

Transhumanism's Impact on Higher Education

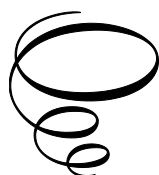
Transhumanism's Impact on Higher Education:

From Humans to Post-Humans

Edited by

Mustafa Kayyali

**Cambridge
Scholars
Publishing**



Transhumanism's Impact on Higher Education:
From Humans to Post-Humans

Edited by Mustafa Kayyali

This book first published 2026

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Copyright © 2026 by Mustafa Kayyali and contributors

All rights for this book reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

ISBN: 978-1-0364-7180-4

ISBN (Ebook): 978-1-0364-7181-1

TABLE OF CONTENTS

Acknowledgments	vii
Introduction	xi
Chapter 1	1
Introduction to Transhumanism: Philosophical Foundations and Technological Innovations <i>Mustafa Kayyali</i>	
Chapter 2	43
Resilience through Education: Fighting Disinformation and Fake News <i>Sheikh Inam Ul Mansoor and Showkat Ahmad Wani</i>	
Chapter 3	70
An Analytical Study on “Perception of Higher Education Students towards the Use of Artificial Intelligence (AI) in Education” <i>Varun Kumar and Ashima Dhiman</i>	
Chapter 4	94
Curriculum Design in an Age of Human Enhancement <i>Peter Chris Okpala</i>	
Chapter 5	120
Transhumanism and the Future of Higher Education – Beyond the Human Mind <i>Pitshou Moleka</i>	
Chapter 6	132
Transhumanism, Society and the Shifting Role of Universities <i>Pankaj Vaishnav</i>	
Chapter 7	157
Transhumanism and the Evolution of Knowledge <i>Pankaj Vaishnav</i>	

Chapter 8	187
Using AI Thematic Analysis to Explore EFL Lecturers' Perceptions of the Employment of Direct and Indirect Written Corrective Feedback of Grammatical Accuracy in Essay Writing <i>Salma al-Nabhani and Taif al-Kinany</i>	
Chapter 9	209
The Post-Human Classroom: Will AI Replace or Augment Human Educators? <i>Mubango Hazel, Muchowe Regis and Muziti Petronella</i>	
Chapter 10	228
Education in the Transhumanistic Future: Shaping the Future Occupational Psychologist <i>Angela De Jong</i>	
Chapter 11	257
From Knowing to Becoming Knowledge in the Age of Transhumanism <i>Laura Radoi</i>	
Chapter 12	291
Ethical Boundaries in Higher Education: Integrating Transhumanist Technologies Responsibly <i>Mustafa Kayyali</i>	
About the Editor	331
Contributors.....	333

ACKNOWLEDGMENTS

Some books are made of paper and ink; others are braided out of loyalties, wagers on the future, and the slow patience of institutions and families who refuse to look away when an idea is still trembling on its feet. This one belongs to the latter kind, a work assembled from many hands and a single horizon—the conviction that education can remain human even as it grows more entangled with the strange bright tools of our century.

To the **Ministry of Higher Education and Scientific Research**, for encouragement that did not confuse velocity with wisdom. This project followed the Ministry's insights: the counsel to set equity beside innovation rather than behind it; the insistence that policy speak both metrics and ethics; the urging that governance arrive early, not as a cage but as an architecture within which freedom can grow sturdy. There are ministries that monitor and ministries that invite. This one invited—invited universities and researchers to think with, not after; to test technologies without surrendering to them; to pursue a future that keeps faith with the public. The book is, in that sense, a child of deliberation as much as discovery, and the Ministry's voice—not loud, yet unmistakable—runs through its pages like a keel beneath a ship.

To **Maaref University of Applied Sciences**, not merely for “support” in the bureaucratic sense, but for a form of intellectual hospitality that feels philosophical at its core: a home where the question is greeted before the answer is demanded, where the corridor debate is treated as data, where a research proposal is allowed to be a confession of wonder and a promise of method in the same breath. There is a university that practices courage without spectacle, a university that lets scholars move too slowly for fashion and too quickly for habit, a university that remembers the ancient duty to enlarge the mind and educate the conscience; that university has a name, and its name is Maaref. The book owes it more than acknowledgments can carry. It owes the quiet of an office made available when the hour ran late. It owes the confidence of colleagues who tried to break an argument because they hoped it would hold. It owes the steady light that lets a thinker risk revision again and again until a better shape appears.

To **Azteca University**, whose wonderful support arrived as friendship disguised as scholarship. Partnership across borders can slip into

performance, yet here it became a discipline of listening. The long-distance seminar that turned skepticism into a sharper claim. The annotated margins that suggested a different genealogy for a concept we had taken for granted. The reminder—offered gently, and exactly when needed—that any conversation about post-human futures is, at bottom, an argument about dignity and belonging. Azteca was not a mirror but a second eye: together depth and depth became stereoscopic, and the terrain—messy, promising, ethically charged—suddenly had contours we could walk. Gratitude for that second eye, and for the warm insistence that scholarly excellence and human warmth are not competing goods.

And then, to the small republic where all large ideas are tested: **family**. To **Abdullah Kayyali**, father and first philosopher, whose teaching seldom arrived as lecture and often arrived as example—the steady hand that refuses panic, the measured word that cuts through fog, the old-world courtesy that reminds new-world minds why knowledge must serve. There is a moral geometry learned in such company: angles of patience, vectors of restraint, the strange calculus by which a person grows more capable by becoming more kind. Scholarship pretends to be self-made; it is not. It learns its gait from fathers who do not hurry, who show that dignity is not an ornament but a method.

To **my three little princesses—Larin Kayyali, Mira Kayyali, and Celia Kayyali**—whose names are constellations over every page. Children interrogate the future without jargon. They ask the question that collapses an entire literature into a pause: Will this make us better? Not just smarter, not just faster—better. They draw rockets and schools and stars and then ask if the star is allowed to speak, and if the school remembers to play, and if the rocket carries kindness in its cargo. Their bedtime negotiations teach concision; their morning astonishments teach curiosity; their patience with a desk overrun by drafts teaches forgiveness. If the book resists the easy cynicism that can creep into any discussion of technology, it is because their laughter keeps winning the argument; if the book reaches for a future where enhancement is stewardship, not surrender, it is because their faces quietly demand it.

To **friends and colleagues**, as numerous as footnotes and as necessary as footnotes are rare—those who carried the vision when it felt too heavy, who offered critique without theatrics, who turned coffee into colloquy, who sent a link that reconfigured a chapter, who, in committee rooms and corridors, refused the false choice between ambition and care. A dedication cannot hold all the names, yet the mind holds them, and the pages do too, in the turns of phrase sharpened by a late-night message, in the caution added after a gentle rebuke, in the courage borrowed from a

friend's unshaken belief that the work mattered. If a book is a city, you built the roads it travels and the bridges it crosses; if a book is a coastline, you tended the lighthouses.

What, after all, is a dedication if not a brief metaphysics of gratitude? One could say: this is for those who made possible the thinking. But the truth cuts deeper. This is for those who made the thinking want to be worthy—institutions that loved the public more than their reputations, partners who argued us away from hubris, a ministry that remembered the common good in an age of private acceleration, a father who taught a scholar to be a son first, children who made the scientist answer to the human. Without such company the future shrinks, even when our devices grow large; with such company the future expands, even when the hours are short and the questions are hard.

Think of the future for a moment not as a timeline but as a moral climate. We are building weather—winds of incentive and pressure, thermals of attention and distraction, climates of belonging or exclusion—inside which students will try to become themselves. If the university fails at this, no algorithm will save it; if the university succeeds, even clumsy tools will be redeemed by wise hands. This book, in its most earnest register, is a vote for success, a wager that communities can outgrow their fear of the new without outgrowing their love of the good. It is easier to believe such things when a university steadies the table, when a partner institution speaks across distance like a neighbor, when a Ministry stands sentry over the fragile equilibrium between daring and duty, when a father's voice sounds like ballast, when three small ones turn the word "tomorrow" into an invitation rather than a threat.

There is a philosophical thread that refuses to snap: the idea that human beings are not finished, and that education is the oldest institution we have for learning to finish well. Transhumanism tempts us with shortcuts; wisdom teaches choreography. The task is not to outrun our limits but to befriend them, to extend them without erasing them, to insist that improvement not be purchased with the currency of someone else's dignity. The friends and colleagues who joined this journey knew that intuition and kept returning us to it: enhancement is not ascension; it is craft. It asks for ethics with teeth, for governance with memory, for pedagogy with soul.

Gratitude, then, becomes a philosophy of time. We pay our debts backward by living forward in a way that honors them. For Maaref University of Applied Sciences, that means continuing to make rooms where inquiry can breathe and conscience can speak. For Azteca University, that means keeping the bridge open and the conversation

honest. For the Ministry of Higher Education and Scientific Research, that means carrying the patient flame of a public good into each next negotiation with haste and hype. For family, that means coming home from the future with stories worth telling aloud. For friends and colleagues, that means staying in the quarrel—the good quarrel—over how to keep learning human when the tools get loud.

If the future is, as someone once said, already here but unevenly distributed, then let the distribution begin with gratitude. Let it move from policy to pedagogy to playgrounds, from white papers to whispered encouragements, from a university’s mission statement to the way a receptionist greets a student who is late and afraid. The smallest gestures shape the largest arcs. Perhaps that is why this dedication leans into names and places and relationships: because the future we keep invoking will be built by people with names who inhabit places and sustain relationships, or it will not be built at all.

May the pages that follow repay, in small and imperfect ways, the trust you placed in a fragile, necessary work. May they help ensure that when the future arrives in our classrooms—wearing the mask of new machines and new habits—it finds us ready, not merely with tools, but with wisdom and with a love large enough to hold the students who come asking to be shaped.

Dr. Mustafa Kayyali

Addana, North Syria

23 August 2025

INTRODUCTION

From Humans to Post-Humans—Reimagining Higher Education in an Age of Enhancement

“Science is a way of thinking much more than it is a body of knowledge.”
— Carl Sagan

Walk through a campus at dawn and you can already feel it: the atmosphere no longer belongs solely to books, whiteboards, and whispered debates. There’s the shimmer of something else—software that murmurs suggestions before questions are fully formed, wrist-worn sensors that nudge attention back into focus, classrooms tuned by invisible feedback loops that adapt to a student’s mental state in real time. The scene is still recognizably a university, yet beneath the brick and ivy a different species of learning is taking root: not just digital, but deeply interwoven with technologies aimed at amplifying human capacities. That is the premise—and the provocation—of this book. It is not simply that artificial intelligence (AI) has joined the institution; it is that higher education is becoming a laboratory for transhumanism’s promises and paradoxes.

Transhumanism, here, is not a slogan for technological boosterism; it is a contested, evolving framework for thinking about human enhancement—cognitive, physical, affective—across the lifespan. In its most sober articulation, it names a family of interventions: AI tutors and copilots, non-invasive and implantable brain-computer interfaces (BCIs), neurofeedback and cognitive-enhancing pharmaceuticals, genetic editing, augmented and virtual reality overlays, and the social systems that govern their use. Each step proposes to push past biological baselines. Each raises thorny questions about identity, equity, consent, governance, and what we mean when we say “education.”

Universities sit at the hinge of this transition. They are research sites, professional gatekeepers, cultural critics, and engines of social mobility. If transhumanism remains a set of hypotheses elsewhere, in higher education it becomes a set of practices. How we design courses, assess learning, accredit programs, train faculty, fund labs, regulate data, and set campus norms will decide which futures become habitable. We are not in a pre-enhancement era so much as in a pre-governance one; the tools are

arriving faster than the rules, faster than the language we need to make sense of them.

This introduction frames the book's central wager: that "post-human" higher education will not be a clean break with the past but a layered, sometimes contradictory evolution of the university's oldest commitments—truth-seeking, human development, critique—under pressures exerted by enhancement technologies. The pages that follow argue for a thoughtful realism: neither catastrophism nor naïveté, but a refusal to outsource judgment to hype cycles or to nostalgia. The university can be both engine and brake—incubating innovation and cultivating the ethical imagination that tames it.

A name for the moment

Transhumanism has always been a moving target. Philosophers cast it as the latest articulation of an old ambition—overcoming limits—while technologists treat it as a design space for iterative prototypes. In the education domain, the term finds its sharpest edges in concrete, near-term shifts: AI tutors that scaffold writing and coding; BCIs that translate neural signals into interface commands; immersive overlays that model molecules, architectural loads, or the grammar of a foreign language with immediate, tactile clarity; and data-driven feedback loops that adjust pace, difficulty, and modality to a learner's cognitive and emotional state.

Thinkers of the early twenty-first century already traced these contours. They described how enhancement technologies might transform attention, memory, and agency, expanding the "adjacent possible" for human learning while complicating the meaning of autonomy. The upshot in education is plain enough: a shift from post-hoc, one-size-fits-many instruction to environments that read the learner and respond dynamically—what some have begun to call Education 5.0.

Yet the line between augmentation and substitution is not straight. One chapter in this volume asks the blunt question that haunts corridors and committee meetings alike: will AI replace the educator or amplify the educator's reach? The emergent answer is more entangled than either camp prefers. Teaching changes, yes; it migrates toward orchestration, diagnosis, supervised autonomy. But the human core of pedagogy—judgment, care, narrative framing, the ability to read a room and a face and a pause—does not vanish under automation. It becomes, if anything, the constraint that rescues learning from machine-polished emptiness.

What higher education is for— under enhancement pressure

Universities do not merely transfer knowledge; they reconfigure minds and cultivate character. Under enhancement pressure, that formation looks different in three interlocking ways.

First, epistemic practice. Students no longer come to campus for information—machines deliver it faster—but for sense-making with and against intelligent systems. Cognitive labor bends toward framing questions, evaluating sources, negotiating uncertainty, and composing with AI rather than composing alone. The craft of scholarship shifts from solo authorship to entangled authorship, where students learn to interrogate the provenance, bias, and limits of their tools and to own the final judgment. As studies collected in this book attest, students are already using AI several times a week, often reporting gains in speed and comprehension—while voicing persistent concerns about reliability, privacy, and over-reliance.

Second, pedagogy and mentoring. Instruction becomes partly diagnostic. A course is no longer just a sequence of topics and tasks, but a living interface between a cohort and a set of adaptive systems. In language writing courses, for example, experiments with AI-assisted thematic analyses of lecturer feedback surface where direct correction accelerates learning and where indirect cues better seed autonomy. Teachers, faced with design choices that once felt merely stylistic, now become clinicians of cognition.

Third, equity and the social contract. Enhancement exacerbates the oldest problem of schooling: uneven access. If high-resource students obtain earlier or richer augmentation—premium AI copilots, reliable connectivity, cognitive headsets—while their peers make do with thin simulacra, the result is not just unequal outcomes but stratified personhood. Research cited here underscores the digital divide: under-resourced institutions often have markedly fewer advanced AI tools, and students repeatedly ask for formal literacy interventions to navigate ethical and effective use. The danger is a two-tier future of “enhanced” and “unenhanced” learners, with credentialism hardening around augmentation. The opportunity is to design policy where access to enhancement is understood as a matter of educational justice.

What counts as learning when minds are hybrid?

A perennial anxiety: if a student produces elegant prose with a generative model's scaffolding, has the student learned? Assessments that once treated outputs as direct proxies for underlying skill now face opaque processes entangled with machine contributions. The right response is not to abandon rigor but to change where rigor lives. We move toward demonstrations that reveal process—version histories, oral defenses, studio critiques, data diaries—toward tasks that require embodied judgment, collaboration, and transfer; toward assignments structured as human–AI co-design challenges with explicit attribution. This is not merely defensive. It recognizes something true about learning that the age of enhancement throws into relief: mastery is the capacity to decide which tools to use, for what ends, under what constraints, and to be answerable for those choices.

The early empirical landscape complicates both utopian and dystopian stories. On the one hand, student surveys in multiple contexts report tangible benefits: personalization, around-the-clock support, assistance for non-native speakers, improvements in organization, and—perhaps most consequentially—motivation sparked by immediate feedback and a feeling of conversational partnership in learning. On the other hand, faculty warn of academic integrity erosion, “black-box” opacity that hinders critique, and the risk of narrowed cognitive habits if students offload too much. The field keeps circling back to the same hinge: how to design for efficiency without hollowing out effort; how to honor the learning journey rather than just the destination.

The post-human classroom, without the science-fiction fog

It helps to deflate the drama. The post-human classroom is not a cyborg theater so much as a set of incremental changes: an AI collaborator embedded in the LMS; formative analytics that show a student where attention dipped; a BCI headband in a neuroscience lab; a design studio where AR becomes the common canvas; a seminar where citation graphs are generated live to test which literatures a claim truly engages. The novelty is less in the gadgets than in the underlying grammar of the classroom: **feedback becomes continuous, agency becomes scaffolded, content becomes co-authored, assessment becomes performative, belonging becomes designed.**

Educator roles mutate accordingly. Professors curate prompts and counter-prompts, stage friction between human and machine approaches, cultivate comparative reasoning (why did the model propose *that*

structure?), and model epistemic humility when systems err. The signal—always—remains human judgment in context. The point is not to simulate a professor's style but to widen the aperture of cognition, and then to ask students to justify how they used that wider aperture.

In language education—a field that often functions as a bellwether for broader pedagogical change—research using AI-based thematic analysis has already mapped where algorithmic assistance improves writing outcomes and where it risks superficiality. The key is not a monolithic method but a repertoire: direct feedback when precision matters, indirect signaling when the goal is durable self-correction. These are not minor choices; they are the difference between acceleration and dependence.

Governance before glamor

If there's a refrain in this book, it is that governance must arrive early, with nuance. Enhancement cannot be permitted to drift into coercion—explicitly (requiring augmentation for program entry) or tacitly (designing competitive environments that effectively punish the unenhanced). Here, professional psychology becomes unexpectedly central. One chapter explores how occupational psychologists, working alongside educators and policy bodies, can develop consent protocols, pacing guidelines, and psychosocial supports for augmentation pilots; design team structures that account for uneven cognitive speeds; and lead longitudinal research on identity integrity under sustained augmentation.

The work is not hypothetical. National contexts—such as the UAE, with AI strategies, UNESCO partnerships, and BCIs moving from clinic to campus—show how quickly policy scaffolding and educational practice can converge. Universities and ministries are already piloting inclusion frameworks, neuro-ergonomic assessments, and educator training that links AI literacy to mental health and belonging. The message is not that every country will replicate these initiatives, but that governance can be proactive, plural, and anchored in human flourishing rather than technological inevitability.

A robust toolkit begins with simple commitments: baseline access (no enhancement without equity plans), transparent data practices, opt-in norms with non-retaliation for opting out, accommodation for enhancement fatigue, grievance channels that treat augmentation harms as recognizable and repairable. Then come the institutional structures: interdisciplinary enhancement boards (an IRB for augmentation), public reporting on pilot outcomes, ethics curricula woven into first-year seminars and lab meetings alike. At every step, the aim is to normalize scrutiny, not augmentation.

The curriculum problem (and opportunity)

Curriculum is where abstractions meet time constraints. Under enhancement conditions, the old quadrants—content, pedagogy, assessment, environment—are threaded by two new axes: **augmentation literacy** and **augmentation ethics**. Students will need explicit guidance to use AI tools critically and inventively, to tune cognitive prosthetics without losing the muscle of attention, to hold both the convenience and the cost of delegation in view. Faculty will need design patterns that stage productive friction—assignments that *require* students to compare machine-generated reasoning with human exemplars, to trace failures not just outputs, to translate across modalities (text, code, diagram, simulation) with metacognitive commentary.

Personalization, so often marketed as an end in itself, becomes an ingredient in a broader aim: agency. When adaptive systems can infer cognitive load and boredom with unsettling accuracy, the temptation is to smooth every edge. But character is partly formed in the roughness. A humane curriculum protects zones where difficulty is not pathologized but reinterpreted, where students learn to work with tools without surrendering to them. Evidence across contexts shows that while AI can increase speed and expand horizons, the quality of learning depends on whether students and teachers are trained to integrate these tools with reflective practice. Without that training, efficiency can occlude understanding.

Computational thinking (CT) deserves special mention. If transhumanism expands the cognitive palette, CT becomes the musical notation—the way learners write, test, and refine complex procedures, including those carried out by AI agents. Cultivating CT across the curriculum is not about turning all students into software engineers; it is about equipping them to decompose problems, design experiments, evaluate models' behavior, and reason about systems. In this sense, CT and enhancement literacy are allies.

The human stakes—identity, dignity, and belonging

Not all consequences are cognitive. Students will ask—quietly, sometimes painfully—what it means to earn a degree in an era where part of the work feels co-authored by machines, to compete in cohorts where some peers are literally faster, to belong when one's cognitive rhythms feel “old-world.” This is where campus life—the clubs and counseling centers, the first-year advising sessions, the rituals of commencement—does heavy

lifting. Belonging must be engineered as carefully as bandwidth. Without it, augmentation corrodes community.

Evidence from early pilots and policy frameworks suggests practical steps: psychological identity integrity scales that track how students narrate the self under augmentation; measures of enhancement anxiety and comparative stress; educator workshops that surface “enhancement strain” and the subtle ways class norms can coerce; support groups that let students talk about pace, pressure, and the fear of being left behind. This is not ancillary. It is what keeps enhancement from becoming another word for isolation.

Research agendas that matter

A research university earns its name by asking the questions that make practice safer and wiser. The near-term agenda is already crowded:

- **Effectiveness and equity of AI tutors.** Which students benefit most? Which skills resist delegation? How do we measure transfer and retention when the path to performance includes machine mediation? Early surveys show positive attitudes and perceived efficiency gains, but also privacy, authenticity, and bias concerns—signals that instrument design must include qualitative accounts, not just usage logs.
- **Assessment under opacity.** If models are black boxes, assessment must become a lantern. Protocols that foreground process—think-alouds, version trails, oral-in-person defenses—can restore visibility without nostalgia for pre-AI conditions.
- **Neuro-interfaces in learning.** Non-invasive BCIs are inching from lab to lecture hall. The research questions are not only technical (signal quality, decoding accuracy) but psychosocial: who opts in and why, what identity narratives emerge, how to set consent thresholds for minors, what withdrawal looks like. Interdisciplinary recommendations already emphasize preventing coercion, protecting privacy, and designing team dynamics for hybrid groups.
- **Faculty development at scale.** The adoption barrier is rarely ideology alone; it is competence and time. Studies remind us that programming and prompt-craft skills among teachers shape the quality of AI use; institutional training must be multi-disciplinary and recurring, not a one-off workshop.
- **Augmentation and the public mission.** If enhancement becomes a private good, the public university’s purpose frays. Research

should track how policy and funding can prevent augmentation from entrenching privilege—e.g., subsidized access, community partnerships, open-source tools, and support for under-resourced institutions that currently lag in AI infrastructure.

A different way to talk about risk

Risk discourse tends to polarize: either every tool is a slippery slope to dependency, or every warning is anti-progress. This book aims for a third way: naming concrete failure modes without inflating them into parables of doom; naming concrete benefits without baptizing them as destiny. We borrow a page from safety engineering: **anticipate drift** (how practices evolve when no one is looking), **layer defenses** (technical, pedagogical, social), **design for graceful degradation** (what happens when systems fail), **simulate the edge cases** (what happens when incentives tempt corner-cutting). In the enhancement context, the same logic becomes ethics with teeth.

That posture also helps with a tricky truth: education systems are messy. Implementation will feel more like bricolage than blueprint. What matters, then, is not perfection but trajectory: governance that keeps the center of gravity on human flourishing, curricula that teach courage with tools rather than obedience to them, campus cultures that hold space for those who opt out of augmentation without penalty. None of this happens by accident.

What this book will do (and will not)

Across thirteen chapters, the book circles the same axis from different orbits: philosophical foundations, classroom design, curriculum, equity, governance, student and faculty perceptions, national policy experiments, and professional practice—including the surprising centrality of occupational psychology in steering augmentation responsibly. You will encounter arguments that education is becoming **neuro-informed** and **agentic**, that the teacher's craft is mutating toward orchestration and diagnosis, that assessment should reveal process rather than merely grade product, that equity requires more than device distribution—it requires institutional redesign. You will hear from students who find AI liberating and from faculty who fear the erosion of authentic effort; from policy makers who speak the language of charters and from practitioners who insist that the details of consent and pacing matter more than slogans.

Some chapters are unabashedly practical: playbooks for faculty development, course patterns that braid reflection with tool-use, checklists for pilot governance. Others are conceptual, asking whether our language for personhood stretches enough to hold hybrids of human attention and machine inference, and whether “post-human” is a helpful label or a distraction from long-standing human struggles for dignity and belonging. Several chapters situate these debates in specific national contexts—the UAE, among others—where AI policy, university strategy, and clinical trials intersect in ways that make abstract questions suddenly concrete.

Threaded through are empirical anchors: student perception studies showing both enthusiasm and unease; lecturer analyses that map when direct feedback outperforms indirect cues; institutional surveys that quantify the digital divide; policy recommendations for BCI deployment that keep consent and anti-coercion at the center. Together, they sketch a field that is young, noisy, and brimming with potential.

The book does not prescribe a single blueprint. It argues for posture and process: an ethos of careful welcome, an insistence that educational goods remain public, a willingness to re-scaffold the craft of teaching without surrendering its humanity. If there is a throughline, it is the stewardship of agency. Enhancement without agency is spectacle. Enhancement with agency is education.

Closing the gap between what we can do and what we ought to do

Stand again on that morning campus, only now look closer. A student, laptop open, is dialoguing with a model that suggests structure, counter-examples, bibliographies; the student accepts some, rejects others, and writes a paragraph that feels earned. Down the hall, a lab group toggles between AR and clay prototypes, learning why stress lines in a beam don't care about your slide deck. Upstairs, a counseling professional meets a student anxious about falling behind in a cohort where some peers wear cognitive headsets; they talk about pace, identity, and how to draw boundaries when optimization turns to compulsion. In a policy seminar, undergrads design an enhancement IRB charter and argue over whether opting out can ever be free when the job market isn't neutral. Later that week, the faculty senate debates assessment reforms that pair code-assist assignments with oral defenses. None of this looks like a break with the university's soul. It looks like the university learning—again—how to keep promises in a new environment.

The choices we make now will echo. If universities treat enhancement as a consumer upgrade, they will get a marketplace with pedagogical wallpaper. If they treat it as an ethical practice of human formation, they will get a campus that is braver, more honest, and more capable of arguing with its own tools. The chapters ahead do not agree on everything; that is their strength. They agree on this: the future of higher education—in a transhumanist age—will be decided by how seriously we take the task of cultivating freedom.

Freedom, here, is not the absence of tools but the wisdom to use them well, to resist their easy seductions when they cheapen effort, to embrace their gifts when they widen access and deepen inquiry, to honor both the speed they offer and the slowness we still need. The post-human university will remain a human place only if we insist on it. That insistence is not a posture of fear; it is a posture of care. Care for students who will inherit a world of hybrid cognition. Care for teachers whose craft must stretch without breaking. Care for knowledge itself, which deserves to be pursued with help and with humility.

If transhumanism's most audacious claim is that human beings can be more, higher education's most responsible response is to ask: **more what?** More capable and more accountable. More connected and more discerning. More empowered and more ethical. Not simply faster or louder, but wiser. It's a demanding list—and the only one worthy of a university.

The morning has brightened. Students stream into classes, some carrying ordinary notebooks, some wearing devices that would have looked like science fiction ten years ago. The sun does what it has always done. The world asks what it has always asked of the university: teach us how to live. The difference now is that we must teach it in partnership with machines that are quickly learning to speak back.

That is the work. That is the invitation. And that is why this book exists.

Dr. Mustafa Kayyali

Addana, North Syria

23 August 2025

CHAPTER 1

INTRODUCTION TO TRANSHUMANISM: PHILOSOPHICAL FOUNDATIONS AND TECHNOLOGICAL INNOVATIONS

MUSTAFA KAYYALI

Abstract: Transhumanism names a hopeful yet contested project: using science and technology to expand human capacities. This chapter introduces its philosophical roots—humanism, posthumanism, and competing ethical lenses such as virtue, deontological, utilitarian, and capability approaches. It then sketches the state of key innovations—AI, brain-computer interfaces, genetic editing, neuropharmacology, longevity science—and the questions they pose about identity, dignity, agency, and justice. Because universities both incubate and educate these futures, we examine how transhumanism reframes curricula, research ethics, student support, and access, especially across global inequalities. The chapter closes with a governance toolkit for higher education: principles for responsible innovation, scenario planning, equity-first design, and evidence-based oversight. The aim is neither advocacy nor alarm, but an invitation for universities to cultivate wisdom alongside power as humanity learns to engineer its own possibilities.

Keywords: transhumanism, posthumanism, higher education, human enhancement, ethical governance, AI and neurotechnology, CRISPR gene editing, curriculum innovation

1 Introduction

Transhumanism is not just a set of technologies or a club of futurists with silver-tinged vocabulary. It is a question posed to the human project itself: if we can intentionally alter cognition, mood, memory, resilience, lifespan, and even the substrate of consciousness, what remains recognizably

“human”—and who gets to decide? The question arrives with urgency because its ingredients are already here, often hidden in plain sight. University labs train neural networks that learn faster than undergraduates can, clinics pilot gene therapies that creep toward enhancement, startups sell consumer neurostimulation as study aids, and everyday software quietly amplifies or narrows our attention. The grammar of improvement—optimize, upgrade, accelerate—has slipped from machines into our self-understanding. In that sense, transhumanism is both a technological horizon and a mirror in which we see our ambitions and blind spots.

Philosophically, transhumanism sits at an uneasy junction. It inherits humanism’s confidence in reason and progress, yet tests humanism’s boundaries by treating the human as a prototype, not a finished work (Sari, 2024). Posthumanist critiques caution that “the human” has often been a narrow category—coded by exclusion, disability, gender, race, and class—and that celebrating enhancement can reproduce those exclusions under a scientific gloss. Ethical traditions offer different lenses: a utilitarian may ask about net welfare gains; a deontologist about inviolable duties to persons; a virtue ethicist about the character such transformations cultivate or corrode; a capabilities thinker about real freedoms people can exercise. None of these views, on their own, can bear the full weight of the transhumanist wager, but together they stage the debate universities must steward with care.

Technologically, the terrain is heterogeneous. Artificial intelligence systems apprentice in classrooms and research groups as tutors, graders, co-authors, and design partners (Riser, 2025). Brain–computer interfaces move from clinical restoration toward augmentative use cases, promising “hands-free” interaction and memory aids while raising profound questions about mental privacy and cognitive sovereignty. Gene editing tools sharpen from therapeutic correction to discretionary enhancement, even as biological systems resist clean boundaries between cure and upgrade. Pharmacological interventions already modulate attention, mood, and wakefulness on campuses, creating gradients of advantage difficult to regulate without pathologizing students or moralizing neurodiversity. Longevity science suggests multi-decade shifts in life planning, intergenerational contracts, and the timing of education itself. Immersive and mixed-reality platforms give students prosthetic presence, rehearsing skills and identities in synthetic spaces that will soon feel less like simulations and more like additional rooms in the house of learning.

Higher education is not a neutral spectator to these developments. Universities are where many of these technologies are invented, validated,

debated, and normalized (Dragoş & Hughson, 2024). They are also where norms are taught implicitly through policy and explicitly through curriculum. When a campus disability office recognizes a new device as an accommodation, it changes the ecosystem of fairness. When an instructor permits or forbids AI co-writing, it shapes the meaning of authorship and the habits of mind students carry forward. When a research ethics board adjudicates a wearable that reads emotional states, it draws lines around mental privacy that society may later adopt or contest. The notion that higher education is merely “about knowledge” is too thin; it is also about the cultivation of persons and publics in a time when both are malleable.

This chapter approaches transhumanism neither as an alarm bell nor as a sales brochure. It treats it as a design problem for institutions trusted to educate free and responsible agents. That design problem has at least five knots:

- Conceptual clarity. “Enhancement,” “therapy,” “augmentation,” and “optimization” are not synonyms. Nor is “posthuman” simply “more than human.” Precision matters because policy and pedagogy hinge on where we draw these lines.
- Justice and access. Enhancements that track existing privilege will widen gaps; enhancements that are subsidized without safeguards can create pressures to conform. Equity by design is not a slogan here—it is the difference between empowerment and coercion.
- Agency and authenticity. If a student’s performance is co-produced by AI, neurostimulation, or algorithmic scaffolding, what remains theirs? The answer cannot be a nostalgic return to “pure” effort, but it also cannot be an abdication of authorship.
- Safety and reversibility. Some interventions can be rolled back; others cannot. Universities must develop standards of evidence and precaution proportional to the irreversibility and systemic risks of a given tool.
- Governance and culture. Formal policies will fail without a culture that invites dissent, protects minority viewpoints, and encourages slow thinking in fast domains.

To animate these knots, imagine a near-future seminar on Renaissance literature. Half the students write with AI partners that can mimic their prose, a third wear discreet neurostimulation patches to maintain focus, one student attends via a photoreal avatar because a chronic condition makes travel risky, and two students have gene-therapies correcting conditions

that, until recently, would have been disabling. The professor's role shifts from evaluating "what you produced" to curating "how you produced it," including declarations of assistance, provenance of ideas, and reflective accounts of tools used. Assessment rubrics must measure learning processes, not only outputs; academic integrity expands to include transparency about augmentation; the classroom becomes a space to practice discernment, not only analysis (Lehane et al, 2024). This picture is neither utopian nor dystopian; it is a plausible tangle of benefits and trade-offs.

The chapter unfolds in five moves. We begin by clarifying the conceptual and moral landscape, mapping the main philosophical positions that shape arguments for and against enhancement. We then survey the technological frontiers most likely to transform learning and research in the next decade, focusing on AI, neurointerfaces, genetic editing, and longevity science. Next, we take up questions of personhood and justice—identity, dignity, agency, accessibility, and the geopolitics of inequality. In the fourth section, we turn to the university as an organization: curriculum redesign, research ethics, student services, and data governance. We close with a governance toolkit—principles, checklists, and scenario prompts—that administrators, faculty, and students can adapt. The guiding conviction is simple: universities should not merely keep up with enhancement technologies; they should teach society how to live wisely with them.

If transhumanism is a wager, higher education is one of the few institutions capable of improving the odds. It can widen the circle of those who benefit, slow down decisions when slowness is a virtue, and cultivate judgment sturdy enough to resist both hype and despair. That work begins, as ever, with a better conversation—rooted in clarity, humility, and the courage to revise our views in light of new reasons and new facts.

2 Framing Transhumanism: Concepts, Hopes, and Fault Lines

Transhumanism begins as a modest hypothesis and quickly swells into a wager on the future of the species: if we gain tools that can reshape our minds, bodies, and lifespans, should we use them—and to what ends? Not a slogan, not a club, not merely the glint in a technologist's eye, it is a grammar newly available to the human animal (Dunér, 2025). We've long altered the world to suit us; now the world returns the favor and offers to alter us. The question is whether we treat that offer like a gift, a temptation, a responsibility, or some uneasy combination of all three.

A frame is useful before any verdict. The human condition, as it's typically sketched, is a bundle of limits and loves: vulnerability, learning, memory's fickleness, finitude, attachment, error. Transhumanism touches each thread. Some seek to soften the rough edges—reduce pain, repair impairment, delay decline. Others want to push past merely “fixing” and cultivate new states: sharper concentration, wider bandwidth, richer perception, longer life. Clarity helps here. Therapy is about restoration toward a prior baseline; enhancement stretches the baseline itself. The boundary blurs in practice—a hearing aid that surpasses typical ranges, a neural implant originally designed for tremor that later becomes a tool for on-demand focus—but it matters because our moral vocabulary shifts depending on which side we think we're on. Restoration sounds like justice; enhancement sounds like preference. Then again, whose baseline counts? Whose normal is the yardstick? Once we admit that norms were never neutral—often built around bodies and minds that excluded many—our tidy categories begin to leak.

The ideology, if one must use that word, inherits humanism's confidence that reason and ingenuity can elevate life, but it also treats “the human” as an unfinished prototype rather than a sacred endpoint (Thomas, 2024). Some hear hubris in that posture. Others hear relief. A mother who watches her child's seizures ease under a neurodevice is unlikely to fret about metaphysical purity. A student whose attention skitters may embrace stimulants not because of cultural pressure but because, for once, the inner noise quiets. It isn't naïve to notice that these are forms of care as much as control. Yet the same landscapes hold their shadows: subtle coercion (everyone uses the tool, so you must), commercialization of intimacy (your mood, your genome, your attention as marketable data), and the old specter dressed in modern clothes—eugenic thinking made aspirational, even benevolent-sounding, until its exclusions reveal themselves later.

What is it, then, that transhumanism actually hopes for? Strip away the neon and you find very old longings. Freedom from preventable suffering. More time—time to work, to love, to explore, to repair harms we've made. Minds that can hold complexity without drowning. Bodies that don't betray us so early or so cruelly. A social compact that doesn't treat disability as an afterthought but as a starting point for design. There is nothing alien about these hopes. They are ordinary, domestic even. What's new is the proximity of tools that claim to deliver on them, not in the abstract but through code, wet lab techniques, and devices small enough to vanish into skin, earbuds, or the ambient hum of a classroom's software.

Language will mislead if we let it. “Upgrade,” “optimize,” “boost”—verbs borrowed from machines, thrown back onto people. They make us sound like laptops with better batteries, as if the only interesting question were how fast we run. That’s one fault line: the risk of flattening value until it’s indistinguishable from performance. Education feels this acutely. If attention becomes a dial we can turn, whose curriculum decides the target state? If writing can be co-authored by an algorithm, do we measure eloquence, or judgment about when not to use the tool? There’s a danger of pretending that the recipe for a good life is simply more capacity. Sometimes it is. Often it isn’t. A violin with additional strings doesn’t automatically produce deeper music; it gives the musician more possibilities to misuse.

Another fault line arrives where freedom meets infrastructure. Advocates talk about “morphological freedom” and “cognitive liberty”—the right to modify one’s body and mind. But freedom requires more than legal permission; it needs material conditions that make saying no possible, dignified, and safe. If a suite of cognitive aids becomes the norm for competitive exams or elite internships, declining is no longer a neutral choice; it’s a self-imposed handicap dressed up as virtue. The rhetoric of liberty can hide new pressures. People don’t only ask, “What do I want?” They ask, “What will be expected of me?” Policy that ignores this social gravity ends up moralizing what are really structural constraints.

Justice threads through every corridor. Enhancements will not fall like rain evenly across a landscape. They will arrive first where power already lives—labs with funding, health systems with reach, families with savings, nations with bargaining chips. Some will call for public baselines: if certain tools become integral to learning or participation, provide them universally, not as charity but as civic infrastructure. It’s a sensible instinct, though not a complete fix, because distribution is only one dimension; the quality of relation matters too. There’s a difference between a tool that widens access and a tool that surveils, extracts, or nudges under the banner of help. The datafication of intimate life—that quiet siphon of neural signals, genomic maps, keystrokes, eye movements—creates a new fiduciary terrain. Who holds the keys? Who can delete? Who decides secondary uses? These aren’t afterthoughts. They’re the hinge on which trust swings.

Transhumanism attracts friends and critics who sometimes talk past each other (Szabados, 2021). The techno-optimist hears, in every caution, an echo of fear that once blocked progress: the same apprehension that tried to forbid anesthesia, or vaccination, or IVF. The bioconservative hears, in every promise, the old conceit that progress is linear, that

technology is morally neutral, that the human story is a climb rather than a braid of gains and losses. Perhaps each camp, when caricatured, is half-right and therefore half-blind. Progress did lift millions; it also produced new forms of domination and ecological ruin. Technology is a force, yes, but forces are fractured by culture, politics, and habit. And the climb? It depends which ledgers you read and whose lives you count.

One productive stance treats transhumanism as a design argument about ends. Not “can we?”—that’s already boring—but “toward what?”—the question that keeps slipping away when the demo is impressive. If the end is measurable output, we will build a school that rewards velocity and truncates reflection. If the end is flourishing—still a contested word but at least a human one—we will ask harder questions: what forms of struggle are worth preserving because they teach humility, patience, solidarity? What forms of struggle are gratuitous, imposed by poor design, indifference, or cruelty? There’s no algorithm for this discernment. It requires practical wisdom, the kind developed when communities argue in good faith and change course when evidence or compassion demand it.

Identity sits, fidgeting, in the middle of the room. Am I still the same person across a significant cognitive upgrade? Legal systems already handle identity’s gradual changes; no court requires a person to be psychologically identical to their younger self. Yet some interventions feel different—closer to editing the coordinates of self than merely adding a new skill. People with deep brain stimulation for Parkinson’s have reported shifts in mood and impulse that felt disorienting; some chose to reduce symptom relief to keep a familiar sense of self (Seritan et al, 2021). The lesson isn’t “never touch the brain.” The lesson is that identity isn’t a fixed artifact; it’s a relationship one maintains with continuity and narrative. Tools that modulate experience should be adopted with that relationship in mind. The more irreversible an intervention, the more we should slow down, include those who know the person well, and build exit ramps where possible.

There is also the oldest question: what counts as dignity? For some, dignity requires respecting a boundary—don’t trespass into germline edits; don’t sell access to the mind’s private theater. For others, dignity requires removing barriers that block one’s capabilities—if gene editing can prevent a life of avoidable suffering, refusing becomes its own kind of trespass. These aren’t merely philosophical stances; they are households, faiths, cultures, memories of harm, different weights given to autonomy and solidarity. A decent politics won’t collapse them into a single program. It will stage them in conversation and organize public life so that no camp can unilaterally impose its metaphysics on everyone else.

Hopes should be handled with the same seriousness as risks. Not all hope is hype. Imagine a first-generation student who, thanks to accessible AI tutors, practices logic at midnight without shame (Argueta, 2025). Imagine a worker returning to school in their fifties because longevity science stretched the arc of working life and the university redesigned with modular credentials that fit around caring for aging parents. Imagine hearing enhancement that not only cures deafness but also toggles between human speech and the auditory textures of a forest at night, introducing forms of aesthetic experience that didn't exist before. These aren't trivial. They're expansions of human possibility and, when governed well, of human intimacy: more ways of being together and learning from each other.

But hope, when it struts alone, becomes extraction. There will be corporate capture—contracts that smuggle surveillance into classrooms under the name of personalization, closed ecosystems that lock students into a vendor's ontology of "engagement," neurodata treated like another advertising signal. There will be geopolitical race dynamics—states justifying reckless adoption because "the others" might do it first, research ethics bent around strategic competition, global South communities told to be grateful for hand-me-down tools without co-ownership or voice. There will be environmental costs—the batteries, the rare earths, the e-waste—folded into the price tag but paid by distant places. It's not dour to anticipate these patterns. It's prudent. They repeat because incentives do.

One way to keep the frame honest is to drop the fantasy that neutrality exists. Every campus policy—on AI writing, on neurotech accommodations, on genetic disclosures, on data retention—implicitly takes a stand on values (Haag et al, 2025). Better to name them: we value equity over speed when the two collide; we protect refusal as a legitimate choice; we design assessments that reward judgment rather than mere throughput; we minimize data by default and treat students' cognitive traces as theirs, not ours. Values won't prevent conflict, but they give communities a compass when the map is noisy.

Another honesty: enhancement doesn't erase struggle; it rearranges it. The student who never learned to wrestle with revision because an algorithm proposes silky sentences will still meet difficulty later—perhaps the difficulty of deciding which voice to own, of tolerating imperfection in a world that can always polish. The researcher who relies on a predictive model will still face the task of skepticism, of knowing when the data's story is too tidy. In this sense, the promise that transhumanism "solves" the human condition is a category error. It changes the texture of ordinary work. Sometimes for the better, sometimes not.

Think of curriculum as an art of attention. If attention can be modulated with devices and drugs, curriculum must become explicit about which states are educationally valuable and why (Nouri, 2025). Not every course needs the same attentional regime. Studio art may welcome meandering focus and associative leaps; organic chemistry may require tight precision; a seminar on tragedy might benefit from slow reading and emotional availability. A mature institution can articulate these differences, invite students into that reasoning, and scaffold tools accordingly. Instead of one-size-fits-all prohibitions (“no AI, ever”) or blanket permissions (“use anything”), we move toward craft: “Here, we’ll practice without augmentation because you need the muscle. There, we’ll collaborate with tools and grade your discernment.”

The dignity of refusal deserves more than a footnote. Some will opt out for religious reasons; some out of temperament; some because they’ve been harmed by similar systems before. Keeping spaces for unaugmented practice isn’t romanticism; it’s an ecosystem strategy. Diversity of approach is a hedge against error when the evidence base is still young and the social effects are nonlinear. It also resists the moral monoculture that innovation sometimes breeds, where speed masquerades as virtue and caution as cowardice. A campus that, with care, shelters plural modes of learning will likely be more resilient than one that bets everything on a single technological pathway.

There is the matter of narrative as well. Humans don’t only need tools; they need stories that make sense of those tools. The stories on offer are too often thin—either apocalypse or salvation, either “we become gods” or “we lose our souls.” The middle story—tragicomic, ironic, brave—says that we will muddle through, that we’ll create new harms while solving old ones, that we’ll discover kinds of beauty we couldn’t have predicted and forms of loneliness we weren’t ready for, that wisdom will remain scarce and precious. Education, when it’s honest, apprentices people to that middle story: how to calibrate awe, suspicion, patience; how to disagree without contempt; how to revise a view without humiliation. Transhumanism doesn’t displace that curriculum; it makes it indispensable.

One more seam to inspect: the ecology of limits. The enhancement mindset tends to treat limits as failures to be conquered. Sometimes that’s true. But many practices—craft, friendship, scholarship, care—depend on the right kind of limits: deadlines that give shape, bodily rhythms that teach empathy, mistakes that become teachers, fatigue that signals the need for others. The brave question isn’t “Do we want fewer limits?” It’s “Which limits are unjust, which are formative, and which are invitations to solidarity?” Answer poorly and we end up with brittle excellence—people

who perform brilliantly until the scaffolding fails. Answer well and we might grow communities that are both innovative and kind.

To frame transhumanism responsibly, then, is to juggle a few commitments at once:

- Treat enhancement as morally serious but not sacred. Tools are tools. Their worth depends on the worlds they help build.
- Keep equity at the center—not as an afterthought or a grant section, but as design criteria from the first whiteboard sketch.
- Guard agency with structure. Freedom requires policies that neutralize coercion by expectation.
- Tie precaution to irreversibility. The harder an intervention is to unwind, the slower and more publicly we should move.
- Honor data as a trust, not a commodity. The mind is not an advertising surface.
- Build spaces for refusal, practice, and play. Homo experimentalis still needs room to be human.

All of this sounds noble; it only becomes real when embodied in mundane choices. Whether a syllabus asks for process notes. Whether a financial aid office budgets for cognitive aids the way it does for textbooks. Whether a disability services unit is empowered to shape campus-wide enhancement policy rather than reacting at the margins. Whether IRBs include people with lived experience of the technologies under review. Whether vendor contracts prohibit secondary data use even when the clause is expensive.

It helps to imagine people, not categories. Consider a student with chronic migraines who finds that a particular neurostimulation wearable reduces attacks by half (Monteith et al, 2023). Their grades improve, yes, but so does their capacity to be present with friends, to volunteer, to sleep. Consider a student from a low-income background who, with an AI tutor, catches up on calculus at hours when no human tutor is affordable or awake. Confidence blooms; major options widen. Consider a student tempted to use every available enhancer and who then learns—through reflective assignments and gentle limits—that saying no is also a skill and sometimes the wiser one. These are not hypotheticals designed to “prove” a stance. They’re reminders that the real work is local, intimate, and iterative.

Skeptics are needed. So are builders. A healthy institution convenes them, lets them test each other, and refuses the lazy comfort of camps. One might call this stance technoprogressive: eager for relief and expansion, allergic to domination and haste (Lipowicz, 2023). The label matters less than the practice. Practice looks like communities of inquiry that don’t