional picture from the survey is clear: Humanities is the least combined field among respondents (26.7%), below both Technology (54.8%) and Arts (33.3%). The full TAH triad is practised by 12.6% of respondents; the dominant pairing is Technology–Social Sciences. The course analysis reinforces this: in nine of seventeen programmes, the humanities contribution is confined to a single ethics

module, an aesthetics layer, or a seminar series, rather than constituting a co-equal mode of inquiry throughout. The literature identifies corresponding failure modes — decorative interdisciplinarity, where one field illustrates another without epistemic consequence; assimilative integration, where a dominant knowledge logic absorbs others into its own framework — and notes that humanities contributions are particularly susceptible to these failure modes in technology-heavy settings.

The interview corpus adds the experiential dimension. Several respondents articulate clearly that humanities and arts contributions shift character depending on where in the research or design process they enter. When they enter at the problem-framing stage — when normative, interpretive, and value-based questions are at the centre of what needs to be decided — humanistic inquiry produces results that no other epistemic tradition could produce: a different understanding of what the problem is, what criteria would count as a solution, whose interests the solution serves and how those interests are weighted against each other. When humanities enters at the communication or reflection stage — after the problem has been framed and the solution designed — it produces commentary on decisions that are already effectively made.

The finding, read carefully, is not that humanities is structurally weak or that it needs institutional protection. It is that most existing TD programmes do not construct the kinds of questions that make humanistic inquiry methodologically indispensable. When a programme organises itself around a technical problem with an ethical dimension, humanities enters as the ethical dimension — as a constraint on, or critique of, a fundamentally technical agenda. When a programme organises itself around a question that is normative before it is technical — who should bear the costs of a transition, what counts as a good outcome, how competing claims on a shared resource are to be adjudicated — humanities is not a constraint or critique but the primary epistemic resource for answering the question at all. The design implication is not to add more humanities, but to construct problems where the humanistic questions are load-bearing from the beginning.

This distinction matters for WP3 in a specific way. If the course frames its task as ensuring humanities is represented in the triad, it will reproduce the failure mode it is trying to avoid: humanities as a protected slot, present because the course mandates it rather than because the work requires it. If the course frames its task as constructing problems that cannot be adequately addressed without normative, interpretive, and value-based reasoning, humanities enters as a methodological necessity rather than an institutional requirement — and the difference in what learners take away from that experience is substantial.

Finding 4: The field understands TD pedagogy as orchestration — and lacks models for enacting it in distributed formats

Across all four instruments, transdisciplinary pedagogy is described not as a method but as an architecture of interactions — a finding that the literature states most explicitly but that the survey, interviews, and course analysis each corroborate through their own evidence.

In the literature, the claim that TD pedagogy is a pedagogy of orchestration (Matson et al., 2025) refers to the observation that pedagogical quality in TD settings lies primarily in decisions about interaction: who encounters whom, around what object, under what rules, with what forms of feedback and structured reflection. The learning climate — psychological safety, mutual respect, the capacity to hold genuine uncertainty rather than performed open-mindedness — is treated across the corpus not as a supplementary condition but as a constitutive one. Intermediary roles, the literature consistently shows, are essential rather than optional: the work of facilitation, brokerage, and translation is not background support for the real pedagogical work but part of its substance.

The survey locates the same insight at the level of practitioner difficulty. Designing TD teaching formats is the most frequently cited challenge (53.3%), followed by finding and selecting appropriate methods and tools (40.7%). These are design difficulties, not delivery difficulties: the practitioners who report them know what they are trying to achieve but lack the architectural tools to construct the learning environment in which TD work can happen. The strong preference for facilitated workshops (70.4%) registers the same finding from a different angle — workshops are the format in which orchestrated pedagogy most often becomes tangibly present for practitioners, even if the workshop itself is not a sufficient architecture.

The interviews specify what orchestration requires in practice. The corpus is consistent: challenge-based structures, mixed teams, iterative feedback with genuine stakes, facilitation that can hold collaboration and conflict simultaneously, and explicit scaffolding for the move from parallel disciplinary contributions toward actual co-construction. One observation from the interviews deserves particular attention for the blended format: learners who have internalised individual-work dispositions — through pandemic-period learning conditions or through institutional cultures that reward solo performance — do not move into collaborative modes spontaneously. The warm-up work, the trust-building, and the explicit negotiation of what collaboration requires in a specific team are pedagogical acts, not preliminaries to pedagogy.

The course analysis translates this into an architectural pattern. The most pedagogically convincing programmes in the corpus combine an integrative engine —

a high-credit, long-running component where TAH perspectives must genuinely meet around a shared task — with a reflective instrument that makes the integrative process legible to both learner and assessor. The study journal, the learning portfolio, and the reflective final report serve this function across different programmes in different ways. Programmes that have only one of these elements — either rich integrative work without a reflective mechanism, or reflective rigour without genuine integration — produce characteristically different and recognisable failure modes.

The gap this synthesis makes visible is specific: virtually everything the field knows about TD orchestration has been demonstrated in long-form, on-site, well-resourced settings. The online and blended cases in the course corpus use modest pedagogical solutions by comparison. How the integrative engine and reflective instrument pairing can be operationalised in a blended, partly asynchronous international format for working educators — without the time, co-location, and infrastructure that on-site programmes assume — is not a question the existing evidence base answers. It is the central design problem that WP3 must approach empirically.

Finding 5: AI as a facilitator of transdisciplinary dialogue has emerged in artistic practice but has not yet entered formal educational programmes

The WP2 research reveals a consistent absence in formal educational settings that becomes analytically interesting when set against what is happening in adjacent practice contexts. Across the literature, the survey, and the course analysis, AI is used in TD-adjacent education primarily as a content tool — for literature search, drafting, visual support, and critical discussion of AI's own implications — rather than as a facilitator of the transdisciplinary process itself: the cross-disciplinary dialogue, the translation between epistemic frameworks, the structuring of multi-perspective problem analysis.

The literature maps the functional space carefully. Keil and Stein (2025) distinguish AI contributions across a five-phase transdisciplinary workflow and assign different technical architectures to different moments: large language models at problem framing and communication; retrieval-augmented generation at knowledge integration; multi-agent systems at scenario building and decision support. The same analysis is explicit about what current AI cannot do: value negotiation, the building of trust between knowledge communities, and the meaning-making that occurs when perspectives that are genuinely incommensurable have to find workable common ground. These remain human tasks — not because AI lacks processing capacity, but because they are relational and normative rather than informational.

The survey establishes what formal practice currently looks like. The most common uses are literature search and analysis (45.9%) and structured reflection with students on AI's capacities and limits (40.7%). No respondent reports using AI for integration facilitation or boundary-crossing dialogue. The course analysis is consistent with this: across seventeen programmes, one case — the University of Tübingen's Transdisciplinary Course Program — uses generative AI as a didactic instrument, specifically for individual exploratory research within a single seminar module. Fourteen of seventeen programmes teach AI as a subject of critical inquiry rather than as a process tool. Two omit it.

The interview corpus introduces an important qualification. Alongside the pattern of AI as support instrument and AI as critical subject, one practitioner-led experiment stands out: the **C-lab (Challenge Lab)**, developed within the Slovenian cultural sector, in which spoken contributions from an interdisciplinary group are assembled in real time by AI into semantic grids on interactive screens. Participants reposition the resulting map, identify points of convergence, and have emerging connections visualised and elaborated, with a facilitator mediating between disciplinary languages throughout. The C-lab has not been designed as a formal educational programme; it emerged from artistic and cultural practice. What it demonstrates is that AI-facilitated group-level transdisciplinary work exists as a developed practice — it has just developed in the artistic and non-formal sector rather than in formal higher education or vocational training.

This distinction between sectors is analytically significant. Formal educational programmes with published curricula are the contexts where new pedagogical tools appear most slowly in the documented record — curriculum revision cycles, accreditation requirements, and institutional risk-aversion all create lag between practice and documentation. Non-formal cultural and artistic contexts work on different timescales and with different tolerance for experimental tools. The finding that AI facilitation of TD work is absent from formal educational programmes is accurate; the inference that it is therefore absent from the field as a whole would overread the evidence.

For the course design, the implication runs in a practical direction. The AI application is entering a formal educational context where no comparable tool yet exists — but it can draw on an emerging body of practitioner-led methodology developed outside that context. The design work is closer to translation and formalisation than to invention from scratch, and the distinction matters for how the application positions its own function and for how the course prepares learners to use it critically.

Finding 6: The course's target audience sits in a gap that the existing HVET has not addressed

One finding that emerges clearly from the course analysis and is reinforced by the survey and the interview data concerns the position of the project's target audience relative to existing provision. Educator continuing professional development at the Technology–Arts–Humanities intersection, oriented toward higher vocational education and training, occupies a space that the existing landscape of TD education has not covered.

The course corpus makes this concrete. Zero of seventeen programmes — selected to represent the most sophisticated and diverse transdisciplinary education currently documented — is primarily designed for educator CPD in the TAH space. The td-net MOOC and the Tübingen Transdisciplinary Course Program are the closest structural analogues, and both are open to educators without being designed for them. HVET contexts are almost entirely absent from the corpus. This is consistent with the literature, which draws its evidence predominantly from research-intensive universities and master's programmes, and with the survey, which confirms that 79.3% of practitioners — including those with substantial TD experience — are unaware of existing frameworks and resources.

The survey also profiles the audience in ways that have direct design implications. The sample splits nearly evenly between HE (43.7%) and HVET (38.5%), and within both groups there are at least three qualitatively distinct populations: practitioners with no or minimal TD experience who need conceptual orientation before anything else; mid-level practitioners with some cross-disciplinary exposure who are looking for structured methods and facilitation tools; and a smaller group of experienced practitioners whose needs are predominantly relational and institutional — recognition, peer exchange, advocacy resources — rather than methodological. These populations differ not only in experience level but in what they would find useful and what would feel patronising or redundant.

The interview corpus reinforces the picture by showing how extensively contextual conditions shape what TD education can look like. Respondents consistently adjust pedagogical design to institutional mission, learner maturity, disciplinary formation, and local professional expectations. The implication is less that the course must serve everyone and more that it must be honest about which decisions it is making and why — which learner profile it is primarily designed for, where it can offer genuine differentiation, and where it is making assumptions that WP3 pilot testing will need to check against actual participant experience.

The field has a developed model for TD education with elite master's students and, to a lesser extent, with mid-career professionals in specialised sectors. It does not yet

have an established model for the population TransInnovate is addressing. The relevant design consequence is that precedents from the corpus can inform structural choices — what to do with an integrative assignment, how to design a reflective instrument, how to sequence encounter and consolidation — but the specific calibration for this audience and this format requires original development rather than transfer.

Methodological observations

What the synthesis leaves open

Assessment at the integrative level remains unresolved. All four instruments agree that conventional grading mechanisms capture only a fraction of what transdisciplinary learning produces — and that the dimensions most worth assessing, integration quality, reflexivity, and the quality of collaborative process, are the hardest to evaluate without reducing them to checklists that lose the very quality they are meant to measure. Horn et al. (2024) document empirically that attitudinal transformation in TD settings cannot be reliably engineered by course design: the same experiences produce genuine shifts in some learners while leaving others essentially unchanged. This places a ceiling on what any competency framework can claim in advance and puts significant weight on facilitation quality and the responsiveness of assessment design to what learners actually bring.

The blended format remains without a strong precedent. The Baltic micro-certificate is the closest structural analogue to TransInnovate in the corpus — a hybrid professional development programme, ten months, 10 ECTS, for working practitioners — but its rhythm and its assumption of regular intensive contact may not translate directly to a more distributed international format. The survey's strong preference for in-person, facilitated interaction sits in tension with the project's necessarily significant online component. How to preserve the relational and orchestration qualities that the research consistently identifies as essential to TD pedagogy, in a format that cannot rely on sustained co-location, is a question the evidence base opens without answering.

The specific use-case architecture for AI-app cannot be derived from the research alone. The WP2 instruments establish the context: an audience with generic AI habits, with critical AI literacy expectations shaped by familiarity with AI as a content tool, and with no prior experience of AI as a TD facilitation instrument in an educational setting. What functions within the AI-app will be useful, credible, and adopted — rather than ignored or treated as a novelty — is a design and testing question rather than a research question. The practitioner-led precedents in the

artistic sector, most visibly the C-lab, provide design reference points rather than transferable models.

Analytical observations

The following section draws on analytical observations produced during the WP2 internal peer-review process. They are not part of the formal research record and carry a different kind of weight: they are positions developed by members of the research team in the process of reading across the instruments, and they belong to the design conversation rather than to the evidentiary argument. They are included here to prevent them from being lost in the transition from D2.1 to WP3 rather than because they are findings in the same sense as the six above.

The TAH triad is a structural condition, not a persuasion target

The 87.4% of survey respondents who do not work across the full TAH triad reflect institutional conditions — funding mechanisms, project briefs, departmental boundaries, commission structures — more than they reflect practitioners' beliefs about or rejection of triadic configurations. Their contexts have not required it. So they have not done it.

This matters for how the course frames its task. A course that sets out to demonstrate the value of the TAH triad — to show why three poles produce better outcomes than two — positions itself as an advocate for its own premise. Practitioners who are professionals with established practices will recognise this posture, and a portion will resist it on those grounds. More fundamentally, a learner who accepts the argument will have accepted an argument, not acquired a competency. The position they take away may be indistinguishable from the one they arrived with, but with a better rationale.

The methodologically coherent alternative is to design situations in which the triadic configuration emerges as a consequence of the work rather than as its premise. A problem that bilateral collaboration cannot adequately address — not because the course says so, but because the learner encounters the specific limit of bilateral collaboration while trying to solve it — makes the third pole methodologically necessary rather than institutionally mandated. The learner's conclusion that a third epistemic tradition was needed is then their own conclusion, built from their own experience, and it transfers beyond the specific project in a way that an accepted argument does not.

Concretely: the course should not open by explaining why TAH integration matters. It should open with a problem. The triad should enter as an answer, and the moment of its entry — the moment when the bilateral team encounters what it cannot do —

should be explicit, named, and reflectively processed, so that the structural logic is visible to the learner rather than remaining tacit in the course architecture.

TAH integration as individual hybridity, not collective configuration

A related reframing concerns how the TAH triad is understood as an educational goal. The WP2 synthesis has tended to treat the triad as a configuration to be assembled: three poles, each contributing what its discipline characteristically produces, organised around a shared problem. The risk in this framing is that it reproduces disciplinary typecasting — humanities as ethics-checking and contextual critique, technology as product development, arts as embodied disruption or aesthetic communication — with each pole remaining in its lane and the resulting collaboration reading as interdisciplinary work with TAH branding.

A more demanding reading treats TAH integration as a developmental trajectory for individual practitioners rather than as a collective configuration. An artist who has genuinely engaged with technical reasoning — not as a guest in a technical conversation but as someone who has acquired enough technical formation to work within the technical logic before departing from it — produces technical contributions that differ in substance from those of someone with only technological training. What the artist notices, what they treat as a design constraint, what counts for them as a successful outcome, will differ in ways that are consequential for the shared work. The same applies in every direction across the triad. The practitioner who has partially crossed into another formation is not playing a disciplinary role in a triadic team; they are bringing a hybrid sensibility that changes the epistemic character of their contribution.

If this reading is correct, the course's aim is not to produce well-coordinated TAH teams but to produce individual practitioners whose skills and habits of attention carry the trace of more than one formation. That is a different educational goal, and it implies different pedagogical choices: the relevant design question is not how to structure the interaction between T, A, and H contributors but how to construct experiences in which a practitioner trained primarily in one tradition genuinely enters the working logic of another.

Workshops as encounter and the sequencing problem

The survey's strong preference for facilitated workshops (70.4%) carries a risk of being misread as evidence that workshop-heavy architecture is what the course should aim for. Workshops in taught courses function well as encounter: they produce first contact with an unfamiliar episteme, disorientation of settled assumptions, the experience of productive friction across disciplinary languages.

They work considerably less well as vehicles for the kind of cumulative, structured knowledge that learners can subsequently mobilise in their own practice.

Practitioners who express a preference for workshops are likely registering that workshops are the format in which TD has most often felt alive and consequential to them — which is genuine and important information about where the pedagogical energy sits. It is less directly informative about how a taught course should be structured. Research workshops, in which participants are co-producers of new knowledge, function for different reasons and with different dynamics than teaching workshops, in which participants are acquiring frameworks they do not yet possess. The success of workshop-format TD residencies and innovation labs in the course corpus reflects the research-workshop logic, and that success does not automatically transfer to taught contexts.

The sequencing implication for WP3 is that workshop episodes should be positioned where they work — as encounters that open up a problem, make an unfamiliar epistemic position tangible, or generate the kind of experiential material that subsequent reflection can work with — rather than as the primary vehicle for knowledge acquisition and skill development. Reading, structured reflective writing, and iterative applied work carry the consolidation function that workshops cannot reliably perform.

Co-working with AI: a distinction the TD literature does not make

The TD literature uses "co-creation" to describe collaborative knowledge production across disciplinary and social boundaries, and the term carries specific assumptions: participants have genuine stakes in the outcome, their knowledge positions are irreducibly different, and the process of working together produces something neither could have produced alone. These assumptions shape what the literature knows about what makes TD collaboration productive — psychological safety, structured facilitation, shared ownership, the management of power asymmetries.

Co-working with an AI interlocutor has a different structure. An AI system does not have a stake in the outcome in any sense that creates accountability, cannot be genuinely surprised by what another knowledge position reveals, and does not carry the vulnerability of having its claims challenged across epistemic cultures. It can simulate the form of co-creation — generating multiple framings, surfacing connections, producing alternative drafts — without instantiating the relational and normative substance that makes TD co-creation epistemically significant. This does not make AI collaboration useless; it makes it a different kind of thing, with different possibilities and different limits.

For AI-app, the distinction matters at the level of how the application positions its own function and how the course prepares learners to work with it. The risk is that

learners transfer the social norms of human TD collaboration — mutual accountability, respect for the specificity of the other's knowledge position, willingness to be changed by the encounter — to their interaction with an AI tool that cannot reciprocate these norms. The course should be explicit about what working with AI offers and what it does not offer, and should design the moments of AI use in ways that keep the distinction legible rather than obscuring it.

What the corpus does not reach: a note on evidential scope

Across all three WP2 instruments that sample from the field — the literature review, the interview corpus, and the course analysis — institutional voices predominate. Consortium reports from STARTS, S+T+ARTS4WaterII, ENHANCE, and the ITD Alliance constitute a significant share of the literature; the interview sample is weighted toward experienced practitioners in formal HE and HVET settings; and the course analysis necessarily draws on programmes with published documentation. Independent practitioners, cultural organisations, and non-formal pedagogical contexts are structurally underrepresented, not because they are less significant to the field but because they produce less documentable evidence.

Two specific blind spots follow from this. The claim that no consolidated TAH-specific methodology yet exists rests on a corpus that does not engage the academic artistic research tradition — Borgdorff's account of the conflict between artistic and scientific knowledge, the Society for Artistic Research, the methodological work published in the Journal of Artistic Research — which constitutes a substantial body of work at precisely the arts-scholarship-technology intersection the project is addressing. And the finding about AI facilitation in formal educational settings, while accurate, should not be read as a statement about the field as a whole: the C-lab and comparable practitioner experiments in cultural contexts suggest that the non-formal sector is working on questions that the formal sector has not yet begun to address institutionally.

These are not corrections to the WP2 findings; they are scope qualifications. The findings describe the contexts that the instruments could reach. WP3 should hold them as entry points for design rather than as settled characterisations of what the field contains.

Design Prompts for WP3 Course Development

The following prompts are drawn from the consolidated design prompt document produced by the WP2 research team. They are grouped by theme rather than by analytical dimension, to reflect the cross-cutting logic of the synthesis. They are offered as questions worth holding during the course development process, not as specifications.

How to read this document

Prompts are grouped by the six analytical dimensions of D2.1 and within each dimension by their triangulation status. Each prompt is labelled with the research source(s) from which it originates. Prompts confirmed across multiple sources are listed first; single-source insights and tensions follow.

[Literature Review] - source tag appears before each prompt
[Survey Analysis] - source tag appears before each prompt
[Interview Analysis] - source tag appears before each prompt
[Best Practices] - source tag appears before each prompt

Dimension 1 — Competencies and Assessment

Converging across sources

- [Literature Review] [Interview Analysis] Which competencies in WP3 should be treated as explicit course outcomes, and which as enabling conditions of collaborative work rather than assessable targets?

- [Literature Review] [Interview Analysis] [Best Practices] How can assessment capture integration quality, reflexivity, and respectful disagreement without flattening them into superficial checklists or scores? A lightweight reflective journal is the single most portable assessment mechanism: cheap, scalable, and compatible with asynchronous delivery.

- [Literature Review] [Interview Analysis] Which TAH-relevant competencies are missing from generic TD taxonomies — especially around value articulation, interpretation, aesthetic judgement, and ethical framing — and how should the TransInnovate competency framework account for them?

- [Best Practices] A compound competency backbone — Wissen–Fähigkeiten–Haltungen–Handlungen or Systems–Target–Transformation — would give TransInnovate a defensible architecture and differentiate it from knowledge-only CPD offers. Naming ambiguity as a learning outcome in its own right is a distinctive marker of transdisciplinary-aware design.

Single-source insights

- [Interview Analysis] Which elements of the course should be explicitly designed to develop dispositional capacities — openness, tolerance of ambiguity, epistemic humility — rather than only to assess them? Which practices from embodied, contemplative, or artistic-research pedagogies are transferable to the TransInnovate course format and compatible with its institutional contexts?

- [Interview Analysis] At what points in WP3 should learners produce evidence not only of what they know, but of how they learned across differences?

- [Interview Analysis] Should IP management for collaborative projects and capacity to facilitate future-scenario thinking be treated as standalone competency areas in the framework, or embedded within existing categories — and what does each choice imply for course design?

- [Survey Analysis] How can the course offer procedural scaffolds that are designed to be exceeded — so that learners encounter the limits of procedure as part of acquiring TD competence, rather than as a frustration with the course?

- [Survey Analysis] Should micro credential standards adopt a tiered proficiency structure allowing entry at the participation level where most respondents currently are, rather than assuming readiness for TD leadership?

- [Survey Analysis] Where in the course sequence should knowledge integration shift from a procedural step to an epistemic challenge — the point where learners must negotiate across differences rather than apply a method?

Dimension 2 — Pedagogy and Didactics

Converging across sources

- [Literature Review] [Interview Analysis] Which elements of WP3 need strong scaffolding, and where should the course deliberately preserve ambiguity and exploratory space?

- [Literature Review] [Interview Analysis] [Best Practices] How can we implement challenge-based, interactive pedagogical formats alongside easily accessible online content for WP3? Precedents exist at ETHZ (Christian Pohl), University of Auckland, and Aix-en-Provence, where programmes begin from the first year with real-world case studies involving external stakeholders and intensive group coaching.

- [Literature Review] [Interview Analysis] What kinds of boundary objects will help participants work across TAH vocabularies without prematurely flattening difference?

- [Literature Review] [Interview Analysis] Which pedagogical tasks require human facilitation, and which could be reliably supported by the AI-app?

- [Literature Review] [Interview Analysis] How will intermediary roles — facilitation, mentoring, brokerage — be made visible in the course architecture rather than treated as invisible background work?

- [Best Practices] Model team-teaching in the course's own delivery: ideally with facilitators from T, A, and H domains of the consortium — making visible the disciplinary translation work the course asks learners to perform.

Single-source insights

- [Literature Review] How will facilitation in WP3 calibrate the learning edge — ensuring learners are sufficiently challenged to venture across disciplinary boundaries, without being so exposed that they shut down?

- [Best Practices] Compress the integrative engine and reflective instrument pairing into the course's internal rhythm. In-person or synchronous sessions are the natural home for the integrative task; asynchronous components can carry the reflective journal. This is the smallest form of the pattern that still preserves its pedagogical function.

- [Best Practices] Keep the framework menu plural: present a compact menu — research-creation, three-knowledge, tri-lectic, service-learning — as lenses participants can choose from depending on their teaching context. This matches the heterogeneity expected in a blended course audience and reflects the corpus's own pluralism.

- [Best Practices] Treat the lack of strong blended TD models as a design opportunity: the course should be positioned as instantiating a format the evidence already points toward — not filling a void, but building what the field has not yet formalised.

Dimension 3 — TAH Integration

Converging across sources

- [Survey Analysis] [Interview Analysis] [Best Practices] Which early WP3 activities should help participants discover what each disciplinary and professional position can contribute to a shared problem — and which problem structures make the TAH configuration genuinely necessary, rather than asserting its value in advance? The goal is emergence, not persuasion: the triadic configuration should arise from the work as the learner's own conclusion.

- [Literature Review] [Interview Analysis] [Best Practices] Which assignments will require arts and humanities to act as knowledge-producing forces in their own right, not merely as context, ethics, or communication support?

- [Literature Review] [Interview Analysis] [Best Practices] Integrate humanities upstream, not as a protected corner: design problems where normative, interpretive, or value-based questions arise as methodologically necessary — so that H enters the integrative engine at the point where the problem itself demands it, not because the course structure mandates it.

- [Literature Review] [Interview Analysis] How will the course distinguish between productive epistemic friction and simple misunderstanding across T, A, and H?
- [Literature Review] [Interview Analysis] What should count as legitimate evidence in a TAH task: prototype, interpretation, narrative, critique, model, scenario, or some deliberate combination?

Single-source insights

- [Literature Review] Which assignments could make visible the movement between systems, target, and transformation knowledge?
- [Best Practices] Organise the course around a shared object: for educators, the natural shared object is a small teaching unit, cross-disciplinary lesson plan, or pilot intervention they design during the course. A final showcase — published on the One-Stop-Shop — turns the course's integrative work into a public-facing artefact.
- [Best Practices] Credit integrative work explicitly in the micro-credential: allocate specific weight to integrative outputs, not only to T-, A-, and H-specific content. Uncredited integration does not happen reliably.

Dimension 4 — AI Applications

Converging across sources

- [Literature Review] [Interview Analysis] [Best Practices] Which AI-app use cases should foreground translation, traceable synthesis, and process support — and which functions should be explicitly prevented from acting as authority or smoothing perspectives into false agreement?
- [Literature Review] [Interview Analysis] How will the application expose source provenance, uncertainty, and human review in ways learners can understand?
- [Literature Review] [Interview Analysis] How should the course help learners notice and reflect on what sustained AI use does to them — to their cognition, authorship, aesthetic sensibility, and the experience of being the producer of work?
- [Survey Analysis] [Interview Analysis] [Best Practices] AI-app enters a context where learners' default AI habits are generic and productivity-oriented. Which moments in the course should prevent TD-specific AI functions from being assimilated to existing habits — and how does the course build the critical vocabulary learners need to recognise when AI is shaping their collaborative judgement rather than supporting it?
- [Best Practices] Anticipate the critical-literacy expectations of the audience: any AI-facilitated component must accommodate the critical-AI literacy tradition visible in the corpus — transparency about model limitations, generalisation bias, and the non-substitutability of human judgement for value negotiation.

Single-source insights

- [Interview Analysis] Where do AI's specific capacities — surfacing tacit assumptions, exposing disciplinary blind spots, generating multiple framings for interrogation — map most directly onto TD pedagogical needs? Which moments should use AI generatively as a friction-maker across disciplinary languages, rather than only as a synthesis or process-support tool?

- [Survey Analysis] The preference data for AI-supported formats (31.1%) reflect current exposure rather than stable disposition. How can the course expand learners' imagination of what AI can do in TD work, treating the preference baseline as a starting point to be moved rather than a design brief to be followed?

- [Interview Analysis] How should TransInnovate stage AI literacy so that beginners receive accessible entry points while more advanced users can explore stronger forms of knowledge infrastructure?

- [Best Practices] What existing practitioner-led methodologies for AI-as-facilitator can WP3 learn from and translate into a formal curricular setting — treating the AI-app as building on an emerging practice rather than inventing the category?

- [Literature Review] What forms of embodied practice could be introduced into WP3 to ground the bodily, attentional, and affective effects of co-working with AI — and where in the learning sequence are they most needed?

- [Literature Review] Which moments in the course should be deliberately designed AI-free, so that learners can calibrate their own perception, sensibility, and discernment against AI-mediated work?

Dimension 5 — Barriers and Drivers

Converging across sources

- [Literature Review] [Interview Analysis] Which barriers should WP3 treat as external assumptions about the institutional landscape, and which should the course design actively mitigate?

- [Literature Review] [Interview Analysis] [Best Practices] Should WP3 integrate a module on institutional factors addressing institutional leaders and coordinators directly — not only equipping educators with advocacy language, but developing TD competence in those who hold structural power over whether TD education is possible?

- [Survey Analysis] [Interview Analysis] [Best Practices] What workload model is realistic for TD facilitation, co-teaching, and stakeholder engagement — and should our methodology make this concrete for institutional leaders so they can see what enabling TD teaching actually costs in time and resources?

- [Literature Review] [Interview Analysis] Which collaborative tasks could the AI-app realistically lighten, and which are too relationally sensitive to automate?

Single-source insights

- [Survey Analysis] Which competencies of institutional change-making — building allies among sceptical colleagues, sequencing advocacy, leveraging student demand — belong in the course? How does the course prepare educators to participate in changing institutional architecture, not only to work within it?

- [Survey Analysis] Should the course and AI-app be designed to produce a community of practice among graduates — sustained connection and peer support — rather than only delivering content into isolated sites? Otherwise the course risks adding educators to a field whose structural problem is precisely that no such relational fabric exists.

- [Literature Review] How will the project recognise and distribute the labour of coordination, reflection, and translation — which is currently rendered invisible and uncompensated in most TD programmes?

- [Interview Analysis] How should the course help participants explicitly negotiate temporal workflow differences between disciplines — for instance, between design's short iterative cycles and science's long research timelines — as a structural precondition of effective collaboration rather than a problem to solve mid-process?

- [Interview Analysis] Which organisational supports should be visible for institutional leaders: time, staffing, reward recognition, cross-faculty coordination, or all of these together?

- [Best Practices] Build durability into the design from the beginning: the micro-credential standard and the One-Stop-Shop should be framed as continuity mechanisms — not only as dissemination outputs — and the course should explicitly prepare participants to use them after the project ends.

- [Best Practices] Design assessment to anticipate the unfair-grading problem: peer review calibrated across disciplinary backgrounds risks remaining multi-disciplinary — multiplying disciplinary critiques — rather than transdisciplinary. Specify how reviewers are guided to evaluate integrative quality and process, not only disciplinary correctness.

Dimension 6 — Context and Target Group

Converging across sources

- [Literature Review] [Interview Analysis] Which learner profiles are primary in WP3 — HE students, HVET learners, mixed cohorts, educators, or facilitators — and which actors should shape the course from the outset rather than remain peripheral?

- [Literature Review] [Interview Analysis] What needs to differ between HE and HVET delivery beyond difficulty level — pace, task format, stakeholder role, assessment logic, or digital support?

- [Literature Review] [Interview Analysis] How will TransInnovate avoid imposing a single TD vocabulary across partner contexts that already use different traditions and institutional languages?

Single-source insights

- [Interview Analysis] Should WP3 adopt a shared core with differentiated pathways — and if so, should branching happen by experience level, sector, disciplinary background, or institutional role?

- [Literature Review] How will WP3 structure the involvement of practitioners — from public administration, industry, or civil society — not as guest contributors but as co-participants in the TD learning process? What roles, moments, and accountability structures make their knowledge contribution legible and reciprocal?

- [Best Practices] Treat the corpus of existing programmes as a source of structural ideas rather than direct templates: because no case targets the same audience or operates in the same institutional context, transferability must be assessed case by case.

Tension — requires design team discussion

- [Best Practices] Dominance versus balance: rather than treating TAH balance as the default ambition, the course should build in structured reflection on participants' primary disciplinary lens — making their dominant perspective legible and pedagogically workable rather than masking it behind a nominal commitment to the full triad. In many institutional contexts a genuinely balanced triad is not feasible; knowing that clearly is more useful than a nominal commitment to one.

Appendix A: Survey Instrument — Full Question List

The table below provides a complete reference list of all questions included in the TransInnovate quantitative survey (KoboToolbox, EN/SI/LT versions, December 2025 – March 2026). The survey comprised 32 primary questions across six thematic sections, with additional conditional sub-questions (marked 'a') triggered by selection of the 'Other' response option or by skip logic. Question type and conditionality are indicated for each item.

Total: 32 primary questions | 6 sections | 3 language versions (English, Slovenian, Lithuanian) | Approx. 20 minutes completion time

Q	Question	Type	Conditional
Section 1: Demographic and Professional Information			
Q1	What is your primary role in research and education?	Single select	
Q2	What is your institutional context?	Multi-select	
Q3	What is your gender?	Single select	
Q4	What is your age category?	Single select	
Q5	What is your highest achieved education level?	Single select	
Q6	In which country are you currently based?	Single select	
Q7	What is your main area of specialisation (ISCED-F 2013)?	Single select	
Section 2: Inter- and Transdisciplinarity			
Q8	What is your experience with inter- or transdisciplinarity?	Single select	
Q9	Which of the following fields do you currently combine in your teaching, research, or work?	Multi-select	
Q10	Does your institution currently offer formal courses or training programs specifically focused on transdisciplinary/interdisciplinary approaches?	Single select	
Q11	Please specify the type of institutionally offered course/training (e.g., specific subject, workshop series, etc.).	*Open-ended*	*If Q10 = Yes*
Q12	What is the main aim of transdisciplinary/interdisciplinary courses/trainings available at your institution?	Single select	*If Q10 = Yes*
Q13	What teaching/training formats are most frequently used in your institution when transdisciplinary/interdisciplinary content is conveyed?	Multi-select	*If Q10 = Yes*
Section 3: Characterising TD/ID Teaching and Training			

Q	Question	Type	Conditional
Q14	Which of the following key competencies do you see as important for students to address complex challenges and questions?	Multi-select	
Q15	Are you currently involved in teaching courses/trainings on transdisciplinary/interdisciplinary approaches?	Single select	
Q16	What is the main aim of transdisciplinary/interdisciplinary courses/trainings you are involved in?	Single select	*If Q15 = Yes*
Q17	What teaching/training formats do you most frequently use when teaching transdisciplinary/interdisciplinary content?	Multi-select	*If Q15 = Yes*
Q18	What delivery formats do you use for these courses/trainings?	Multi-select	*If Q15 = Yes*
Q19	How important is it for you to receive further training or professional development in effective transdisciplinary/interdisciplinary teaching/research methods?	Likert scale	
Q20	What is your interest in continued education offers for transdisciplinary/interdisciplinary approaches?	Multi-select	
Q21	What specific types of skills or methodologies are missing in your current capacity to effectively teach/facilitate TAH/Transdisciplinary cooperation?	*Open-ended*	
Section 4: Benefits and Challenges			
Q22	How do you perceive the importance for students to receive teaching/training in transdisciplinary/interdisciplinary approaches?	Likert scale	
Q23	What do you perceive as the main benefits for students receiving transdisciplinary/interdisciplinary capacity building?	Multi-select	
Q24	What do you see as the main challenges in teaching/training transdisciplinary/interdisciplinary approaches?	Multi-select	
Q25	What are the key barriers or challenges you face when attempting to implement transdisciplinary/interdisciplinary approaches in your institution?	Multi-select	
Section 5: Resources and Needs			
Q26	Are you aware of existing methodologies, frameworks, or resources for teaching Transdisciplinary or TAH competencies?	Single select	
Q27	How are you dealing with AI in teaching and training for transdisciplinary/interdisciplinary approaches?	Multi-select	

Q	Question	Type	Conditional
Q28	If new training resources were developed for TAH transdisciplinary cooperation, which format would you find most useful?	Multi-select	
Q29	Do you have any specific needs regarding transdisciplinarity capacity building for TAH (Technology, Arts, Humanities)?	*Open-ended*	
Q30	How would you briefly characterise transdisciplinarity?	*Open-ended*	
Section 6: Follow-up and Consent			
Q31	Would you be interested in being contacted for a detailed expert interview regarding your experiences with transdisciplinary/TAH education?	Single select	
Q32	Would you like to receive updates and news about the TransINNOVATE project and its results?	Single select	

Note: All 'Other (Please specify)' sub-questions (Q1a, Q2a, Q5a, Q6a, Q7a, Q8a, Q9a, Q12a, Q13a, Q14a, Q16a, Q17a, Q23a, Q24a, Q25a, Q27a, Q28a) are not listed separately above. They are triggered automatically when the respondent selects the 'Other' option in the parent question and ask for open-ended specification.

Appendix B - Best Practices Desk Research Protocols

Compact case cards — 17 transdisciplinary programmes

Each card presents the case identification block, a six-field analytical summary, and the key transferable lessons for TransInnovate course design. Full desk research protocols are available in the Work Package 2 (WP2) working files.

Abbreviations used throughout this document

Abbreviation	Full form
TAH	Technology–Arts–Humanities
TD	Transdisciplinary / transdisciplinarity
HE	Higher education
ECTS	European Credit Transfer and Accumulation System
AI	Artificial Intelligence
PBL	Problem-Based Learning
CPD	Continuing Professional Development
NGO	Non-Governmental Organisation
GenAI	Generative AI

Case 01 ArTeC Master's degree — Master Recherche-Création (Paris 8 / Paris Nanterre / EUR ArTeC, France)

Institution	EUR ArTeC — co-accredited by Université Paris 8 and Paris Nanterre, France
Type	MA (Master of Arts)
Duration / ECTS	2 years · 120 ECTS
Delivery	On-site (Paris region) · Semester rhythm · Compulsory semester abroad (S3)
Target audience	HE master-level · Humanities, Arts, or Computer Science background
Launched	2018 · Funded until 2028
TD classification	Trans— · Research-creation transdisciplinarity: intentional blurring of academic inquiry and artistic practice to generate new knowledge
TAH triad	T: digital technology, computer science, technologies of human mediation · A: dominant lens — consortium includes 4 national art schools · H: 20+ affiliated labs (philosophy, aesthetics, social sciences)
Pedagogy	IEM (Innovative Educational Module) · 30–50 unique workshops annually · Project-based, group dynamics · Team-teaching standard (2–4 instructors per module) · High student agency: personalised trajectory à la carte
Competencies & assessment	Personal project of experimentation in the final year (M2) — form-free output (film, performance, device); public exhibition at partner cultural venues (Centre Pompidou, Gaîté Lyrique)
AI as didactic tool	Not evident — AI appears as content (modules on algorithms, immersive AI); no evidence of AI facilitating the transdisciplinary process
Transferable lessons	"Living Catalogue" model — annual open call for modules is more sustainable than a fixed curriculum · Team-teaching as standard: proof that cross-institutional co-teaching can be institutionalised · Public exhibition as assessment: moving grading into cultural venues increases stakes and validity · Project-gated entry: individual project proposal anchors the whole learning journey

Case 02 Cross-Disciplinary Strategies — Applied Studies in Art, Science, Philosophy, and Global Challenges (Vienna)

Institution	University of Applied Arts Vienna (Die Angewandte) · Austria
Type	MA (+ corresponding BA)
Duration / ECTS	2 years · 120 ECTS
Delivery	On-site (Vienna) · Semester rhythm
Target audience	HE master-level · Humanities, Sciences, or Arts graduates
Launched	BA 2017 · MA 2021
TD classification	Trans— · Artistic strategies as common language to integrate Science, Technology, Engineering and Mathematics (STEM), socio-economics, and humanities to address Global Challenges
TAH triad	T: Critical AI Literacy, Machine Learning, Creative Coding, Robotics · A: artistic strategies as lingua franca — performative and visual methods applied to non-artistic problems · H: Philosophy, Economics, Politics, Transcultural Studies
Pedagogy	Cross-Disciplinary Capabilities Lab (CDC Lab, 10 ECTS/semester) — practice-related collaborative workshop environment · Problem-Based Learning (PBL) focused on Global Challenges · Team-teaching explicit in curriculum · Study Journal (1 ECTS): mentored reflection including documentation of failed projects
Competencies & assessment	Project work (CDC Labs) + Study Journal + cross-disciplinary Masters thesis + interdisciplinary committee examination
AI as didactic tool	AI as content, not as didactic tool — high density of AI content (Critical AI Literacy, AI and Democracy); used as subject of study, not as facilitator of TD process
Transferable lessons	CDC Lab as integrative engine: high-ECTS, every-semester format ensures TD is a core practice, not an elective · Study Journal (including failure documentation): tracks boundary-crossing process, not just outputs · Art as lingua franca: artistic strategies as neutral communicative bridge between technical and humanistic vocabularies · Thesis supervision triads (2–3 instructors from different fields): institutionalises TD at assessment level

Case 03 MA in Transdisciplinary Studies in the Arts — ZHdK (Zurich University of the Arts)

Institution	Zurich University of the Arts (ZHdK) · Switzerland · Collaborations with ETH Zurich
Type	MA Major · 90 ECTS (usually part of 120 ECTS programme)
Duration / ECTS	3–4 semesters · 90 ECTS major
Delivery	On-site (Zurich, Toni-Areal) · 24/7 access to dedicated student studio
Target audience	HE master-level · Creative disciplines or Science/Economics with artistic/creative methods
Launched	Long-standing programme · Current regulations Dec 2023
TD classification	Trans— · TD as "negotiation of paradigms" and attitude of curiosity; three figures: mediators/hybrids, other publics, forms of knowledge
TAH triad	T: Institute for Computer Music (ICST) and ETH Zurich links · A: core lens — artistic strategies as methodology for questioning disciplinary divisions · H: Discourse module (history, aesthetics, cultural analysis)
Pedagogy	Project-centred (45 ECTS = 50% of major) · Studio (generating work) vs Discourse (theoretical reflection) · Mentorship-based: students choose own mentors across departmental lines · Extreme student agency: independent project development throughout
Competencies & assessment	MA Thesis (60%) + Context & Public presentation in student-chosen format — exhibition, publication, performance (20%) + Colloquium with external experts (20%)
AI as didactic tool	Not evident — AI appears in artistic research electives as content; no evidence of AI facilitating the transdisciplinary process
Transferable lessons	"24/7 Studio" concept: permanent shared workspace as meeting point for heterogeneous groups — implies need for always-on digital equivalent · "Prefix Trans-" figures: working in-between as pedagogical framework — TD is about shifting contexts, not adding knowledge · External expert in final defence: real-world/cross-sectoral validity built into assessment · Public presentation weighted at 20%: stakeholder communication treated as a core academic requirement

Case 04 Master ArtScience — ArtScience Interfaculty (Royal Conservatoire & Royal Academy of Art, The Hague)

Institution	ArtScience Interfaculty — Royal Conservatoire & Royal Academy of Art · Netherlands
Type	MA (Music or Arts) · 2 years · 120 ECTS
Duration / ECTS	2 years · 120 ECTS
Delivery	On-site (The Hague) · Full-time
Target audience	HE master-level
Launched	1989/1990
TD classification	Trans— · Operative logic: "problems of contemporary society transcend disciplinary structures" · Professional Integration pillar moves research into the lifeworld (societal engagement as graded requirement)
TAH triad	T: Sonology, electronic instruments, digital world-building (Unity3D) · A: core framework — art as research tool · H: Educational Philosophy, reflection on societal role, cultural memory
Pedagogy	Individual project-based learning + coaching · Student-selected coach from diverse expert pool · Students enter with self-designed Master Project Plan · Four pillars: Artistic identity, Practice development, Interaction, Transforming the institution
Competencies & assessment	Master Project integrating academic research (H/S) + artistic development (A) + Professional Integration — mandatory connection to external/non-academic stakeholder
AI as didactic tool	AI as content only — forefront of AI in art (Institute of Sonology); no evidence of AI facilitating the TD learning process
Transferable lessons	Mandatory Professional Integration pillar: every TD module needs a required external contact or societal application phase · Student-selected expert coaching: menu of T/A/H specialists learners can access for their specific project · "District Practitioner" model: training educators as ambassadors who apply TAH knowledge in local communities · Collective Master Project: TD assessment on group basis — essential model for collaborative innovation

Case 05 Media Arts Cultures (MediaAC) — Erasmus Mundus Joint Master Degree

Institution	Consortium: Krems (AT), Aalborg (DK), Łódź (PL), LASALLE Singapore · Erasmus Mundus
Type	Erasmus Mundus Joint MA · 2 years · 120 ECTS
Duration / ECTS	2 years · 120 ECTS
Delivery	On-site / Mobility — students rotate through ≥3 partners · Mandatory internships and Media Arts Cultures Labs
Target audience	HE master-level · Future researchers and practitioners in creative/cultural sectors
Launched	2014 · Curriculum 3.0 approved 2024–2030
TD classification	Trans— · Mandatory Immersive Professional Experience (internships + Labs hosted by museums, creative industries, Non-Governmental Organisations / NGOs) · Produces industry-ready reflective practitioners
TAH triad	T: digital archiving, technologies of experience design, electronic media · A: media arts, curating, games, artistic processes · H: Media Art Histories, cultural heritage, theories of digital culture
Pedagogy	Problem-Based Learning (PBL, Aalborg model) + Project Group Work · Spiral curriculum: returns to core elements with increasing complexity across cultural contexts · Team-taught, multi-institutional · Internship Report as formal assessment
Competencies & assessment	MA Thesis + oral defence (30 ECTS) + PBL group projects + Internship report
AI as didactic tool	Not evident — digital culture and technologies covered as content; no evidence of AI facilitating the learning or collaboration process
Transferable lessons	Spiral curriculum logic: re-engaging with TAH concepts at increasing levels — strong Continuing Professional Development (CPD) model · PBL for mixed backgrounds (Aalborg model): proven methodology for bridging Art vs. Tech students · Intensive Labs (6 ECTS) hosted by external stakeholders: scalable model for pilot modules · International mobility as lens: rotating host institution introduces diverse institutional cultures of TD

Case 06 International Design Business Management (IDBM) — Aalto University, Finland

Institution	Aalto University — jointly: School of Business, School of Arts, Design & Architecture, School of Engineering · Finland
Type	MA / MSc · 2 years · 120 ECTS
Duration / ECTS	2 years · 120 ECTS · Includes 8-month industry project
Delivery	On-site (Espoo/Helsinki)
Target audience	HE master-level from business, design, or engineering backgrounds
Launched	1995 · 30+ years running · 200+ industry partners
TD classification	Trans— · Mandatory integration of industry partners and real-world "wicked" problems · Industry Brief is the central curricular anchor
TAH triad	T: School of Engineering — prototyping, technical implementation, system architecture · A: School of Arts, Design & Architecture — Design Thinking as primary methodology · H/Business: School of Business — global strategy, ethics, organisational behaviour
Pedagogy	Industry Project (30 ECTS, 8 months) — live brief from partner company · Four-way ecosystem: Students + Faculty + Partners + Industry Experts · Professors as facilitators/mentors · Client-facing assessment includes partner formal evaluation
Competencies & assessment	Prototypes + business concepts + process reflection + client feedback from industry partner
AI as didactic tool	AI as content primarily; didactic use emerging — AI for business transformation in modules; experiments with AI for team scaffolding not yet formally documented
Transferable lessons	"Industry Brief" as anchor: live brief from a local small or medium-sized enterprise (SME) or NGO forces immediate TD negotiation · Inter-school institutionalisation: formal agreement between three schools is prerequisite — administrative framework required · 8-month rhythm: TD cannot be rushed — long duration allows team storming/norming to reach performing · Client-facing assessment: external partner voice in final grade makes assessment boundary-crossing by default

Case 07 Design Informatics (MA/MSc) — University of Edinburgh (Edinburgh College of Art & School of Informatics)

Institution	University of Edinburgh — jointly: Edinburgh College of Art and School of Informatics · UK
Type	MA (12 months full-time) · 180 Scottish Credit and Qualifications Framework (SCQF) credits (≈ 90 ECTS)
Duration / ECTS	1 year · 90 ECTS equivalent
Delivery	On-site · Includes Festival of Creative Learning (1-week curriculum suspension)
Target audience	HE master-level · Mixed: design or programming backgrounds
Launched	Active (mentions 2025 graduates)
TD classification	Trans— · "Tri-lectic" methodology: Cultural context + Technical parameters + Commercial/Industrial application · Live projects with external partners (charities, public sector)
TAH triad	T: Data science, Internet of Things (IoT), machine learning (ML), physical computing, blockchain · A: Design Thinking, speculative design, making/hacking as research · H: Data ethics, ethnographic methodologies, socio-cultural user experience (UX)
Pedagogy	Studio-based / Hacking · Flipped classroom · Tandem/team-taught across two Schools · Research through Design (RtD) + Agile Hacking · Festival of Creative Learning: 1 week, normal teaching suspended
Competencies & assessment	Public exhibitions (each semester) + team-based assessment by multiple staff + prototypes/networked artifacts
AI as didactic tool	AI as content, not as didactic tool — ML and Natural Language Processing (NLP) as subjects/tools for building products; no evidence of AI facilitating TD dialogue
Transferable lessons	"Tri-lectic" framework: simple tool ensuring every module covers Culture (H), Tech (T), and Industry (TD signal) · Festival of Creative Learning: curriculum suspension for intensive TD exploration — no credit competition · Team-based assessment scrutiny: cross-programme committee validates interdisciplinary marks, preventing disciplinary bias in grading · Public exhibition as semester deadline: curation for public audience is a recurring, not just final-year, requirement

Case 08 Digital Humanities MA — Technische Universität (TU) Dresden, Germany

Institution	Technische Universität (TU) Dresden · Partners: Sächsische Landesbibliothek – Staats- und Universitätsbibliothek Dresden (SLUB), Staatliche Kunstsammlungen Dresden, Sorbian Institute · Germany
Type	MA (Postgraduate) · 2 years · 120 ECTS
Duration / ECTS	2 years · 120 ECTS · Mandatory Practical Semester (S3)
Delivery	On-site (Dresden) · Semester rhythm
Target audience	HE master-level · First degree in humanities/social sciences + digital methods knowledge
Launched	Active · Valid until at least May 2026
TD classification	Trans— · TD via mandatory Practical Semester: students work in non-academic settings (museums, libraries, archives) applying digital research to public heritage
TAH triad	T: Applied computer science, machine-readable corpora, digital modelling, indexing · A: Art & Visual Studies specialisation — architecture, visual arts, digital knowledge transfer in museums · H: Primary host — history, linguistics, literature, social sciences, ethics
Pedagogy	Practical Semester + Project Development (10 hrs/week internship, S3) · Four specialisation tracks · Collaborative: comprehensive advice with partner institutions · Aptitude assessment gates entry
Competencies & assessment	Internship Portfolio (100 hrs, module examination) + MA Thesis + Colloquium
AI as didactic tool	Not evident — digital modelling and applied computing covered as content; no evidence of AI facilitating TD process
Transferable lessons	"Portfolio" for practice: 100-hour module assessing external internships — structured reflection on real-world TD experience · External institutional anchoring: formally naming specific local partners as Practical Semester hosts ensures sustainability · Public knowledge transfer as graded outcome: forces learner to think about non-academic audience for TAH projects · Multi-sector tracks (School & Education vs. Art & Visual Studies): TD model adapted to different professional sectors within one programme

Case 09 BASc (Hons) in Arts and Technology — Hong Kong Baptist University (HKBU)

Institution	Hong Kong Baptist University (HKBU) · Hong Kong SAR
Type	Bachelor of Arts and Science (Honours) · 4 years · 128 units
Duration / ECTS	4 years · 128 units
Delivery	On-site with regional mobility (Greater Bay Area and overseas)
Target audience	HE undergraduate · Open to all academic backgrounds
Launched	Active (part of HKBU Transdisciplinary Hubs initiative, c.2022)
TD classification	Trans— · Transdisciplinary Common Core focused on Global Challenges · Mandatory Arts Tech Work Experience with industry partners
TAH triad	T: Computing for Creatives I & II, Interaction and Participation, Technology Concentration · A: core lens — Arts Tech Practices, Making Senses, Transmedia · H: Global Challenges I & II + University Core Courses
Pedagogy	Experiential learning + industry collaboration (years 3–4: constant problem-solving on industry projects) · PBL and Reflective Practice · Expert tandems (renowned professors + industry practitioners) · Three concentrations (Visual, Sound, Technology) + 15 free elective units
Competencies & assessment	Portfolio-driven (primary cumulative evidence) + project-based (industry-led) + Honours Project (10 units)
AI as didactic tool	Not evident — Computing for Creatives and Interaction covered; AI likely as content within Technology Concentration
Transferable lessons	"Global Challenges" core as prerequisite: shared normative anchor ensures unified TD mindset before specialist modules · Heavy credit weight for collaboration (12 units): signals institutional value of process over product · Arts Tech Work Experience (3 units) as formal requirement: bridges HE and labour market · Portfolio as evidence of TD: captures soft skills (negotiation, synthesis) that exams cannot

Case 10 Media Arts and Technology (MAT) — UC Santa Barbara, USA

Institution	University of California, Santa Barbara (UCSB) — College of Engineering + College of Letters and Science · USA
Type	Master of Science (MS) and PhD · MS: 48 units (≈ 90 ECTS)
Duration / ECTS	MS: 2 years · PhD: 4–5 years
Delivery	On-site (Santa Barbara) · Access to AlloSphere (3-storey immersive research environment)
Target audience	HE graduate and doctoral · Engineering, music, or visual arts backgrounds
Launched	1999
TD classification	Trans— · "Transvergence" — modalities of art, sensing, and fabrication fused into implemented works · Internship in Industry + doctoral research addressing problems the field has yet to recognise
TAH triad	T: Multimedia engineering, Computer Science (CS), robotics, signal processing, computational fabrication · A: Electronic music, sound design, spatial arts, Digital Audio Montage · H: Aesthetics, history of technology, MAT Seminar Series (media theory, philosophy, critique)
Pedagogy	Lab-based research + Studio composition · "Demo or Die" / "Deploy" (Research-Creation) · Faculty Committee (3 members crossing departments) guides each student · High student agency in research direction
Competencies & assessment	MS Plan 2 — digital media work + 30-page paper + public presentation · PhD: Qualifying Exam (60-day) + Dissertation
AI as didactic tool	AI as content only — ML and Agent Systems as key subjects; AI as didactic tool not documented
Transferable lessons	"Transmodal Continuum": data as medium — coding and sculpting as essentially the same transdisciplinary activity · Cross-departmental oversight: committee must include faculty from different original disciplines · "Pre-presentation" requirement (2 weeks before final): creates feedback loop vital for TD projects · Aesthetics as first-year foundation alongside Technology and History: not a layer, a requirement

Case 11 Partnering for Change: Link Research to Societal Challenges — td-net MOOC (University of Basel)

Institution	University of Basel + td-net (Swiss Academies) + consortium: ETH Zurich, EPFL (École Polytechnique Fédérale de Lausanne), Univ. Geneva, Univ. Bern, Lucerne University of Applied Sciences and Arts (UASA)
Type	Massive Open Online Course (MOOC) / Short course · ≈30 hours workload · Not typically ECTS
Duration / ECTS	≈30 hours · 6 chapters
Delivery	Online asynchronous · Virtual whiteboard for learner interaction
Target audience	All disciplines + non-academic practitioners seeking solutions to complex challenges
Launched	c.2015 · Updated version valid to May 2026
TD classification	Trans— · Transdisciplinary Research (TDR) as reflexive research approach for wicked problems · Three outcome spaces: societal improvement + scientific knowledge + mutual learning between researchers and practitioners
TAH triad	T: Tool within case studies (mobile disease surveillance, digital water modelling) · A: Swiss Academies lens — Street Theatre as Transformation Knowledge in Migration Case · H: Foundational pillar — ethics, philosophy of science, social dynamics
Pedagogy	Case-based learning (5 projects: Migration, One Health, Water Scarcity, Antimicrobial Resistance / AMR, Tourism) · Three Types of Knowledge: Systems (facts), Target (values), Transformation (agency) · Expert consortium from multiple Swiss Higher Education Institutions (HEIs) · Student selects own case track
Competencies & assessment	Formative self-reflection + quizzes on 3 TDR phases + collaborative whiteboard
AI as didactic tool	Not evident — case studies involve digital transformation as content; AI not yet used as didactic tool within the MOOC
Transferable lessons	Three Types of Knowledge framework: forces teachers to distinguish teaching facts (Systems) from teaching agency (Transformation) · Nomadic Concepts: identifying words that mean different things in Art vs. Tech (e.g. "Code", "Prototype") prevents communication breakdown · "Sustainability Wheel": visual tool for scoring TAH projects across dimensions (Justice, Economy, Ecology) · Multi-stakeholder roles: researcher as Intermediary or Honest Broker — not only academic expert

Case 12 Transdisciplinary Course Program (TCP) — University of Tübingen, Germany

Institution	University of Tübingen (Tübingen Research Academy & Career Service / TRACS) · Germany
Type	Certificate / Module / MOOC / Faculty CPD (Hybrid) · Individual courses 2–6 ECTS
Duration / ECTS	Flexible · Intensive blocks (2–3 days) + weekly seminars + self-paced e-learning
Delivery	Hybrid: on-site workshops + online asynchronous (ILIAS) + synchronous
Target audience	Mixed HE learners (BA and MA from all faculties)
Launched	Established · Brochure valid 2026
TD classification	Trans— · Überfachliche Kompetenzen (over-disciplinary competencies) + Service-Learning with NGOs and municipal authorities · Wissen (knowledge) + Haltung (attitude) + Handlung (action)
TAH triad	T: 1DI section — Data Literacy, AI, Digital Health · A: 2KA section — Drawing, Photography, Curating, Art-Science integration · H: 1PGE section — Ethics, Human Rights, Globalisation · Integrative module example: glaciologist + landscape artist co-teach alpine ecosystems
Pedagogy	Workshops / Service-Learning / Hackathons · Service-Learning + Design Thinking + Betzavta Method · Expert tandems (practitioners from outside university) · Student designs personalised roadmap across modules
Competencies & assessment	Diverse by module Transfer goal: Portfolio, Poster, Podcast, Exhibition curation
AI as didactic tool	AI as content AND as didactic tool — "Sustainable AI?" module uses Generative AI (GenAI) tools (ChatGPT, Perplexity, CoPilot) for explorative scientific investigation; the only case in the corpus where AI functions as a didactic instrument
Transferable lessons	"Certificate" pathway: bundling short workshops into a Certificate — direct model for micro-credentialing strategy · Service-Learning as TD bridge: formally crediting NGO engagement + providing Reflexion workshop to tie it to TAH theory · Tandem faculty (hard scientist + artist in residence): concrete template for TAH module co-teaching · "Job-oriented qualifications" framing: TD as marketable professional skill, not academic luxury

Case 13 Program in Media Arts and Sciences (MAS) — MIT Media Lab, USA

Institution	Massachusetts Institute of Technology (MIT) Media Lab, School of Architecture and Planning (SA+P) · USA
Type	Scientiae Magister (SM) and PhD · SM: 66-unit programme of study
Duration / ECTS	SM: 2 years · PhD: duration varies · ≥4 terms in residence required
Delivery	On-site (Cambridge, MA) · Lab-based research groups
Target audience	HE graduate and doctoral · Engineering, physics, CS, cognitive science, art and design
Launched	1985 (Media Lab founded)
TD classification	Trans— · Anti-disciplinary philosophy — explores white space between disciplines · Mandatory collaboration in lab groups where neuroscientist and musician co-create prototypes · Research addressing wicked societal problems
TAH triad	T: AI, robotics, nanotechnology, digital fabrication · A: Electronic music, sound design, spatial/visual arts, Tangible Interfaces — art as rigorous mode of inquiry · H: Affective Computing and Ethics, AI for Impact, Space Enabled Designs Advance Justice
Pedagogy	Apprenticeship / Lab-based research · "Demo or Die" / "Deploy" pedagogy · Research advisors as active researchers leading interdisciplinary teams · High student agency within strategic research framework of chosen Lab group
Competencies & assessment	Satisfactory Research Thesis + General Exams (PhD) + Final Project/Paper (often publication-quality or functioning prototype)
AI as didactic tool	AI as content only — world leader in creating AI (Affective Computing, Foundations of AI Ventures); curriculum does not document AI as didactic instrument
Transferable lessons	"Apprenticeship" model: most effective TD learning by embedding in a live research/innovation project led by expert practitioner · Radical diversity at entry: intentionally different undergraduate backgrounds make the cohort work better · Ethics as mandatory constraint on Tech (not afterthought): Affective Computing + Ethics shows H leg as structural requirement · "How to Make Almost Anything" logic: adaptable to "How to Teach Almost Any TD Module" — technical and creative toolbox

Case 14 Certificate in Transdisciplinary Studies (Self-Designed) — Antioch University Online, USA

Institution	Antioch University Online (AU Online) · USA · Dept. of Humanities & Social Sciences
Type	Graduate Certificate · 13 US semester credits (≈26 ECTS)
Duration / ECTS	9 months · 13 credits
Delivery	Online · Asynchronous + synchronous tutorials
Target audience	Master-level learners and professionals seeking flexible CPD or career change
Launched	Active 2024–2025 catalogue
TD classification	Trans— · TD as "transformative academic journey" for social, organisational, or personal change · Certificate Project addresses real-world inquiry
TAH triad	T: Basic technological skills required; tech coursework can be integrated · A: Creative working methods and high-level aesthetic requirements · H: Dominant lens — Department of Humanities & Social Sciences
Pedagogy	Individualised Studies + Mentorship · Active partnership with Faculty Advisor + optional external Mentor · Students submit own individualised course syllabi · Can study with external scholars not on university faculty
Competencies & assessment	Foundations Course (designed path) + Certificate Project (inquiry project + literature analysis) + Reflective Reports
AI as didactic tool	Not evident — 100% online delivery requires digital literacy; AI tools not explicitly mentioned as facilitating TD process
Transferable lessons	"Navigating ambiguity" as formal outcome: naming mess as a skill reduces learner frustration — directly transferable to TD course design · External mentorship accreditation: studying with non-university practitioners as credited study — real-world TD grounding · Individualised syllabi: requiring learners to design their own course section forces transdisciplinary integration at the design stage · Lean credit structure (13 credits / 9 months): efficient model for professional CPD deep dive

Case 15 Culture and Health: Managing Cross-Sectoral Initiatives — Baltic Micro-Certificate (WITAC)

Institution	Baltic Consortium: Latvian Academy of Culture, Rīga Stradiņš University, Estonian Academy of Music and Theatre, Lithuanian University of Health Sciences · Erasmus+
Type	Micro-qualification / Micro-certificate · 10 ECTS · 250 academic hours
Duration / ECTS	10 months (Sept 2025 – June 2026) · 10 ECTS
Delivery	Hybrid: face-to-face kick-off (Kaunas) + 3 online modules (Zoom) + practical pilot project
Target audience	Professionals from culture, health, and social sectors in Latvia, Estonia, or Lithuania
Launched	2025 · Funded by Erasmus+ project "Inclusive Wellbeing Through Arts and Culture in the Baltics" (WITAC)
TD classification	Trans— · Preparing a new kind of practitioner for cross-sectoral initiatives · Mandatory real-life Culture for Health Pilot Project (Module 4) with vulnerable communities
TAH triad	T: Lowest weight — digital health information systems, digital project management tools · A: Very strong — arts-based and participatory methods, participatory art workshops · H: Strong — social inclusion, bioethics, public health policy, societal engagement in arts
Pedagogy	Service-Learning + Team-Based Project Work · Site visits to existing case studies · Long-term practical pilot · Consortium mentors (national teams supported by partner university mentor)
Competencies & assessment	Pilot Project Implementation & Evaluation (50%) · Team Project Plan & Budget (20%) · Key Concepts (10%) · Methods (10%) · Learning Journal (10%)
AI as didactic tool	Not evident — interactive learning via Zoom and reflective diaries; no mention of AI facilitating cross-sectoral dialogue
Transferable lessons	10 ECTS micro-certificate as sweet spot: substantial enough to change practice, lean enough for working professionals to complete in one year · Weighted assessment for action: 50% to pilot project implementation — Action valued over theoretical Knowledge · Reflective Learning Diary (10% of grade): mandatory journaling processes the messy experience of TD into personal competence

Case 16 The City as Laboratory — TU Berlin, Germany

Institution	Technische Universität Berlin (TU Berlin) · Part of Berlin University Alliance · Germany
Type	Module (2 elective courses) · 6 ECTS total
Duration / ECTS	2 × 3 ECTS · Intensive block days (5 days per course, Fri/Sat)
Delivery	On-site (Berlin) · Block format
Target audience	HE learners with diverse educational biographies · Likely Master/Doctoral
Launched	Active · Schedule provided for 2026
TD classification	Trans— · TD as transcending disciplinary and institutional boundaries · City as laboratory and testing ground where university and society negotiate solutions · Pluralistic knowledge (scientific, experiential, practice-based)
TAH triad	T: MotionLab.Berlin (hardtech), SPAIA (AI/biodiversity), DB mindbox (mobility/startups) · A: Ernst Busch University of Theatre Arts (performative knowledge), Hamburger Bahnhof (contemporary art as open lab) · H: Core lens — urban turn, migration, threats to democracy, embodied knowledge
Pedagogy	Block-style field visits + hands-on experience · Frameworks: PBL, Citizen Science, Real-world Laboratories, Service Learning · TD toolbox: Storytelling, Design Thinking, Scrum · Students use cooperative urban spaces (makerspaces, community gardens) for own research
Competencies & assessment	Project-based or portfolio (implied) · Core learning goal: plan and implement collaborations
AI as didactic tool	AI as content only — partner SPAIA uses AI for biodiversity protection as content; module does not use AI to facilitate learning process
Transferable lessons	"Partner institution inventory" model: list spanning makerspaces (T), theatre schools (A), social centres (H) — immediate off-campus TD contexts · Agile TD management: Scrum taught alongside Design Thinking — tools for managing TD project process (frequent point of failure) · Formalising "non-scientific" knowledge: clear framework for valuing and assessing embodied and experiential knowledge essential for TAH integration · Problem-oriented block rhythm: 5-day intensive blocks allow deeper engagement than standard weekly lectures

Case 17 Art, Science & Technology: Transdisciplinary Connections — Leiden University, Netherlands

Institution	Leiden University — Faculty of Humanities + Biomedical Sciences · Netherlands
Type	Module (elective within MA programmes) · 10 ECTS (Art History) / 5 ECTS (Biomedical Sciences)
Duration / ECTS	13 weeks · Asymmetric ECTS by student background
Delivery	On-site · Weekly sessions · Site visits + laboratory practicals
Target audience	HE master-level · Mixed: Art History, Literature, Media, and Biomedical Sciences students
Launched	2022–2023 · Still active
TD classification	Trans— · TD as societal evaluation of scientific/technological innovations through art and humanities lens · Public dialogue in museums and galleries · Real-world critical dilemmas addressed by mixed cohort (Arts + Sciences)
TAH triad	T/Science: Life Sciences, robotics, AI, genetics, biomedical research · A: Signals ethical issues, subject of study inspired by science, role of art in science museums · H: Dominant lens — humanistic and social dimensions of knowledge production, history of medical research, ethics
Pedagogy	Seminar + Excursion (site visits) + Laboratory Practical · Research-Creation / Curatorial Practice: students act as researchers and prospective curators · Mixed cohort of Science and Art students collaborate on digital exhibition proposal
Competencies & assessment	Digital Exhibition Proposal (25%) + Written Paper (50%; 4500 words Arts / 1000 words Science) + Participation incl. site visit reports (25%)
AI as didactic tool	AI as content, not as didactic tool — AI as development inspiring artists and subject of societal evaluation; not used to facilitate learning process
Transferable lessons	Asymmetric ECTS weighting: brings students from two faculties with different workloads (5 vs 10 ECTS) into same module — useful administrative model for diverse teacher-learner groups · "Digital Exhibition" as assessment: curatorial proposal forces synthesis of TAH content into communicative, visual, stakeholder-oriented format · Laboratory practicals for Humanities students (and vice versa): concrete method for breaking down disciplinary barriers · Moral/ethical mapping as formal learning goal: prepares educators for value-heavy nature of TD work