# Educating in the Age of AI: Cultivating Integral Human Development

# Educating in the Age of AI: Cultivating Integral Human Development

AI Research Group
*for the*
Centre for Digital Culture
*of the*
Dicastery for Culture and Education of the Holy See

Edited by
Catherine Moon, Taylor Nutter, and Luis Vera

Foreword by
Paul Tighe

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Cultivating Integral Human Development
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# Dedication

In memory of Pope Francis

# Theological Investigations *of* Artificial Intelligence Book Series

**Series Editors**
Matthew Gaudet, Santa Clara University
Jason King, St. Mary's University—San Antonio, TX
M. Therese Lysaught, Georgetown University

Society has crossed the threshold of massive upheavals due to the advancement and proliferation of artificial intelligence and other technologies. The Theological Investigations of Artificial Intelligence book series will offer reflections on this technological revolution and its consequences from the tradition of Catholic social, economic, and ethical thought.

The series will be published in collaboration between the AI Research Group for the Centre for Digital Culture, which is part of the Holy See's Dicastery for Culture and Education, and the *Journal of Moral Theology*. It advances the *Journal of Moral Theology*'s mission of fostering scholarship deeply rooted in traditions of inquiry about the moral life, engaged with contemporary issues, and exploring the interface of Catholic moral theology, philosophy, economics, political philosophy, psychology, and more.

Online versions of the volumes in the Theological Investigations of Artificial Intelligence series are available for free download at jmt.scholasticahq.com. Paper copies may be purchased from Wipf & Stock. This dual approach reflects the *Journal of Moral Theology*'s commitment to the common good, as it makes the scholarship of Catholic theological ethicists broadly available, especially across borders. Additionally, you can find the series listed on the website of the Dicastery for Culture and Education at: www.dce.va.

# Series Titles

*Encountering Artificial Intelligence: Ethical and Anthropological Investigations*, edited by Matthew J. Gaudet, Noreen Herzfeld, Paul Scherz, and Jordan J. Wales (2024)

*Reclaiming Human Agency in the Age of Artificial Intelligence*, edited by Paul Scherz and Brian Patrick Green (2025)

*Educating in the Age of AI: Cultivating Integral Human Development*, edited by Catherine Moon, Taylor Nutter, and Luis Vera (2026)

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**The AI Research Group** is a group of North American theologians, philosophers, and ethicists who have come together at the invitation of the Vatican Centre for Digital Culture, under the auspices of the Dicastery for Culture and Education of the Holy See, to discuss the current and future issues that the continued development of artificial intelligence poses for life and society as we know it. This book is the result of the collaborative efforts of these scholars from 2024 to 2026. The lead authors for this volume were Catherine Moon, Taylor Nutter, and Luis Vera, and the contributing authors were Heather Foucault-Camm, Kevin Gary, Matt Gaudet, Brian Green, Jason Heron, Cory Labrecque, Maria Morrow, Paul Scherz, Ann Skeet, John Slattery, and Warren J. von Eschenbach.

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The research of this book was inspired by the papal magisterium initiated by Pope Francis (*Antiqua et Nova*, *Laudato Si'*, and various addresses), warning that AI solutions that merely provide answers instead of prompting students to arrive at answers themselves risk failing to develop critical thinking skills. Also, Pope Leo XIV in his recent *Magnifica Humanitas* and the apostolic letter *Drawing New Maps of Hope*, has been an inspiration in the completion of this book, calling for an educational alliance in this digital challenge by teaching and forming people to use technology responsibly, critically, and creatively.

The final structure for the book was developed at a plenary meeting of the group in July 2025 at the University of Notre Dame. That conference was organized by the de Nicola Center for Ethics and Culture. We are grateful for the support of Justin Petrisek, Brooke Tranten, Danny O'Callaghan, Margaret McManaway, and Jennifer Martin for the incredible amount of work they devoted to making sure the conference went smoothly. It received the financial support of a Henkels Large Conference Grant from the Franco Family Institute for Liberal Arts and the Public Good, College of Arts and Letters, University of Notre Dame, for which we are thankful. The McGrath Institute for Church Life provided further logistical support.

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Finally, we express our heartfelt appreciation to all the students who have proved to be very fruitful interlocutors during field tests and to everyone who has contributed—directly or indirectly—through leadership, critique, resources, companionship, encouragement, and prayer. Their shared commitment has brought this project to fruition.

Angel González-Ferrer
Centre for Digital Culture

# FOREWORD

Over the last few years, welcoming a new publication by the AI Research Group for the Centre for Digital Culture of the Dicastery for Culture and Education has become one of the more pleasant features of my work. I am delighted to acknowledge the latest fruit of their collaborative efforts: *Educating in the Age of Artificial Intelligence: Cultivating Integral Human Development*. This is a particularly timely production as all educational institutions globally—including Catholic schools, colleges and universities—seek to redefine their mission in the light of the emergence of AI. This rethinking has been required by the rapid adoption of AI technologies by many and by the diffusion of AI applications that are transforming teaching methods, assessment procedures, and the learning environment. In addition, educators are being forced to think about the forms of education that may be needed to equip young people to live in a world that is being reconfigured economically, socially and in terms of employment while also teaching them to understand the technologies, business models, and dynamics that shape AI and determine its impact on individuals and society. As Pope Leo XIV said in *Magnifica Humanitas*, "Rapid technological transformations reveal just how unprepared we are on the educational level" (§139). This volume seeks to deepen the conversation and sharpen readers' discernment rather than attempting to settle all relevant questions in advance. It is aimed at empowering all the relevant stakeholders—students, parents, educators, and policy makers—to take responsibility and shape the development and employment of these new and potentially helpful tools. It is not enough for people to wait and watch, "observing from afar and merely hoping for the best" (§6).

This text highlights a radical tension between the allure of AI as a mechanistic tool for efficiency and the true purpose of Catholic education:

the integral development of the human person. Framed by the scriptural vocation of the gardener (Genesis 2:15), the book reminds us that education is not about reducing students to data or relationships to mere rules but ultimately about nurturing their humanity. It is a summons to cultivate human flourishing through dialogue, hope, and an authentic encounter with reality. Against the backdrop of structural trends like behaviorism and surveillance capitalism, the book champions an approach that respects the dignity of every person and remains attentive to the "wisdom of the heart."[1] It rightly warns that any claim presenting educational technology as the answer to all our problems must be approached with caution, as such claims necessarily rely on a reductive understanding of the human person.

This publication invites educators, parents, and administrators to pause and engage in personal, ongoing discernment. While AI applications promise advancements in individualized learning and preparation for the modern workforce, they also risk exacerbating inequalities, eroding academic integrity, and deskilling both students and teachers. True Catholic education resists the empty promises of a technocratic paradigm that would substitute a partial aspect of learning for the genuine whole. It seeks to form individuals for community, remaining firmly rooted in the preferential option for the poor and oriented toward the common good. Education seeks to draw out the abilities and capacities of the student while inviting him or her to place his or her gifts and talents at the service of the community.

Drawing on the wisdom of some of the Doctors of the Church and Catholic social doctrine, the authors develop a constructive vision of integral technology. This philosophical framework helps differentiate

[1] See Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova* [*Note* on the Relationship Between Artificial Intelligence and Human Intelligence], January 14, 2025, vatican.va/roman_curia/congregations/cfaith/documents/rc_ddf_doc_20250128_antiqua-et-nova_en.html, §§114, 116; also Pope Francis, "Message for the LVIII World Day of Social Communications," *L'Osservatore Romano*, January 24, 2024 vatican.va/content/francesco/en/messages/communications/documents/20240124-messaggio-comunicazioni-sociali.html.

beneficial uses of AI from harmful ones, allowing educators to navigate practical spheres such as curriculum design, individualized education, assessment, and the teaching of AI literacy. Furthermore, the text addresses deeper questions regarding worker burnout, leisure, and skilled creativity, guiding educators as they form students for good, meaningful labor in an AI-shaped society. By doing so, it effectively reframes the ethical discourse, moving away from overly simplistic optimistic or pessimistic narratives to focus squarely on the human heart.

I cannot but echo the sentiment that technology must serve humanity rather than dominate it. The commitment of the Holy Father in *Magnifica Humanitas* to placing the human person at the center of technological progress makes this volume particularly relevant and pertinent. It is my hope that *Educating in the Age of Artificial Intelligence* will inspire educational communities to navigate this era with joyful creativity, ensuring that our tools serve, rather than subvert, the sacred task of teaching. Just as Pope Francis insisted that "communication is ultimately a human rather than technological achievement," we must insist that at the heart of education there is personal exchange in which the teacher puts him or herself in play and invites the student to realize the fullness of his or her humanity.[2]

I formally express my gratitude to the volume editors and all the contributing scholars for their dedication. This volume is itself the product of much reflection, conversation and debate—I am grateful to all who helped to write it for their competence and their commitment. It is aimed at fostering further reflection and comes with an invitation to readers to respond, to comment and to articulate their own perspectives. Education is, as Leo reminds us,

> a long journey requiring patience, and therefore needs time for development and for engagement with reality beyond appearances. . . . As Plato wrote,

[2] Francis, "Message of Pope Francis for the 48th World Day of Social Communications," June 1, 2014, vatican.va/content/francesco/en/messages/communications/documents/papa-francesco 20140124messaggio-comunicazioni-sociali.html.

the deepest and most important things are learned only after much time and effort, by engaging in discussion with others, 'striking upon' ideas and experiences together like flint until the spark of understanding is kindled within us. (*Magnifica Humanitas* §140)

Bishop Paul Tighe
June 30, 2026

# Preface

Technology alters our self-conception and the ways in which we interact with the natural world and one another. It does this by mediating our relationships and so influencing their shape, by inviting certain habits of mind and of body, and by making some social possibilities easier and more likely and others more difficult and improbable. Because of this, technology ethics ought not to confine itself only to the consideration of right and wrong at the level of individual use. It also ought to consider what kind of relationships, habits, and social possibilities any given technology promotes or impedes. These issues can be compounded in educational technology since formal education is intimately tied to the transmission of not just a body of knowledge within a particular field but also our collective self-understanding through shared cultural and social practices. Of course, educational technology aligned with a broad and rich understanding of the true purpose of education, such as integral human development, would allow us to reap the benefits of increased access to information. But this alignment must resist all forms of reductivism that substitute some partial aspect of learning for the genuine whole.

Thus, Catholic education will approach technology in a way that resists the empty promises of a future determined entirely by the technocratic paradigm's focus on manipulating reality for maximal profit and security. Instead, it will seek to embody hope in the future God has promised wherein every tear shall be wiped away (Revelation 21:4 NAB). A good education will therefore cultivate a specific kind of hope. This hope imagines and seeks futures that lie beyond the horizons set by fear, avarice, acedia, and the subjection of human beings to technological control. For the Christian, education must be rooted in an Easter hope that rejects a false optimism in a false utopia merely of human making. Such an education flows from faith in the resurrected Christ who calls us beyond our narrow ways of thinking and living into a perilous journey toward an

abundant life, a life that does not bow to the sources of death, mourning, crying, and pain in this world but works to bend and break them.

The particular twists and turns of this journey cannot be known beforehand, but God's promises are trustworthy and God has promised to plant God's people in a secure and abundant place. To take up the call to embark on this journey means being joyfully open to the unpredictable, as one is joyfully surprised by the emergence of the particular personality of a child. The child's character can be influenced, but it ought not to be overbearingly controlled. It must bloom by an internal impetus and we must lovingly await its self-manifestation. Education at its best balances an invitation to growth in particular directions with a patience that gives space for children to develop their own capacities according to their agency and uniqueness.

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# INTRODUCTION

Educators must always negotiate tension. They commit themselves to serving others, hoping to reach the highest and truest ideals. Even when teaching a specific skill, Catholic teachers usually have their students' overall formation in mind. And yet, they aim for those ideals in the context of limits: insufficient time, attention, and resources, among others. Negotiating this tension well is part of what it means to teach others. That tension is a key reason why teaching involves both much joy and much difficulty. Teaching is intrinsically ordered to the flourishing of students in the hope that they might commit themselves to the true and to the good and to the beautiful. But teaching occurs within structural constraints that in many instances render challenging and frustrating the commitment to concretely promote holistic student flourishing. This being the case, it must be stated from the outset that this volume is not meant to tie up heavy burdens and lay them on the shoulders of educators (Matt. 23:4). Instead, we intend this volume as a dialogue partner that, we hope, will be of assistance as educators discern what is best for their students in the age of artificial intelligence (AI).

There is little agreement about how to respond to the advent of AI technologies and applications in the world of education. Many teachers are encouraged by the possibilities: of their efforts bearing more fruit when the same resources are used in tandem with AI, of tailoring lessons to *many* individual students, and of minimizing drudgery so as to maximize personal interaction. Many are also eager to put these benefits in service to educating the poor and marginalized. At the same time, concern about the harms of AI to students and to educational ecosystems has become a constant hum across educational communities. The concerns raised are many: ballooning detective work for teachers and lost trust due to AI-

powered cheating, difficulty fostering the skills and personal investment students need for deep creativity and for wise interpretation and judgment, and the worsening of cultural conditions that are already unfriendly to the sincere and collaborative pursuit of truth. The tension is felt all the more deeply by members of learning institutions that are facing increasing financial challenges. What can the Church say in the face of this tension? How can Catholics and other Christians bring their tradition to bear on these questions to serve the flourishing of their own educational institutions as well as all other communities of learning?

The Catholic Church's stance toward technology is fundamentally ordered toward integral human development. We are responsible for ensuring that human artifacts and technologies are designed, built, and used in a way that *genuinely contributes* to the common good. This conviction embodies a sense that technologies are part of the world that God is creating and redeeming, along with a recognition that humanity's technological ingenuity is somehow connected both with our embodied vulnerability and with our deeper orientation towards infinite truth, beauty, and goodness. The fruits of human ingenuity *can* be oriented to the flourishing of the human family and of creation, but they can also be oriented to the withering and decay of the human family and creation. We are influenced by our tools: they encourage some actions and discourage others, and they function as conduits for some sociocultural influences over others. For instance, given their design and especially within a technocratic horizon, cars can exacerbate an individualistic and displaced outlook. But human creative freedom can also orient tools toward integral human development, especially when we respond with courage and love to God's redeeming mercy. The right set of habits and practices might enable people to use cars in service to genuine goods while minimizing these tools' negative formative tendencies. *The Church has thus come to see technology not as neutral but as both morally loaded and open to human creative freedom.* The chapters to come will have much to say about how this view, in conjunction with the Church's approach to education and

the human person, offers us a constructive perspective on questions regarding AI-driven educational technology. At the outset, however, we outline for the reader some of the themes and images that permeate the whole book in order to help us stay oriented to the approach to technology proposed above.

## The Image of the Gardener: Sowing Dialogue, Germinating Hope

In the second chapter of Isaiah, we find a well-known vision where all the peoples of the world "stream" to "the mountain of the Lord's house," freely seeking God's wisdom on how to live together justly and "walk in his paths" (Isaiah 2:3). Isaiah declares that they "shall beat their swords into ploughshares and their spears into pruning hooks. One nation shall not raise the sword against another, nor shall they train for war again" (Isaiah 2:4).[1] As Isaiah seems to see it, even tools of destruction can be bent to good uses. But first they must be bent. They cannot simply be redirected, just as they currently exist, towards new and better goals. They cannot simply be used more "safely" or "ethically" as they are. Isaiah is not saying, "Swords don't kill people; people kill people." Rather, the sword and spear have a morally problematic structure that must be reckoned with and ultimately reconfigured if we are to cooperate with God's healing of the world. In his recent encyclical, *Magnifica Humanitas*, Pope Leo XIV argues that AI technologies are tools with destructive potential like the sword and spear. Such technologies must be "disarmed" before they can be used in true service to humanity.[2]

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[1] Pope Francis makes similar use of this image in "Message for the 57th World Day of Peace," January 1, 2024, vatican.va/content/francesco/en/messages/peace/documents/20231208-messaggio-57giornatamondiale-pace2024.html, §6. All magisterial documents cited in this volume can be found on the website of the Holy See, vatican.va.

[2] Leo XIV, *Magnifica Humanitas* [Safeguarding the Human Person in the Time of Artificial Intelligence], The Holy See, May 15, 2026, §110. According to *Magnifica Humanitas*, "To disarm means discrediting the assumption that technical power automatically confers the right to govern. To disarm does not mean rejecting technology, but preventing it from dominating

The image of bending and beating also reminds us that this process entails a particular kind of *work*. Taxing effort and self-giving attention are called for, along with vision (for perceiving which tools are appropriate for living into God's world) and highly skilled creativity (for knowing how to rework a particular tool into something better). Hopeful creativity is not easy. It requires sacrifice and wisdom. But on the other side of that work, we can glimpse not only plows and pruning hooks but the alternate world they reveal: one where we begin to reclaim our vocation as gardeners of God's world. We are called to till and to keep the world, that is, to cultivate and care for it with loving attention and steadfast service (Genesis 2:15).[3]

What, then, does it mean to educate according to **the vocation of the gardener**, and to bend AI applications to this way? There is no denying the accomplishments of AI technologies: increased efficiency in climate modelling, earlier cancer detection, faster prediction of protein folding, and more. There is also no denying the dangers of AI: bias, autonomous weapons, energy consumption, surveillance, and more. The question for educators, then, is: How do we become the kind of persons who are willing and able to bend AI technologies toward the former and away from the latter? And how, then, do we cultivate such a habit in our students?

God is our first and most perfect model for the way of the gardener. All of creation proceeds from and is maintained in its being through the work of God's loving hands. St. Hildegard of Bingen substantively meditated on this image in her theological writings. According to Hildegard, like a gardener, God "first chooses a suitable site, and then deciding on a place for each planting reflects on the fruit of good trees and the utility, taste,

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humanity. It means freeing technology from monopolistic control and opening it to discussion and debate, therefore making it human-friendly and restoring it to the plurality of human cultures and ways of life" (§110).

[3] Daniel Castillo offers an overview of this theme and his interpretation of how the Bible contrasts it with social systems that press technological development in service to the endless accumulation of power and wealth, leading to the exploitation of both people and the land. See Daniel Castillo *An Ecological Theology of Liberation: Salvation and Political Ecology* (Orbis Books, 2019), 67–138.

fragrance," laying out "each of the plantings where he thinks it will be most useful."[4] The way of the gardener is not simply one of planting and ordering the environment in which the plant grows but is also one of constantly and ceaselessly nurturing, tending, and pruning so that what has been planted may bear fruit that is then properly gathered, carried, and distributed throughout the world. From the beginning, God planted a garden, ordering it out of the chaotic waters, filling it with beauty, delight, and fruit-bearing trees, nurturing its growth through the living waters of a welling stream and providing it with special caretakers created in God's own image (Genesis 2:4–9; Psalm 104). It is fitting, then, that Mary Magdalene first mistook Jesus for a gardener at the empty tomb since "cultivating and keeping the garden is the original task that Jesus brought to fulfillment."[5] This is why "his last words on the cross—'It is finished'—invite each of us to rediscover the same task," that is, to be the caretakers and custodians of the garden where the loving self-sacrifice of the "Crucified One was laid as a seed, to rise again and bear much fruit."[6]

In light of the prophet Isaiah's vision for a peaceful future and the scriptural allusions to the way of gardening, *the vocation of the gardener* is put forward as a *universal human vocation.* Among the many images in Scripture and the Christian tradition used to describe God's care for creation and God as the great Teacher, we find the image of the gardener to be a particularly fitting one for thinking through the goods of education and the pursuit of integral human development in the age of AI.[7] This

[4] St. Hildegard of Bingen, *Scivias*, trans. Mother Columba Hart and Jane Bishop (Paulist Press, 1990), I.2.32.

[5] Leo XIV, "General Audience," November 19, 2025, vatican.va/content/leo-xiv/en/audiences/2025/documents/20251119-udienza-generale.html.

[6] Leo XIV, "General Audience," November 19, 2025.

[7] For instance, the image of a shepherd is used to describe the way God leads and never abandons God's sheep no matter how far they stray or how perilous their journey becomes (Psalm 23; John 10:11–18). The image of the sculptor is used to describe how God personally forms and molds each person to a specific end and, when broken, reworks his creations into something new (Genesis 2:4; Jeremiah 18:1–23). The image of light is used to describe how

image highlights what AI technologies in their current form have the tendency to obscure: the distinctions between the *organic* and the *inorganic*, the *animate* and the *inanimate*, and the *personal* and the *mechanical.* But most importantly, the image of the gardener points to an integral education that sows *dialogue* and germinates *hope*. What do we mean by this?

First, the educator-as-gardener is fundamentally committed to *dialogue*. As St. Edith Stein (Teresa Benedicta of the Cross, OCD) describes, the human soul can be likened to the seed of a rosebush insofar as neither are formless nor void but carry the end for which they strive within themselves, within the *core* of their being.[8] Learning is *not* "an external possession" of information, any more than growing is separate from the life of a plant.[9] Teaching is *not* the external imparting of facts, imprinting onto a blank slate, or filling of an empty bucket.[10] Gardeners allow their garden and its plants to speak, listening to the needs of each thing according to its nature. The gardener is patient and, therefore, uncompromising, listening to and attending to the garden and each of its plants' needs in due season. So, too, do teachers need to encourage dialogue with their students and between their students and reality. As theologian and educator Fr. Luigi Giussani posited, education is the entrance of the soul into the real.[11] It is the cultivation of an encounter with reality in the

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God can be a beacon in even the darkest places and guide people back to the way of truth and goodness, away from falsity and evil (Psalm 27; John 8).

[8] Edith Stein, *Edith Stein Selected Writings,* trans. et ed. Marian Maskulak, CPS (Paulist Press: 2016), 199–200. Additional gardening metaphors concerning education and the cultivation of the human person can be found in writings from all of the female Doctors of the Church. See St. Teresa of Avila, *Book of Her Life*, trans. David Lewis (Thomas Baker, 1904), IX.10–12; Hildegard of Bingen, *Scivias*, I.32.; St. Thérèse of Lisieux, *The Story of a Soul*, trans. Michael Day, Cong. Orat. (TAN Books, 2010), 13–15, 42–45; St. Catherine of Siena, *The Dialogue*, trans. Suzanne Noffke, OP (Paulist Press, 1980), XXIII–XXIV.

[9] Edith Stein, *Essays on Woman*, trans. Freda Mary Oben (ICS Publications, 2010), 130.

[10] Stein, *Essays on Woman,* 130.

[11] Luigi Giussani, *The Risk of Education,* trans. Rosanna M. Giammanco Frongia (Crossroad, 1995), 105.

depth and totality of its meaning. Learning is thus rooted in an openness to and an ongoing *dialogue* with reality. It is an openness to the way in which we can not only ask questions of reality but reality can ask questions of us.

The vocation of the gardener is then thoroughly *non-mechanistic*. To garden is to respect the fundamental integrity of the garden and each of its plants. It is to take on a perspective that refuses any form of reductivism out of a deep love for all the creatures that one nurtures into flourishing. We tend to think of machines as reducible to their parts. But this is clearly impossible with the living creatures that form part of a garden ecology. Plants are integral wholes. While machines in a crucial sense operate by rules we can specify clearly in advance, the living of plants, by contrast, is too dynamic, complex, and emergent to be fully understood through any set of rules. Tending to plants thus requires a skillset analogous to the virtue of *prudence*. Prudence is not a matter of memorizing and following rules. It is the cultivation of a deep sensitivity to the requirements of right reason regarding action in any given circumstance. No set of rules could possibly capture all that one should do in every possible circumstance. In this way, prudence involves the flexible ability to put what one knows in dialogue with what one is encountering so that one might practice virtue concretely. Gardeners allow themselves to be joyfully surprised by the emergence of the other and understand that emergence to be a great gift of divine governance. Each season is unique: fall is not summer and no two summers are completely alike. But an enduring and loving attentiveness to a garden over many seasons equips the gardener to act prudently in any season.

The vocation of the educator is analogous to the non-mechanistic vocation of the gardener. Such educators refuse to reduce relationships to rules or to reduce people to data. They understand humans as wholes not to be reduced to parts and not to be regulated into a perfection that is false because it has been imposed through a reductivist rule-based control. Just as plants must be given the space to mature according to an internal

impetus, so must humans be given the space to engage their freedom in the creative actualization of their cognitive capacities. They need room and support to discover, take possession of, and give full expression to their wonder, that is, their desire to know. And just as the gardener's wisdom emerges from and sustains patient attention, so too the educator's prudence emerges from, and eventually helps sustain, the teacher's listening heart. Such a heart is necessary for modeling wonder for students—wonder at both reality and at each student's unique self-realization as a knower and as a responsible member of the world.

Educating others into a wonder-driven and non-mechanistic dialogue with reality requires *hope*. Hope strives for a holistic understanding of flourishing against any reductive way of seeing or understanding reality. Because it seeks this integral flourishing, hope embraces the path of risk and patience rather than suffocating integral flourishing through procedures meant to secure outcomes.[12] The image of the gardener is again helpful here: to garden is to respect the fundamental integrity of the garden and each of its plants. Stewardship cannot be reduced to control. To approach a garden in a unilateral or transactional fashion is to cultivate a part to the detriment of the whole. Hope instead recognizes that reality is diminished if one approaches the world with the goal of control. Control does not allow each creature in the garden—and the interrelated

[12] Thus, hope must be carefully distinguished from an optimism that actually encourages control. Such optimism hides its face from suffering, attending only to the desired goal and to the means for attaining that goal. Hence, it can encourage us to not just ignore but actively conceal or even use others' suffering in the pursuit of utopian ends. Rather, hope is oriented to justice and right order so as to cultivate the integral flourishing of each member. It also looks honestly at the suffering of each and at the risk entailed by seeking a fully hospitable and non-manipulative path. Since it must renounce manipulative control, hope is then linked with trust in divine providence. Educators who follow the path of the gardener trust in God's loving care for their students and are *therefore* freed to risk a pedagogy that aims for the most integral flourishing in the least manipulative way. For more on the connections between hope, risk, and trust in providence in a technocratic setting, see Paul Scherz, *Tomorrow's Troubles: Risk, Anxiety, and Prudence in an Age of Algorithmic Governance* (Georgetown University Press, 2022).

membership of that garden—to reveal itself of its own accord in all its meaning, beauty, and complexity. Educators, for their part, need hope in order to aim for holistic flourishing while providing a non-manipulative space in which students can self-develop in the complex memberships of their classrooms and learning communities. Students also need hope that the difficult journey of realizing oneself as a lover of truth is both worthwhile and possible. Teachers first exercise this hope on students' behalf and then help students to cultivate it themselves.

Education as gardening is a path of love. The love of a patient, prudent, hopeful, and wonder-driven educator frees students to love reality and to be at home with themselves so as to build a common home with others. And this reveals the *right end* of education: self-transcendence in love—of God, our true home, and all things (that is, our neighbors) in God. Education as gardening cultivates a culture of encounter.

## A Theme of Integral Human Development and the Heart

This book is the third collaborative effort by the AI Research Group for the Centre for Digital Culture, which seeks to stimulate and deepen reflection on AI's impact on humanity by bringing Catholic social teaching to bear on key aspects of that conversation.[13] Over the course of our reflection on education, a clear central principle emerged time and again: **the implementation of AI technologies in education must always count as a robust service, and never an obstacle, to *integral human development*.** The word "integral," from the Latin "*integer*,"

[13] AI Research Group for the Centre for Digital Culture of the Dicastery for Culture and Education of the Holy See, *Encountering Artificial Intelligence: Ethical and Anthropological Investigations*, ed. Matthew J. Gaudet, Noreen Herzfeld, Paul Scherz, and Jordan J. Wales (Pickwick Publications, 2024), jmt.scholasticahq.com/article/91230-encountering-artificial-intelligence-ethical-and-anthropological-investigations. Also AI Research Group for the Centre for Digital Culture of the Dicastery for Culture and Education of the Holy See, *Reclaiming Human Agency in the Age of Artificial Intelligence*, ed. Paul Scherz and Brian Patrick Green (Pickwick Publications, 2026), jmt.scholasticahq.com/article/154545-reclaiming-human-agency-in-the-age-of-artificial-intelligence.

means "whole" and is etymologically related to the English word "entire." Its verbal form "*integrare*" means "to make whole" and comes into English as "integrate."[14] *Integral* human development thus refers to that which makes human persons whole and contributes to their complete fulfilment and perfection.

In line with the term's etymological meaning, Pope Saint Paul VI's 1967 encyclical *Populorum Progressio* teaches that in order for human development to be "authentic, it must be well rounded [*integra*]."[15] *Populorum Progressio* further clarifies that this well rounded or *integral* development "must foster the development of each [person] and of the whole [person]."[16] The "aptitudes and abilities" which human beings possess in "germinal form" at birth are cultivated first by their caretakers and later through their own freedom and ongoing relationships, "so that they may bear fruit" in the realization of God's plan.[17]

Integral human development, then, flows from true intersubjective encounter and the full scope of aspirations this encounter manifests. Pope Benedict XVI's 2009 encyclical *Caritas in Veritate,* which pays tribute to *Populorum Progressio,* further clarifies that *development* is a *vocation*.[18] The human person, therefore, "does not develop through his own powers, nor can development simply be handed to him"[19] but rather it "requires a free and responsible answer" by *all* in solidarity *with all*.[20] Building on the insight that human development can neither be "enclosed within

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[14] Robert K. Barnhart, ed., *The Barnhart Dictionary of Etymology* (The H.W. Wilson Company, 1988), s.v. "integral."

[15] Paul VI, *Populorum Progressio* [On the Development of Peoples], The Holy See, March 26, 1967, vatican.va/content/paul-vi/en/encyclicals/documents/hf_p-vi_enc_26031967_ populorum.html, §14.

[16] Paul VI, *Populorum Progressio*, §14.

[17] Paul VI, *Populorum Progressio*, §§14–15.

[18] Benedict XVI, *Caritas in Veritate* [On Integral Development in Charity and Truth], The Holy See, June 29, 2009, vatican.va/content/benedict-xvi/en/encyclicals/documents/hf_ben-xvi_enc_20090629_caritas-in-veritate.html, §16.

[19] Paul VI, *Populorum Progressio*, §11.

[20] Paul VI, *Populorum Progressio*, §17.

history"[21] nor the fruit of contempt or selfishness, *Caritas in Veritate* asserts that

> Development requires a transcendent vision of the person, it needs God: without him, development is either denied, or entrusted exclusively to man, who falls into the trap of thinking he can bring about his own salvation, and ends up promoting a dehumanized form of development. Only through an *encounter* with God are we able to see in the other something more than just another creature, to recognize the divine image in the other, thus truly coming to discover him or her and to mature in a love that "becomes concern and care for the other."[22]

We can in this brief passage begin to see the profound relationship between encounter and integral human development. Authentic and integral human development *is* the human vocation. Human development "derives from a transcendent call" and "is incapable, on its own, of supplying its ultimate meaning."[23] In order for authentic and integral human development to concern "the whole of the person in every single dimension" it must include the transcendent dimension of the human being.[24] In *Dilexit Nos*, Pope Francis describes this transcendent dimension of the human being as the *heart*. The heart is "the inmost core of our person."[25] This is why "when we grasp a reality with our heart, we know it better and more fully."[26] The inmost core of our person is the site for true encounter with reality.

Through true *encounter* and loving, compassionate involvement, integral human development is made possible and brought to its rightful activity

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[21] Benedict XVI, *Caritas in Veritate,* §11.

[22] Benedict XVI, *Caritas in Veritate,* §11, emphasis added. Benedict here is quoting his encyclical *Deus Caritas Est*, December 25, 2005, §6.

[23] Benedict XVI, *Caritas in Veritate,* §16.

[24] Benedict XVI, *Caritas in Veritate,* §11.

[25] Francis, *Dilexit Nos* [Of the Human and Divine Love of the Heart of Jesus], The Holy See, October 24, 2024, vatican.va/content/francesco/en/encyclicals/documents/20241024-enciclica-dilexit-nos.html, §15.

[26] Francis, *Dilexit Nos*, §16.

and purpose. This transcendent dimension does not merely include love or *caritas.* Rather love *is* its *very principle*. Love is the "driving force behind the authentic development of every person and of all humanity."[27] After all, "'the inmost core of reality'" itself is love.[28] The human person's integral growth towards a full response to reality must be founded in encounter with fellow creatures and especially with God. The encounter that spurs integral growth is a matter of self-transcendence. It involves an ever fuller participation in the dialogue that God the Father has initiated with all humans through the Son who is the Word and the Spirit who is Love. Education for integral development must, therefore, be dialogical rather than transactional, a matter of personal encounter through relationship rather than anonymous, individualized effort.

More recently, Pope Leo XIV has called for the Church to contribute to ethical dialogue concerning the "ramifications of AI" and he stressed that this dialogue should be grounded in a focus on the integral development of the human person.[29] Building on the work of his predecessors, Leo XIV asserts that "the benefits or risks of AI must be evaluated precisely according to [the] superior ethical criterion" that accounts for "the well-being of the human person not only materially, but also intellectually and spiritually"; this ethical evaluation of AI technologies entails "safeguarding the inviolable dignity of each human person and respecting the cultural and spiritual riches and diversity of the world's peoples."[30] This same approach is clear in Leo's statements on education:

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[27] Benedict XVI, *Caritas in Veritate*, §1.

[28] Francis, *Dilexit Nos*, §16. Francis here is quoting Karl Rahner, "Some Theses for a Theology of Devotion to the Sacred Heart," *Theological Investigations*, vol. 3: *The Theology of the Spiritual Life*, trans. Karl-H. Kruger and Boniface Kruger (Helicon Press, 1967), 333.

[29] Leo XIV, "Message of Pope Leo XIV to Participants in the Second Annual Conference of Artificial Intelligence, Ethics, and Corporate Governance," June 17, 2025, vatican.va/content/leo-xiv/en/messages/pont-messages/2025/documents/20250617-messaggio-ia.html.

[30] Leo XIV, "Message of Pope Leo XIV to Participants in the Second Annual Conference of Artificial Intelligence, Ethics, and Corporate Governance."

> *Gravissimum Educationis* . . . warns against reducing education to functional training or an economic tool: a person is not a "skills profile," cannot be reduced to a predictable algorithm, but is a face, a story, a vocation. . . . Christian formation embraces the entire person: spiritual, intellectual, emotional, social, physical. It does not pit manual and theoretical skills, science and humanism, technology and conscience against each other; rather, it demands that professionalism be imbued with ethics, and that ethics be not an abstract concept but a daily practice. Education does not measure its value only on the axis of efficiency: it measures it according to dignity, justice, the capacity to serve the common good. This integral anthropological vision must remain the cornerstone of Catholic pedagogy. Following in the wake of the thought of Saint John Henry Newman, it goes against a strictly mercantilist approach that often forces education today to be measured in terms of functionality and practical utility.[31]

We need to therefore be thoughtful about the role of AI technologies in education to ensure that we are calling forth and fostering the wisdom of the heart that will continue to give life meaning to our descendants as entire persons. As we write, initiatives for strongly regulating the presence of smartphones in grade schools continue to pick up momentum in the U.S. and across the world.[32] Whether these initiatives fully address the concerns that drive them remains a real question. They, however, at least indicate that the technological ecologies that scaffold education are more malleable by concerted political action than we might initially realize. Sometimes we forget that swords can be bent into ploughshares. In some

[31] Leo XIV, "Apostolic Letter 'Drawing New Maps of Hope,' on the Occasion of the 60th Anniversary of the Conciliar Declaration *Gravissimum Educationis*," October 27, 2025, vatican.va/content/leo-xiv/en/apost_letters/documents/20251027-disegnare-nuove-mappe.html.

[32] See, e.g., "To Ban or Not to Ban? Monitoring Countries' Regulations on Smartphone Use in School," UNESCO, January 24, 2025, unesco.org/en/articles/smartphones-school-only-when-they-clearly-support-learning; Jeff Amy, "Majority of US States Now Have Laws Banning or Regulating Cellphones in Schools, with More to Follow," *The Associated Press*, May 21, 2025, apnews.com/article/cellphones-phones-school-ban-states-c6a54feb9d2661e04989b7cdd5b2821b.

sense, AI technologies are likely here to stay. But how we do or do not employ them in our educational practices is a choice we must exercise carefully. We cannot afford to relinquish that choice through passive acquiescence to the directions that technology companies find profitable. To allow education to be structured according to the efficiency that is profitable for some but not conducive to integral human development for all is to fail to resist the reduction of education of which Leo warns.

## The Purpose of This Book: Preparing the Soil for Ongoing Discernment

We ultimately hope for this book to be a point of departure for ongoing dialogue and discernment about which uses or types of AI technologies are conducive to the purposes of education and which ones are not. Reckoning with our material constraints is an inescapable responsibility. But our sense of what is possible within those constraints is never more than an interpretation of our situation. These interpretations can be wrong. They are also liable to be influenced by those most likely to gain from our educational technology decisions. Technology can be used well, but to do this, we must first commit to keeping it in its place by only using it for functions that genuinely contribute to the common good and integral human development. We must, therefore, give ourselves permission to pause and reimagine what is possible in service to our commitments. We never know what new doors may open through concerted and creative efforts driven by a clear vision and a love for our students. This requires that we commit to set the bar as truthfully as possible, and to cultivate a restless creativity in service to that standard when material constraints seem to prevent us from meeting it.

Over the course of this book, we offer a positive, constructive proposal of what it can mean to educate in the context of a world increasingly molded by AI technologies. A part of that proposal is the vocation of the gardener. An educator-as-gardener lives out the demands of *integral human development* and the *wisdom of the heart* and is grounded in *hope*,

*dialogue*, and *a culture of encounter*. These are, then, the tools we ought to bring with us as we reflect on the place of AI in education: a **hope**-oriented **dialogue** that invites one into familiarity with one's **own mental and spiritual living** and that is **not reducible** to any **mechanical procedure.** This hope enables one to **encounter** and respond to **reality in the depths of its meaning,** and thereby, **cultivate a culture of encounter**. This vision applies to the parents and educators reading this book and not simply to their children and students. Hence, our goal is not to fully settle conversations on AI technologies in education nor is it to simply tell educators or parents what to do and what not to do concerning AI use in every case. Our goal is rather to help enrich, deepen, and nuance reflection about what is necessary for AI technologies to serve integral human development and support the pursuit of a culture of encounter in education. After all, as a group of scholars and ethicists committed to the Catholic tradition, we, too, are still in the midst of ongoing discernment and dialogue about what concrete practices and particular uses are consistent with integral human development and flourishing. While there are many uses upon which we agree, we do not always concur on the degree to which various applications of AI will improve or worsen education. But we are finding a shared way to discern these questions fruitfully and from the heart of the Church's tradition and wish to propose this approach for the benefit of other educators and their communities.

Thus, this book offers tools for discernment to educators and parents who desire to face the challenges presented by AI technologies within the context of education in an honest and informed manner. Such tools are not meant to be discrete items, but complementary components of a unified vision of the good. Learning how best to utilize those tools must, therefore, be a matter of discernment. This discernment is central to the vocation of the teacher as gardener.

When discerning the shape of education in the age of AI, we must not force a single solution, a single approach, or a singularly impersonal policy. Rather, we must cultivate the skills required to *listen* so that we might be

capable of knowing when rules are applicable, when rules must be revised, and when rules are simply inadequate. But this requires the cultivation of the skills intrinsic to discernment. Some of those skills involve the ability to grow in familiarity with oneself as intelligent. Making good, prudential judgments about appropriate functions of AI technologies requires investing the best of our creativity, critical reasoning, and agency to that end. Educators ought to discern what uses of AI technologies, if any, are appropriate, and at what stages of learning. Educators also need to consider how or if AI technologies aid the development of the prudence and expertise that would allow students to make creative use of AI technologies for the flourishing of all.

It is precisely the one who understands intimately how to accomplish a task without a given tool who also understands how that tool must be shaped and so can envision genuine improvements to and novel beneficial applications of the tool. In light of the fact that AI technologies by their very nature entice many to cognitive offloading, educators must be careful not to promote uses of AI that stymie a student's movement toward that expertise. Likewise, AI technologies must not become a constricting force in the development of a student. The implementation of AI tools in education ought not to create dependencies that obstruct the full flourishing of a person's mature capacity to critically engage with the world. The extent to which education develops restrictive dependencies in students is the extent to which technology will foreclose rather than open possibilities in the human community.

In our view, the good of the human person, human communities, and creation as a whole must be placed front and center for the discourse about AI technologies in education to be constructive and for it to be a genuine and fruitful offering of our tradition in loving service to the world. For when AI educational technologies are properly oriented, they serve in creating and sustaining integral human development in pursuit of a culture of encounter, shared flourishing, and integral ecology. It is our hope, then, that this volume will prove a fruitful interlocutor for a broad

range of educators: parents, teachers, administrators, those in both public and private schools, and those involved in Montessori schools, Cristo Rey high schools, Classical schools, homeschool co-ops, and more. Although we write from within the Catholic tradition, we desire to be in dialogue with all educators regarding the goods that education is meant to bring about. Inspired by *Gaudium et Spes*, we know well that we share the joys, hopes, griefs, and anxieties of the world as we face the age of AI together.

## The Structure of This Book

This book proceeds in seven chapters. We set out to consider how the lens of integral human development might better illuminate how we can best attend to AI educational technologies in the present and how we might best prepare for the future. The first chapter, **The Landscape of AI in Education,** surveys the state of discourse on AI in education, identifying common motivations and misgivings that drive and surround the implementation of AI technologies to education. It first explains different types of AI along with specific uses, functions, and applications relevant to AI educational tools and the education discourse. It then turns to key motivations and misgivings in the contemporary discourse concerning preparation for work, equality and access, individualized learning, and efficiency. It then shows why these motivations and misgivings point to deeper questions that the Catholic tradition is well-suited to address. It concludes by drawing out five central questions that must be considered deeply in order to be able to properly discern and make prudential judgments about the role of AI technologies in education.

The second chapter, **A Catholic Vision of Education,** sets out what the meaning and purpose of education is from a Catholic perspective, also discussing the key theme of integral human development. First, this chapter returns to sources and foundational documents on education from the Church and Catholic intellectual tradition to articulate how the meaning and purpose of education can only be understood in light of the being and nature of the human person as created by God. Following this,

it explains why education from the Catholic perspective is not merely information acquisition, skill training, or job preparation but the integral development of the whole person in time towards her vocation, temporal and transcendent. This chapter concludes by explaining what it means for the human person to be educated and formed as an individual person and as a person meant for community.

The third chapter, **Catholic Teaching on Technology,** gives an account of Catholic social teaching on technology in order to provide a positive vision for good technology that can act as a measure by which to morally assess existing AI technologies and their various applications. Out of the Church's social encyclicals, this chapter first provides an overview of what the Catholic Church has taught on technology from the beginning of the industrial revolution to the present day. This chapter concludes by delineating what necessary qualities technology requires in order for it to be truly integral.

The fourth chapter, **Behaviorism, Profits, and Modern Education Technology,** identifies behaviorism and profit as key challenges in contemporary educational technology development in order to better contextualize AI educational technologies. The chapter primarily focuses on the way behaviorism in educational technology arose in an American context in the twentieth century as well as the consequences of the rising profitability of educational technologies in the twenty-first century. It intends to show how this development is deeply entrenched in structural and cultural trends that parents and educators must learn to recognize and confront effectively in order to be able to discern well and make good practical judgments about AI technologies in education.

The fifth chapter, **Education and Preparation for Good Work** aims to ground and orient readers' own ongoing discernment of how education can best serve integral human development through these changes in the world of work. While the Catholic tradition takes a holistic view of education, it should be kept in mind that "preparation for the world" is a genuine part of that holistic approach. This chapter first addresses key

points in Catholic social teaching on work. It then clarifies how this vision of work relates to education for integral human development and vocation. It concludes by highlighting the importance of teachers reflecting on their own labor and how they model good labor to their students.

The sixth chapter, **Philosophical Foundations for the Way of the Gardener in Education,** synthesizes the preceding chapters, in order to both philosophically and theologically ground as well as "set the bar" for an integral approach to education in a time of AI. This chapter ultimately seeks to reorient and deepen the contemporary discourses concerning AI and education and to refocus discernment around the way AI specifically impacts the personal and social dimensions of human persons as well as their relationship with and ability to encounter reality and the world. This chapter concludes by setting out six necessary elements for a positive, constructive approach to integral education in the age of AI.

The seventh and final chapter, **Practicing Integral Education in the Age of AI**, aims to model what good, prudential judgment about the use of AI technologies in concrete situations looks like according to the "way of the gardener" and an integral approach to education. We model this across several common spheres of concern including writing, plagiarism, curriculum, lessons planning, teacher aides, gamification, feedback and grading, research, and AI literacy and ethics.

# Chapter 1

# The Landscape of AI in Education

What is artificial intelligence? What are AI educational technologies? Each of us comes to the table with certain metaphors for AI already in hand. Is AI more like a calculator? Or the printing press? The atom bomb? The steam engine? The invention of writing? Fire? Electricity? Or is it like none of these? Is it truly a *new* technology? Is it an artifact *sui generis*? Each analogy assumes particular interpretations of the new technology in question. Some of these analogies may be insightful and productive. Others may distract us from or confuse the central questions at stake. But like people who first interpreted motor cars as "horseless carriages," we must ultimately strive to move beyond these initial comparisons and reckon with the new artifact's own structure, the way it is already being appropriated in various contexts, and the implications it has already had for the shape of social institutions.

What impact will AI educational technologies have on education? Should AI technologies even be adopted by educational institutions? Is this impact on educational technology for the better, worse, or some combination of both? Since 2022, much debate has been ignited across popular media, governmental agencies, and academic scholarship about the potential good of implementing generative AI technologies into

education and school curricula. Careful thought must be given to why and how we educate and why and how we use AI technologies. Before we can begin a wholesale analysis of how AI technologies might fit into the Catholic educational tradition and its vision of integral human development, it is helpful to orient ourselves to the current types, trends, motivations, and open questions that society is already grappling with concerning AI and its potential uses for education.

This first chapter introduces the reader to the landscape of AI educational technologies and the discourse surrounding their implementation into the practices of teaching and learning. We begin by clarifying the term "artificial intelligence." We then differentiate among different types of AI: symbolic AI, machine learning, analytical AI, generative AI, and agentic AI, giving examples of the specific educational technologies that fall under each type. It is difficult to anticipate and attend to all of the ramifications of AI technologies for society at large, let alone education in particular, so this chapter focuses on major currents. After this, we present the key and most popular motivations and misgivings in public discourse concerning the adoption and rejection of AI educational technologies. We then show why these motivations and misgivings point to deeper questions that the Catholic tradition is well-suited to address. These five underlying foundational questions must be considered deeply in order for us to properly discern and make prudential judgments about the role of AI technologies in education.

## What Is Artificial Intelligence?

What are we referring to when we talk about "AI educational technologies?" Part of the difficulty in finding ready answers to this question is the fact that "artificial intelligence" is itself a term with multiple meanings. Indeed, while the term "AI" might seem to indicate a uniform technology with a single definition and technical structure, this could not be further from the case. There is no single agreed upon or authoritative definition and meaning of what artificial intelligence is or what people

mean when they say, "AI."[1] AI involves computational processes like machine learning or computational architectures like neural networks as well as specific computational models like Large Language Models (LLMs). Beyond any particular technical, mechanical process, however, AI can also refer to an interdisciplinary subfield related to computer science and data science that seeks to build and develop digital computers that are capable of performing certain tasks and solving certain types of problems commonly associated with human intelligence. AI can also refer to a field of study that sees its ultimate task as building machines that mimic not only specific human behaviors but the totality of human behavior. In an even more expansive sense, AI can also be used to refer to "machine intelligence" or "machine consciousness" whether in the sense of a serious transhumanist pursuit or in the fictive sense that shows up in literature, entertainment, and popular media.

Attempts to define and clarify the term can at times even be considered controversial or partisan. This amorphousness is noteworthy because it at once differentiates AI from earlier technologies like the calculator, printing press, and even the atomic bomb, since those technologies have set and generally uncontroversial definitions and technical structures even if they might have controversial uses. Why, if it is just another new technology, is AI so difficult and controversial to define?

Coined in the middle of the twentieth century to delimit the pursuit of building "thinking" machines, artificial intelligence or "AI" has become an umbrella term that encapsulates a number of different but not necessarily compatible technical and ideological meanings. John McCarthy, Assistant Professor of Mathematics at Dartmouth College in New Hampshire, used the term "artificial intelligence" as part of the title for his 1956 summer

[1] See AI Research Group, *Encountering Artificial Intelligence,* 17–23; George M. Coghill, "Artificial Intelligence (and Christianity): Who? What? Where? When? Why? and How?" *Studies in Christian Ethics* 36, no. 3 (2023): 604–619, doi.org/10.1177/09539468231169462.

research workshop regarding "thinking" machines.[2] The proposal for the workshop asserted that the study of artificial intelligence proceeds from "the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it."[3] Thus, the study and pursuit of building "intelligent" or "thinking" machines is not founded in a technical achievement or scientific breakthrough but is an ideological claim with its own latent philosophical account of what human knowledge is and how it works.

What constituted "learning" and "intelligence" for early artificial intelligence research? McCarthy's project proposes to "make machines use language, form abstractions and concepts, and solve kinds of problems now reserved for humans, and improve themselves."[4] At the Dartmouth Workshop, the predominant understanding of intelligence was implicit in the "**expert systems**" that were theorized there. An expert system replicates human decision-making by applying the rules of logical inference to a specific domain of knowledge. Thus, at the earliest stages of the development of AI, intelligence was understood to be a procedure constituted by the application of rules to given information. This is not without consequence. If education cultivates intelligence, then this understanding of intelligence will require an education that consists of the mere accumulation of facts and the derivation of conclusions from those facts based on rules that are presupposed or learned by rote. In other words, the education of the "intelligence" of an expert system cannot but be impersonal, transactional, and mechanistic. Eventually, though, this understanding of intelligence was replaced by the understanding of intelligence implicit in machine learning.

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[2] J. McCarthy, M.L. Minsky, N. Rochester, and C.E. Shannon, "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence," *AI Magazine* 27, no. 4 (2006): 12–14.

[3] McCarthy, et al., "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence," 12.

[4] McCarthy, et al., "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence," 12.

Unlike expert systems, contemporary AI involves the algorithmic techniques named **machine learning**. When a computer implements machine learning techniques, it develops a model for prediction or classification. If the predictions or classifications based on that model exceed a certain threshold of error, then the computer will iteratively revise the model. What is interesting about machine learning is that it can work toward *approximating* an optimal result, rather than giving an *exact* solution. This is what makes machine learning feel dynamic and surprising, and what allows it to be capable of identifying patterns in data even when that data involves a good bit of randomness. Machine learning is often defined as those computational techniques by which machines learn without being explicitly programmed to do so.[5] This definition is inaccurate. The "learning" that machine learning accomplishes is *precisely* what it is programmed to do. Let us, therefore, not imagine that computers that realize machine learning are like humans in that they learn without being programmed to do so. While we humans are certainly not programmed, machine learning certainly is.

**Artificial neural networks** are one prominent machine learning technique in contemporary AI. As a model of cognition, artificial neural networks inaugurated a movement named **connectionism**.[6] According to connectionism, learning is a matter of pattern recognition, with pattern recognition defined as the act of drawing associations among frequently related data. This pattern recognition is represented in an artificial neural network through the strength of the connections between its artificial

[5] For instance, Oliver Theobald makes this claim regarding machine learning in *Machine Learning for Absolute Beginners* (pub. by author, 2018), 10. In his foundational paper, Arthur Samuel made the following assertion: "Programming computers to learn from experience should eventually eliminate the need for much of this detailed programming effort." Samuel is, therefore, not himself responsible for the misunderstanding that machine learning does not involve explicit programming. See Arthur Samuel, "Some Studies in Machine Learning Using the Game of Checkers," *IBM Journal of Research and Development* 3, no. 3 (1959): 210.

[6] For an excellent account of the history of AI technologies, including the transition from symbolic AI (or expert systems) to connectionism, see chapter 1 of Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed. (Pearson, 2021), 1–35.

neurons. The stronger the association, the stronger the connection. This is the so-called Hebbian rule: "Neurons that fire together, wire together."[7] Connectionism has been opposed to symbolism—the idea that cognition is a matter of manipulating symbols through logical operations. The abovementioned expert systems are examples of symbolic models of AI.[8] Symbolism considers cognition to be simply a matter of organizing data and drawing inferences from data according to logical rules. While symbolic models of AI fail to replicate tasks, such as language generation and speech-to-text interpretation, that are not exhaustively captured by a procedure that is constituted by a finite set of rules, connectionist models of AI are quite capable of capturing patterns amidst chaotic data because many of their algorithmic techniques are fundamentally statistical in nature. For this reason, connectionism has become much more prominent in contemporary AI, even if symbolic AI models are still deployed for various tasks.

Because contemporary AI is for the most part constituted by statistical algorithms, it gives rise to phenomena such as **sycophancy** and **hallucinations**. AI sycophancy occurs when an AI model is too agreeable, even to the point of affirming incorrect information and suggesting harmful human behavior.[9] Many AI models are trained by human-in-the-loop reinforcement learning, a technique by which AI-generated content is evaluated by humans. In this way, AI comes to privilege agreeable outputs because such outputs are on average evaluated more positively by humans. AI hallucinations occur when the response determined to be most probable by AI makes no or only very loose sense when interpreted

[7] See Donald Hebb, *The Organization of Behavior: A Neuropsychological Theory* (Wiley, 1949).
[8] Symbolic AI is also sometimes referred to as "good old fashioned AI" and abbreviated as, "GOFAI."
[9] On AI sycophancy, see Myra Cheng, Cinoo Lee, Pranav Khadpe, Sunny Yu, Dyllan Han, Dan Jurafsky, "Sycophantic AI Decreases Prosocial Intentions and Promotes Dependence," *Science* 391, no. 6792 (2026): doi.org/10.1126/science.aec8352.

by humans.[10] For instance, a hallucinated output might be an incorrect response to a prompt query that makes sense only as a word association. Such hallucinations are provably unsolvable; meaning there is no perfect technical solution. This is why "hallucination" is an inapt and inaccurate description, despite it being the most prevalent term in the field for this phenomenon. Hallucinations are a statistical inevitability insofar as there are some questions that are asked quite infrequently and some terms that occur in datasets rarely. Such improbable questions and data are a challenge for contemporary AI precisely because of the statistical nature of their algorithms. Because of these problems, models have been proposed that combine elements of both symbolic AI and connectionist AI. An example of this is neuro-symbolic AI that not only identifies statistical relations but operates according to the formal rules of logic. This reduces the possibility of a hallucination by eliminating certain probable but incorrect outputs through logical evaluation.

While solutions that attempt to minimize hallucinations and sycophancy exhibit ingenuity, these two phenomena allow us to recognize the contours of *the understanding of intelligence* presupposed in AI. Humans do not converse with one another by merely determining which next phrase is the most probable to follow the phrase just uttered by one's interlocutor. Instead, humans understand one another's meaning and respond accordingly. In turn, human learning does not merely consist of building models that identify statistical associations among data. Humans learn to grasp explanations; that is, humans learn to grasp *why* data is correlated, not only *that* data is correlated. Moreover, if human intelligence is not reducible to the connectionist interpretation of intelligence, neither is it reducible to the symbolic interpretation of intelligence. Human

[10] On AI hallucinations, see Mahmut Özer, "Is Artificial Intelligence Hallucinating?," *Turk psikiyatri dergisi* [*Turkish journal of psychiatry*] 35, no. 4 (2024): 333–335, doi.org/10.5080/u27587; and Yujie Sun, Dongfang Sheng, Zihan Zhou, and Yifei Wu, "AI Hallucination: Towards a Comprehensive Classification of Distorted Information in Artificial Intelligence-Generated Content," *Humanities Social Sciences Communications* 11, no. 1278 (2024): doi.org/10.1057/s41599-024-03811-x.

reasoning is not merely a rule-following procedure. Indeed, while reasoning well requires that one abide by the canons of logic, human reasoning involves the capacity to recognize validity and soundness and, moreover, to *evaluate interpretations* of validity and soundness. Humans have the capacity to reflect on the nature of their own intelligence and, therefore, to know why the canons of logic must be followed if one is to know what is true. It is important, then, to keep in mind certain possible misunderstandings of intelligence that follow upon characterizing machines as capable of learning.

Here we first begin to see that education has a unique relationship to artificial intelligence research since the foundation of artificial intelligence research proceeds from claims about what knowledge is and in what learning consists. This opens up the possibility that the theories of knowledge and learning underpinning the development of "intelligent" machines differ from or are even potentially contrary to the pedagogy of educational institutions, teachers, and families. As will be addressed in more detail in subsequent chapters, from the perspective of the Christian tradition, both symbolism and connectionism are reductionistic interpretations of human cognition.

## What Are AI Educational Technologies?

Educational technologies are nothing new. They are as old as human language and the written word and as commonplace as textbooks and calculators. However, because of the aforementioned amorphousness of AI technologies, what people mean when they refer to AI educational technologies or AI in education can in turn often be ambiguous.[11] There is no one definition of AI to which those proposing the implementation of AI into education are actually referring. How, if at all, does AI differ from, add to, or detract from existing or prior educational technologies? AI educational technologies can and have been developed using both

[11] AI Educational technologies is sometimes abbreviated "AIED." For the sake of clarity to our audience, we have chosen not to use this or other related abbreviations.

symbolic and connectionist models. Following the development of computer-assisted instruction systems like PLATO (Programmed Logic for Automatic Teaching Operations), in the 1970s through 1990s, rules-based AI techniques, usually instances of symbolic AI**,** began to be used to develop intelligent tutoring systems for one-on-one help in specific subject areas like medicine,[12] geography,[13] and algebra,[14] as well as for automatic grading of short answer and multiple-choice questions.[15]

In the 1990s, machine learning techniques started to be used to develop educational technologies. For the purpose of understanding and thinking through different types of AI educational technologies that are currently or on the cusp of being publicly and commercially available, it can be helpful to distinguish AI developed through machine learning techniques into three categories: **analytical AI, generative AI, and agentic AI**. Although there can reasonably be overlap among them, each type represents different functions of AI. Having given a brief, albeit not uncontroversial description of what is meant by AI, the following section describes some of the proposed and present uses of AI for students, teachers, parents, and administrators according to each type. It addresses teaching assistance, adaptive learning and analytics, AI-powered virtual tutors, educational access, and administrative assistance. Given the far-reaching and rapidly changing landscape of AI technologies, what we offer in this section is but a snapshot.

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[12] William J. Clancey, "Tutoring Rules for Guiding a Case Method Dialogue," *International Journal of Man-Machine Studies* 11, no. 1 (1979): 25–49.

[13] Hyacinth S. Nwana, "Intelligent Tutoring Systems: An Overview," *Artificial Intelligence Review* 4, no. 4 (1990): 251–277.

[14] David McArthur, Matthew Lewis, and Miriam Bishary, "The Roles of Artificial Intelligence in Education: Current Progress and Future Prospects," *Journal of Educational Technology* 1, no. 4 (2005): 42–80.

[15] Kenneth Epstein and Eleanor Hillegeist, "Intelligent Instructional Systems: Teachers and Computer-Based Intelligent Tutoring Systems," *Educational Technology* 30, no. 11 (1990): 13–19. See also James A. Kulik and J. D. Fletcher, "Effectiveness of Intelligent Tutoring Systems: A Meta-Analytic Review," *Review of Educational Research* 86, no. 1 (2016): 42–78.

Traditional AI, also known as predictive AI or **analytical AI,** is one type of AI developed through machine learning techniques. As its name suggests, traditional AI *analyzes* data in order to find actionable patterns. The data it analyzes is typically structured and the actionable patterns it finds are typically used to make predictions, suggest optimizations, or provide descriptions. At times the data is not structured. The difference is captured in the distinction between "supervised" and "unsupervised" machine learning. In supervised machine learning, data is already labeled and a computer is deployed to identify correlations among the labeled data. For instance, supervised machine learning techniques can be used to distinguish examples of the written numbers "1" and "2," given a dataset of images that are already labeled as images of "1" or "2." In unsupervised machine learning, the dataset is not labeled. So, instead of identifying correlations among already labeled data, the machine develops categories by which to sort data. For instance, unsupervised learning techniques can be used to identify what factors make someone at-risk for a disease, given a dataset regarding people with that same disease. While both techniques are analytical, their uses and the structure of the data employed are distinct in the two cases.

In the 1990s, 2000s, and 2010s, traditional AI systems began to be used in learning management systems, the workflows of educational institutions with certain financial means, and new forms of tutoring systems and learning platforms.[16] Much of the positive discourse surrounding the adoption of these traditional AI systems concerned their ability to be tailored to suit personalized education, whereas much of the negative discourse concerned efficacy, the potential for privacy violations, and bias in the data mining and analytics. Education systems have been

[16] See Dick Schoech, Andrew Quinn, and Joan R. Rycraft, "Data Mining in Child Welfare," *Child Welfare* 79, no. 5 (2000): 633–650; C. Romero and Sebastián Ventura, "Educational Data Mining: A Survey from 1995 to 2005," *Expert Systems with Applications* 33, no. 1 (2007): 135-146, doi.org/10.1016/j.eswa.2006.04.005; Cher Ping Lim, "Trends in Online Learning and Their Implications for Schools," *Educational Technology* 42, no. 6 (2002): 43–48; Colin McCormack and David Jones, *Building a Web-Based Education System* (Wiley, 1997).

using traditional AI for some time in learning management systems and administrative tools.[17] This type of data analysis, pattern recognition, and descriptive or predictive output has been and continues to be used in administrative educational contexts for scheduling, facilities maintenance and usage, budgeting, and resource allocation. Additionally, since learning management systems generate so much data on students, that generated data can then be used for **education data mining** and later **learning analytics**.[18] Education data mining and learning analytics have been used to find actionable patterns in student data, typically relating to student progress in some capacity as well as to help with the development of **adaptive learning platforms**.[19] Adaptive learning platforms adjust the level of difficulty based on how a student is performing in real time according to pre-developed pathways.[20] Learning analytics are used in adaptive learning platforms to make recommendations or provide learning adaptations.[21]

For example, apps like Duolingo sometimes use machine learning techniques to adapt to a learner's progress and provide more targeted lessons.[22] This approach allows for greater flexibility in the practice sets and lessons students are given. A similar if not greater flexibility is that of **automated chatbots.** A student can interact with and receive feedback from an AI chatbot in a way that is not possible with a program whose

[17] See Wayne Holmes and Ilkka Tuomi, "State of the Art and Practice in AI in Education," *European Journal of Education*" 57, no. 4 (2022): 542–570.

[18] Romero and Ventura, "Educational Data Mining," 135–136.

[19] Zacharoula Papamitsiou and Anastasios A. Economides, "Learning Analytics and Educational Data Mining in Practice: A Systematic Literature Review of Empirical Evidence," *Journal of Educational Technology & Society* 17, no. 4 (2014): 49–64.

[20] Prema Nedungadi and Raghu Raman, "A New Approach to Personalization: Integrating e-Learning and m-Learning," *Educational Technology Research and Development* 60, no. 4 (2012): 659–678.

[21] Simon Buckingham Shum and Rebecca Ferguson, "Social Learning Analytics," *Journal of Educational Technology & Society* 15, no. 3 (2012): 3–26.

[22] Parker Henry, "How Duolingo Uses AI to Create Lessons Faster," *Duolingo Blog*, June 22, 2023, blog.duolingo.com/large-language-model-duolingo-lessons.

avenues for exploration and responses are fixed. Because contemporary AI technologies are statistical in nature, automated chatbots can be tailored to individual users to an extent previously not possible. In education, this means that students can prompt an automated chatbot to provide explanations suited to their own self-perceived horizon of understanding. Of course, the danger here is that the information provided to a student by a chatbot without prior constraints on its output might be incorrect. It might also be insufficiently personal, despite purporting to be so, which will be discussed in greater detail in chapter 3 and chapter 6.

**Generative AI** is a second type of AI developed through machine learning techniques that has grown in prominence and is one of the primary motivations for excitement and worry about the impact of AI technologies on education. Generative AI produces linguistic, visual, and auditory content through sophisticated predictive analysis based on given prompts.[23] The creation of outlines, papers, reading summaries, emails, lesson plans, rubrics, assessments, images, videos, podcasts, and written feedback for assessments are all examples of actions generative AI technologies can perform. Much of the positive discourse surrounding the adoption of generative AI concerns its supposed personalization and bespoke outputs. For instance, generative AI can be used to customize content or practice sets to an individual student's interest. A number of adaptive learning platforms are transitioning to using generative AI or developing hybrid systems. When powered with generative AI, earlier generation AI tools like adaptive learning, recommendations, and analytics are able to be more fully specified to a given context or set of parameters. Because of the content it is able to generate in real time, generative AI tends

[23] See Thomas H. Davenport and Peter High, "How GenAI and Analytical AI Differ–When to Use Each," *Harvard Business Review,* December 13, 2024, hbr.org/2024/12/how-gen-ai-and-analytical-ai-differ-and-when-to-use-each; Bernard Marr, "The Difference Between Generative AI and Traditional AI," *Forbes*, July 24, 2023, forbes.com/sites/bernardmarr/2023/07/24/the-difference-between-generative-ai-and-traditional-ai-an-easy-explanation-for-anyone.

to be what people are most concerned about when it comes to AI causing de-skilling and job replacement.

Additionally, LLMs like ChatGPT and Claude are at their core just highly sophisticated chatbots. Generative AI chatbots are more flexible in their responses than automated chatbots because they are not only able to tailor prepared text or images, but to produce "novel" text and images according to a specific prompt or directive. This has at least in part led to the promotion of generative AI chatbots as "AI tutors," "AI assistants," or "AI teachers." Instead of exposing students to previously developed learning pathways, generative AI chatbots can produce content that, according to its predictive model, is most likely to enable a particular student to advance toward a given learning outcome. Of course, the content that generative AI produces is a response to specific prompts. So, the implementation of generative AI requires that those using it be trained to design prompts well. That is, a generative AI chatbot will not take the initiative of its own accord to develop content for students. It must be directed to do so by a human. Moreover, building on what was noted above, hallucination and sycophancy remain challenges even with chatbots engineered precisely for use in schools. Thus, humans must develop the skills to engage well with this type of AI technology and to discern the extent to which it is a good and appropriate educational tool.

Although it is not yet as widely known as generative AI, **agentic AI** is a third type of AI developed through machine learning techniques that is slowly developing prominence.[24] Agentic AI executes tasks after having been given parameters and a master instruction or set goal. A general example of agentic AI is autonomous vehicles. Rather than operating step by step and requiring a new prompt after executing a response like

[24] See Mohamad Abou Ali, Fadi Dornaika, and Jinan Charafeddine, "Agentic AI: A Comprehensive Survey of Architectures, Applications, and Future Directions," *Artificial Intelligence Review* 59, no. 11 (2026): doi.org/10.1007/s10462-025-11422-4; Mark Purdy, "What is Agentic AI? How Will It Change Work," *Harvard Business Review,* December 12, 2024, hbr.org/2024/12/what-is-agentic-ai-and-how-will-it-change-work.

generative AI, agentic AI is built to execute tasks and actions successively according to some prescribed end with minimal human oversight. For example, while both agentic AI and generative AI can be used to respond to email, agentic AI can autonomously reply to all of one's unread emails by its own impetus. Generative AI, on the other hand, could generate a single email response, but the user would need to ask for the response to be generated and then would need to send the generated reply. Rather than a teacher creating a lesson plan or activity by prompting generative AI, agentic AI would create a lesson plan or activity without the prompting of the teacher.[25] Thus, agentic AI chatbots can most effectively imitate the actions of a human conversation partner. Because agentic AI will execute tasks without prompting, it can, for instance, extract student data, analyze that data to determine the reading comprehension level of that student, and then, if equipped with generative capabilities, produce exercises that match the abilities and desired growth pathways of that student according to its analysis. Agentic AI shares similar challenges with traditional AI like bias, privacy, efficacy, and accuracy, and with generative AI like de-skilling, sycophancy, and hallucination. Given its lack of oversight, agentic AI requires careful consideration before implementation, especially in a vulnerable context like education.

Because a single AI model with the right agentic capacities can be perceived as a cost-effective way of providing personalized education plans for students in need of remediation, we must be sure that such remediation truly personalizes education. That is, we must ensure that machines never take the place of personal encounter. Education is more than a matter of being given exercises and content suited to one's current abilities. It is also a matter of growth in confidence in oneself and one's horizons as a learner. But as we shall explain in sections to come, that confidence is developed only through a loving encounter with another human.

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[25] Ume Nisa, Muhammad Shirazi, Mohamed Ali Saip, and Muhammad Syafiq Mohd Pozi, "Agentic AI: The Age of Reasoning—A Review," *Journal of Automation and Intelligence* 5, no.1 (2025): 69–89, doi.org/10.1016/j.jai.2025.08.003.

## What Are Popular Motivations for and Against Adopting AI Educational Technologies?

With the landscape of AI educational technologies in mind, we now turn to the landscape of contemporary public discourse on the adoption of AI technologies in education. In what ways are analytical, generative, and agentic AI technologies poised to impact teaching, learning, human development, and what it means to be educated as a whole? What are the purported benefits of integrating AI technologies into education and schooling? What are the risks? What changes and future impact do AI technologies portend for education administration and the teaching and learning process? Would such changes improve education and student outcomes or worsen and exacerbate existing problems? Should AI be integrated into already existing educational technologies and learning platforms? Do we even have a choice? Do students, teachers, parents, individual schools, or school systems have the choice to reject the integration and adoption of certain AI technologies? Or has the train already left the station, so to speak? Are students, teachers, parents, and schools simply at the mercy of the AI technologies being developed for education and society?

With the advent of commercially available generative AI and in the wake of nearly every online platform integrating often unremovable "AI-powered" features over the last several years, parents, teachers, administrators, and even students have been forced to ask themselves questions like these nearly every day. AI technologies are nothing new to the world of education—and neither are strong pushes from technology developers that claim their new technology will revolutionize education, attend to already existing problems within education, or cure all social ills through the perfection of education. Nevertheless, we must still reckon with the way these new artifacts are being appropriated and adopted in various contexts.

Beyond unreflective expressions of fear or optimism, there are already some substantial disagreements on the answers to these questions. Some parents, educators, and administrators think that analytical, generative, and agentic AI can and ought to be leveraged for all aspects of education in order to properly prepare students for the future and better the processes of teaching and learning by making them more effective and efficient. Others have concerns that AI technologies have the capacity to transform education for the worse and inhibit the process of teaching and learning itself since AI educational technologies bring with them problems of bias, privacy invasion, hallucinations, negative environmental impact, expensive maintenance, cultural homogenization,[26] as well as the additional problems of cognitive atrophy,[27] diminishment of agency,[28] and moral deskilling.[29] Others still are simply at a loss of what to do, buried under the weight of so many cross pressures and competing narratives about what is truly best for their children, students, schools, and communities.

Four prevalent motivations that we have noticed in contemporary public discourse are: preparation for future success in a labor market shaped by AI technologies; advancement of equality, access, and equity in education; expansions of individualized learning; and the betterment of

[26] Luona Lin, "A Quarter of U.S. Teachers Say AI Tools Do More Harm than Good in K-12 Education," Pew Research Center, May 15, 2024, pewresearch.org/short-reads/2024/05/15/a-quarter-of-u-s-teachers-say-ai-tools-do-more-harm-than-good-in-k-12-education.

[27] Michael Gerlich, "AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking," *Societies* 15, no. 1 (2025): 6–33, doi.org/10.3390/soc15010006.

[28] Ratko Ivković, Dragan Vučković, Milan Ječmenić, Dolores Ananieva, Miloš Stanković, Martina Petković, and Ninoslava Janković, "The EU AI Act and Its Contractual and Educational Implications: AI, Education, and the Law of Obligations," *International Journal of Cognitive Research in Science, Engineering & Education* 13, no. 2 (2025): 551–562, doi.org/10.23947/2334-8496-2025-13-2-551-562.

[29] Frank J. Hoffman, and Klairung Iso, "Google, ChatGPT, Questions of Omniscience and Wisdom," *Asian Philosophy* 35, no. 1 (2025): 14–28, doi.org/10.1080/09552367.2024.2366046; Tomislav Furlanis, Takayuki Kanda, and Dražen Brščić, "Robots as Moral Environments," *AI & Society* 39, no. 4 (2024): 1749–1767, doi.org/10.1007/s00146-023-01656-7.

both teaching effectiveness and learning effectiveness. It has become commonplace for most writings on AI ethics or AI safety to begin by setting out the potential benefits and harms or the potential opportunities and risks of AI. In this section, however, we present these popular motivations for and against the adoption of AI technologies into the educational context. While the benefits and harms along with the risks and opportunities that AI technologies pose matter to ethical reflection, we think the core reason why some people are pushing *for* and some people are pushing *against* AI adoption in education has more to do with the underlying goods they are trying to achieve or protect than the precise risks or benefits of any one AI technology. Bringing these underlying goods and thus motivations to light and making them explicit will help us be able to ethically evaluate the state of affairs more fully.

### *Preparation for Success in the World of Work*

A major motivation for integrating and adopting analytical, generative, and agentic AI technologies into education is to prepare people for future success in a labor market shaped by AI technologies. Much of the anxiety surrounding AI technology in general concerns how it is set to impact the world of work. Whether born of excitement, anxiety, or a simple acquiescence to what is perceived to be inevitable, a commonly cited reason for why many parents, guardians, teachers, administrators, and students are moving to adopt AI technologies has little to do with present goods and much to do with anticipated future goods. Many educators, broadly construed, are concerned about students being prepared for the future and want to make sure that students are equipped with the skills, the know-how, and the certifications or degrees necessary to be a desirable hire from the perspective of future employers.

It is common to hear proponents of AI implementation in education argue that it is "our responsibility to help [students] develop into thoughtful, responsible, and ethical adults" in an interconnected world and that, "given the ubiquity of AI, we need to explore meaningful

opportunities to integrate AI literacy across our K–12 curriculum."[30] To this end, some have proposed that AI technologies should be integrated into school curricula, so that students are more versatile for the future labor market.[31] This integration can simply mean making sure students have access to computer science and engineering courses at the higher levels of learning. It can mean introducing computer science and engineering courses at earlier and earlier ages. It can also mean using any and every possible AI technology at every level of education, so that students have it fully integrated into their lives and learning. This would include training students early on skills such as prompt engineering. Integrating AI into curricula can also mean requiring courses in AI literacy, AI safety, and AI ethics in order to not only have the technical AI engineering knowledge and skills that a future employer might want but also to help students develop a critical and informed approach to using AI technologies so that they are good stewards of and not taken advantage by this technology.[32]

Recommendations such as these express the common and reasonable underlying concern that people, communities, and even entire countries will be left behind economically if AI technologies are not harnessed for market growth and if education is not properly conformed to the needs of the contemporary technology industry. At the same time, however, there

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[30] Joan Monahan Watson, José Antonio Bowen, and C. Edward Watson, *Learning with AI: The K-12 Teacher's Guide to a New Era of Human Learning* (Johns Hopkins University Press, 2024): 3.

[31] See Taylor Kabuto "Stanford Education Experts Put AI into Perspective," *Stanford Report,* May 13, 2026, news.stanford.edu/stories/2026/05/education-experts-ai-risks-opportunities; John C. Chick, "AI-Enhanced Computational Thinking: A Comprehensive Review of Ethical Frameworks and Pedagogical Integration for Equitable Higher Education," *Education Sciences* 15, no. 11 (2025): doi.org/10.3390/educsci15111515.

[32] Natasha Singer, "'A.I. Literacy' Is Trending in Schools. Here's Why," *New York Times,* February 23, 2026, nytimes.com/2026/02/23/business/ai-literacy-faq.html; Lauraine Langreo, "Are AI Literacy Lessons Now the Norm? What New Survey Data Show," *Education Week,* March 3, 2026, edweek.org/technology/are-ai-literacy-lessons-now-the-norm-what-new-survey-data-show/2026/03.

are others who, equally concerned with making sure people are prepared for the future, worry that the adoption of AI technologies into education will, in many cases, cut out ways in which education prepares students for a flourishing life and, therefore, will actually detract from their future success and preparation.[33] From this perspective, considerations of AI and education that are focused on future success and preparedness often wrongly equate the goods of education with economic and monetary goods. Rather than fostering curiosity, wonder, critical thinking, and creativity, students are viewed as mere participants in an economic system, in need of knowledge and skills to contribute to money-making and efficient production.

Preparing learners well for the future and helping to equip them with tools for future success and to do good work is a primary motivation animating contemporary discourse on how to attend to AI and education well. But an impasse lies at whether preparing people for the future well consists in adopting and integrating analytical, generative, and agentic AI wherever possible, in rejecting them wherever possible, or in being very cautious about the conditions under which it is implemented. Education is meant by its very nature to prepare students for the future. That future in almost every instance involves participation in the economy. The economy, however, is itself a source of both great opportunity and grave injustice. So, to prepare a student for success in the world as it is entails not just preparing them to conform to that world. It also involves preparing them to rise to the challenge of altering that world. Before we can decide whether and, if so, which AI technologies we ought to integrate into education, we must distinguish opportunity from injustice in our world. And to do that, we must distinguish opportunity from injustice in the world as shaped by AI technologies themselves.

[33] See Corey Turner, "The Risks of AI in Schools Outweigh the Benefits, Report Says," *NPR*, January 14, 2026, npr.org/2026/01/14/nx-s1-5674741/ai-schools-education.

### *Advancing Equality, Access, and Equity*

Advancing equality, access, and equity is a second popular motivation that many people have for integrating and adopting analytical, generative, and agentic AI technologies into education. Not all people, whether adults or children, have equal access to education and schooling. Many people throughout the world have no access to education or schooling. Others have access but with much difficulty or with very limited resources. Making education more accessible and making the education that is accessible of a higher-quality and less resource-intensive is a major motivation for why some want to adopt and implement AI technologies into education.[34] AI technologies are said to have the ability to give access to education and learning to people who currently do not have access, either by lowering costs, or by using AI to level the playing field for students who would otherwise struggle to participate and be inclined to drop out. If deployed across the entire economic spectrum, proponents argue that AI tools hold promise for closing the education gap between rich and poor, especially those in remote or underserved regions.[35]

AI technologies are also said to be able to help not only with access to education but with learning itself by ameliorating learning gaps or assisting students with learning disabilities or neurodivergences. Adaptive learning and tailored learning is viewed as a way to help overcome education gaps because it allows students to work at their own pace and motivates them through their own interests. Additionally, because not every family has the resources to hire private tutors and because family members are not always able to provide needed assistance, generative and even potentially agentic AI tutors provide the possibility of alleviating some of the burden placed on parents to assess and assist with homework and other learning tasks. In such cases, students may be able to find guidance and practical help from

[34] See OECD, *Reimagining Teaching in an Accelerating World*, International Summit on the Teaching Profession (OECD Publishing, 2026), doi.org/10.1787/d0edfe8c-en.

[35] See "How AI Can Enhance Digital Inclusion and Fight Inequality," World Economic Forum, June 4, 2025, weforum.org/stories/2025/06/digital-inclusion-ai.

generative and agentic AI. AI technologies also have the potential to assist students with disabilities, providing tools like speech recognition, text-to-speech, real-time captioning, lecture transcription, and even virtual reality to enhance learning.[36] Moreover, proponents of AI also suggest it can be used to reduce bias in testing, lectures, curriculum development, and classroom management.[37] This reduction in bias is said to help to correct social shortcomings stemming from human biases or unjust social structures that unfairly benefit some and harm others.

The advancement of equality, access, and equity in education is, however, also a motivation for why some people are leery about the implementation of AI into education and are dubious about its adoption in a number of different areas. Rather than making good education more accessible, there is widespread concern that AI technologies will make education less accessible by worsening teacher shortages and creating greater financial strain on educational communities who need to acquire and maintain expensive electronic devices and subscription fees.[38] To this end, some people believe AI technologies will widen the wealth gap and exacerbate economic inequality.[39] There is even concern that AI education technologies might result in structurally unjust systems within which only the privileged have access to an education rooted in human interaction and

[36] See Jackie Leach Scully, "Disability and AI: Much More Than Assistive Technologies," *Science,* August 21, 2025, science.org/doi/10.1126/science.aea4918.

[37] Hoang Pham, Tanvi Kohli, Emily Olick Llano, Imani Nokuri, Anya Weinstock, "How Will AI Impact Racial Disparities in Education?," *Stanford Law School* (blog), June 29, 2024, law.stanford.edu/2024/06/29/how-will-ai-impact-racial-disparities-in-education.

[38] Meredith Coffey, "Logged In, Tuned Out: Fifteen Years and Billions of Dollars Later, What Has Learning Tech Accomplished?," *Education Next* 26, no. 1 (2026): educationnext.org/logged-in-tuned-out-fifteen-years-billions-of-dollars-later-what-has-learning-tech-accomplished.

[39] Catherine Giono, "AI Will Make the 'Tech Bro' Class Even Richer, Nobel Laureate Joe Stiglitz Says, Just as It Can Take Your Job," May 31, 2026, fortune.com/article/why-does-nobel-laureate-joe-stiglitz-think-tech-bro-class-richer.

personal encounter.[40] Disability advocates and ethicists have also raised concerns about the way AI and machine learning technologies characterize intelligence and learning.[41] Perhaps naming a machine "intelligent" or capable of "learning" excludes the forms of intelligence or the ways of learning of the very neurodivergent persons who AI education technologies can purportedly aid.

Moreover, despite the abovementioned benefits regarding the ability of AI to minimize bias, many have raised concerns about how AI tools have consistently been shown to display bias.[42] AI technologies produce outputs by developing prediction and classification models based on data about human behavior. Because humans and social structures are biased, data contains biases. Thus, AI technologies produce outputs that are characterized by the biases immanent to the data that it is trained on. These biases involve many harmful assumptions about students of certain groups.[43] Using AI technologies to customize or individualize education to each student would thus not de-bias education.

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[40] David Elliott, "'Education Is a Place Where We Build Democracy.' Why a Teacher's Union Isn't Afraid AI Will Replace Teachers," *World Economic Forum*, July 2, 2024, weforum.org/stories/2024/07/artificial-intelligence-education-teachers-union.

[41] Karen Hao, "Can You Make an AI that Isn't Ableist?," *MIT Technology Review*, November 28, 2018, technologyreview.com/2018/11/28/1797/can-you-make-an-ai-that-isnt-ableist; Alan Foley and Fasika Melese, "Disabling AI: Power, Exclusion, and Disability," *British Journal of Sociology of Education* (2025): 1–22, doi.org/10.1080/01425692.2025.2519482.

[42] Beth Carpenter, "The Bias Is Inside Us: Supporting AI Literacy and Fighting Algorithmic Bias," *Library Trends* 73, no. 4 (2025): 476–492, doi.org/10.1353/lib.2025.a968492. See also Gideon Christian, "The New Jim Crow: Unmasking Racial Bias in AI Facial Recognition Technology Within the Canadian Immigration System," *McGill Law Journal* 69, no. 4 (2024): 441–466.

[43] See Andre M. Perry and Nicol Turner Lee, "AI Is Coming to Schools, and If We're Not Careful, So Will Its Biases," *Brookings Institution*, September 26, 2019, brookings.edu/articles/ai-is-coming-to-schools-and-if-were-not-careful-so-will-its-biases; Bodong Chen, Jiayu Cheng, Chen Wang, and Vivian Leung, "Pedagogical Biases in AI-Powered Educational Tools: The Case of Lesson Plan Generators," *Social Innovations Journal* 30, no. 2 (2025): socialinnovationsjournal.com/index.php/sij/article/view/10004.

The environmental costs of AI and how those costs disproportionately impact the poor and marginalized are also often left out of large organizational considerations about the potential harms of AI technologies. From the start of its life cycle, AI technologies require extractive mining and processing of materials like lithium, which creates runoff pollutants, renders the surrounding environment uninhabitable and unfarmable, uses extreme amounts of water for both the necessary machinery and separating machinery, and poses life-threatening danger to human miners.[44] Data centers also require extreme amounts of water for cooling the machinery, which has its own runoff and consumes massive amounts of electricity, and creates noise pollution for the surrounding community.[45]

Advancing equality, access, and equity in education is a primary motivation animating contemporary discourse on how to attend to AI and education well. But an impasse lies at whether or not making education more accessible and equitable consists in adopting and widely disseminating AI technologies or not.

### *Individualized Learning: Attending to the Needs, Knowledge Level, and Interests of Each Child*

Individualized or personalized learning is a third popular motivation that many people have for integrating and adopting analytical, generative, and agentic AI technologies into education. Those motivated to adopt AI technologies for better overall education and student learning outcomes often propose that AI can help make learning more individualized by being able to identify and attend to the needs, knowledge level, and interests of each child.

Some developers propose that analytical and generative AI have the capacity to individualize education to each student by adapting exercises

[44] Kate Crawford, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* (Yale University Press, 2021), 23–41.

[45] Crawford, *Atlas of AI*, 41–46. See also AI Research Group, *Encountering Artificial Intelligence*, 223–225.

in real time, tailoring course material to a student's pre-existing interests, or giving the student more one-on-one attention.[46] For instance, Shantanu Sinha, Director of Product Management at Google and a founding board member of Khan Lab Schools, asserts that AI and other adaptive technologies will "'transform the future of school'" into a more "'personal learning experience.'"[47] Similarly, after a visit to an elementary school in Newark, New Jersey, that was employing Khan Academy's Khanmigo tools, Microsoft co-founder Bill Gates contended:

> AI will be a total game-changer for both teachers and students once the technology matures. Even today, when the teachers . . . delegate routine tasks to AI assistants, they reclaim time for what matters most: connecting with students, sparking curiosity, and making sure every child feels seen and supported—especially those who need a little extra help.[48]

According to Gates, AI has the potential to make teachers more available for one-on-one attention and to give students more targeted practice exercises and assignments. Gates also emphasizes the specific example of how "Leticia Colon, an eighth-grade algebra teacher," with the help of Khanmigo used generative AI to develop "problem sets about hometown

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[46] See Kristjan-Julius Laak and Jaan Aru, "AI and Personalized Learning: Bridging the Gap with Modern Educational Goals," *Educational Technology & Society* 28, no. 4 (2025): 133–150, doi.org/10.30191/ETS.202510_28(4).RP08. Also see Ethan Castro, Saurabh Sinha, Catherine Moran, "How Artificial Intelligence Can Personalize Education: Instructors Can Leverage AI to Help Students Learn Better," *IEEE Spectrum*, December 18, 2023, spectrum.ieee.org/how-ai-can-personalize-education.

[47] Lauraine Langreo, "Google Executive: AI Could 'Transform' School into a 'Personal Learning Experience,'" *Education Week*, July 6, 2023, edweek.org/technology/google-executive-ai-could-transform-school-into-a-personal-learning-experience/2023/07.

[48] Bill Gates, "My Trip to the Frontier of AI Education," *Gates Notes*, July 9, 2024, gatesnotes.com/my-trip-to-the-frontier-of-ai-education. See also Dan Fitzpatrick, "How ChatGPT Boss Sam Altman's New AI Predictions Affect Education," *Forbes*, September 28, 2024, forbes.com/sites/danfitzpatrick/2024/09/28/how-chatgpt-boss-sam-altmans-new-ai-predictions-affect-education.

heroes the students might be interested in."[49] Colon created "equations that incorporated Newark boxer Shakur Stevenson's workout routines, so her students could practice math skills while learning about a real-world role model."[50] From this perspective, AI technologies' ability to analyze learning patterns could allow for a highly individualized and dynamic education experience that helps students to achieve outcomes with more ease by making learning more frictionless and interesting. This approach is said to allow for greater flexibility in how students learn, potentially reducing dropout rates by making learning feel more achievable and by increasing the pace at which students achieve learning goals and complete schooling.

AI technologies are primarily imagined to achieve this personalization through adaptive learning platforms, gamification, and AI chatbots, frequently called "AI tutors" or "AI teachers" driven by learning analytics, text generation, and reward mechanisms. Adaptive learning platforms like Knewton, Dreambox, and Duolingo can adjust the level of difficulty, the sequence of what is present, or the content presented based on how a student is performing in real time.[51] Early adaptive learning platforms were primarily developed from traditional AI. However, integrating and using generative AI to develop these platforms is becoming more popular. Adaptive learning platforms are also becoming increasingly gamified, so that the exercises or problems students are using to learn or practice content knowledge are more akin to computer or mobile games with rewards systems, motivation structures, or nudges, and the interface of such platforms.[52]

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[49] Gates, "My Trip to the Frontier of AI Education."

[50] Gates, "My Trip to the Frontier of AI Education."

[51] See Le Ying Tan, Shiyu Hu, Darren J. Yeo, Kang Hao Cheong, "Artificial Intelligence-Enabled Adaptive Learning Platforms: A Review," *Computers and Education: Artificial Intelligence* 9 (2025): doi.org/10.1016/j.caeai.2025.100429.

[52] See Pumudu A. Fernando and H. K. Salinda Premadasa. "Use of Gamification and Game-Based Learning in Educating Generation Alpha: A Systematic Literature Review," *Educational Technology & Society* 27, no. 2 (2024): 114–132; Sara de Freitas, "Are Games Effective Learning

Generative AI chatbots like Khanmigo or ChatGPT's "study mode" present the prospect of on-demand help, offering students immediate assistance with difficult concepts or homework. Some even argue that "AI tutors will gain access to larger memory and context windows, including the ability to read and analyze a student's previous work" which will "better inform tutoring sessions" and lead to "greater empathic capabilities, allowing [AI chatbot tutors] to better motivate and engage students."[53] The individualization provided by such programs is said to offer the ability to accelerate learning and let students complete their studies faster, while at the same time, the AI chatbot can adapt the curriculum to help students overcome their weaknesses. Some developers and proponents of AI adoption in education even go so far as to assert that AI chatbots, whether generative or agentic, can take the place of human teachers, teaching aides, and tutors, opening up the possibility that all students have a one-on-one learning experience. For instance, OpenAI CEO Sam Altman has asserted, "Our children will have virtual tutors who can provide personalized instruction in any subject, in any language, and at whatever pace they need."[54] From this perspective, in the case of teacher shortages—or for students who want more beyond the classroom—students can have access to "personalized" education, which need not even be in a school building. This AI-powered "personalization" promises to be more efficient and therefore to get students to higher levels of education—and to an eventual exit from education entirely—more swiftly.

And yet, others argue that if one of the persons in the teacher-student relationship is removed and replaced by AI, it is actually a *depersonalized* education, even though the lessons are indeed *individualized* to the particular student, who is now alone in the learning endeavor with neither

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Tools? A Review of Educational Games," *Journal of Educational Technology & Society* 21, no. 2 (2018): 74–84.

[53] John Bailey and John Warner, "AI Tutors: Hype or Hope for Education? In a New Book, Sal Khan Touts the Potential of Artificial Intelligence to Address Lagging Student Achievement. Our Authors Weigh in," *Education Next* 25, no. 1 (2025).

[54] Sam Altman, "The Intelligence Age," September 23, 2024, ia.samaltman.com.

peers nor role models.[55] Thus, some believe that such an approach misunderstands the very nature of education and works against the process of teaching and learning itself.[56] In their view it actually inhibits the learning process and leads to a mass of highly credentialed people who have little grasp of explanations (because they have only learned what is the case and not why) or internal motivation to learn (because their education did not invite them to be motivated by their own questions).[57]

The term "personalized learning," suggests that the AI tool is tailoring the lesson to the student's unique needs and that the tailoring is somehow suited to that student as a whole person. But neither of these things is really happening in either analytical or generative AI since any output is the result of classification and statistical modeling. Algorithmic classifications via statistical modelling are not instances of personal encounter. Analytical and generative AI educational technologies tailor the learning of a specific skill to the student's *current* abilities with *that* skill or to a particular predefined behavior or characteristic the student is *currently* demonstrating or has demonstrated in the past according to a set of parameters. Because of this, those who have reservations about adopting AI technologies for these purposes tend to find "individualized learning" to be a more helpful way to speak about this technology than "personalized learning" since that more accurately names the differentiated and adaptive learning features that some analytical and generative AI systems offer students.

Concerns about rapidification and the turn to AI as a tool of efficiency have led to advocacy for alternative modes of education and schooling that

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[55] See Jeffrey Bilbro, "Con Academy: The False Promise of AI Tutoring," *The Hedgehog Review* 27, no.1 (Spring 2025): hedgehogreview.com/issues/after-neoliberalism/articles/con-academy.

[56] See Jacob Potash, "Rethinking Education in the AI Age: The Surprising Fragility of Learning," *The Hedgehog Review,* May 20, 2026, hedgehogreview.com/web-features/thr/posts/rethinking-education-in-the-ai-age.

[57] Amin Abbosh, Adnan Al-Anbuky, Fei Xue, and Sundus S. Mahmoud, "Perspective on the Role of AI in Shaping Human Cognitive Development," *Information* 16, no. 11 (2025): 1011–1023, doi.org/10.3390/info16111011; Peter Wulff and Marcus Kubsch, "Learning Against the Machine: The Double Edged Sword of (Gen)AI in STEM Education," *International Journal of STEM Education* 12, no. 1 (2025): 1–7, doi.org/10.1186/s40594-025-00588-6.

emphasize interpersonal relationships, encounter with the world, embodied activity, and print texts. These alternative models include schools such as Waldorf, Montessori, and Classical models, which focus on observation, curiosity, awe, reflection, extension of attention span, self-mastery, and a love for learning in and of itself, rather than as a quick means to an end for other goals. Critics of AI chatbot tutors argue that part of the "disconnect between what a tutor bot can offer and what happens in a human exchange between student and teacher is that learning is not just about what someone knows, but how someone is thinking."[58] From this perspective, learning is not a straight line of object-oriented knowledge that students methodically ascend at a unique pace but rather an untidy and nonlinear process in which one engages in a complex mix of object-oriented cognition as well as metacognitive activities.

Those working within institutions of education know that it is a constant challenge to meet the individual needs of each student. In turn, a rigid standardization of education does not serve each student and each community well. For this reason, many have purported that AI will revolutionize modern mass education by allowing it to become personal in a way that it has not yet been. But, of course, this "personalization" often comes at the expense of further standardization. If the presentation of material is "personalized" by a chatbot, that does not necessarily mean that the content presented is not standardized. In turn, an AI-enabled "personalization" of education is not necessarily a matter of personal encounter. If students begin to learn from machines more than they learn from humans, then education will become thoroughly anonymous. Consequently, learning will not be understood by students as a participation in a community. We must balance these considerations as we attempt to do justice for our students in a world defined by structural injustice.

[58] Bailey and Warner, "AI Tutors: Hype or Hope for Education?"

### *More Effective and Efficient Teaching, Education Administration, and Learning*

Improving teaching, education administration, and learning effectiveness is a fourth popular motivation that many people have for integrating and adopting analytical, generative, and agentic AI technologies into education. Those motivated to adopt AI technologies often believe AI will save teachers, administrators (and even students) from busy work, and thus free them to put their time and effort into the kinds of activities that matter most, like critical thinking, creative expression, and more complex interpretation or integration work.

A major purported benefit of implementing AI into any sphere of human life and society, including education, is efficiency. The co-founder and CEO of Duolingo, Luis Von Ahn, is on record having stated, "It's just a lot more scalable to teach with AI than with teachers."[59] Proponents of AI claim that by accelerating learning and thus preparing students to quickly move along to the next step in their educational process, AI technologies enable students to minimize the time required to prepare for life and maximize the time spent *living* life. To this end, some argue that education is inefficient and we should try to make education as economically or time-efficient as possible. In various ways, analytical, generative, and agentic AI technologies are said to be able to more efficiently execute a number of the tasks—especially time-consuming, toilsome tasks—surrounding assessments, lesson planning, learning analytics, education administration, and the development of foundational or lower order skills. Proponents believe that help with such tasks would improve education and make teaching, administration, and learning more effective by helping to optimize workflows and resources for students, relieve burdens from overworked teachers—especially in places where

[59] Irina Ivanova, "Duolingo CEO Says AI Is a Better Teacher Than Humans—but Schools Will Still Exist 'Because You Still Need Childcare,'" *Fortune,* May 20, 2025, fortune.com/2025/05/20/duolingo-ai-teacher-schools-childcare.

there are teacher and teaching aide shortages—and increase time spent on creative, higher order tasks and thinking.[60]

For example, traditional AI tools can be used to grade multiple choice, fill-in the blank, or short answer assessments and standardized tests. Analytical AI can also be used to help teachers identify gaps or patterns and offer insights into both individual student learning or a class's overall grasp of concepts by means of graded assignments or any other recorded information about students. Similarly, from an administrative perspective, analytical AI can also provide insights into retention, areas of learning weakness on a larger scale, record management, facilities use, and resource allocation in a concise way, saving the "bean-counting" time of years past.[61]

Additionally, while teachers have been using mixed media for a long time in education, generative AI is said to offer the ability to create mixed media course content quickly, so that teachers can make their lessons more targeted and iterative with little time or effort. Generative AI also offers teachers the ability to generate substantive revisions or long form feedback on essays, class participation, behavior, or overall student performance almost instantly when those same tasks would typically be very time-consuming, especially for those with large class sizes or heavy teaching loads. Generative AI is also purported to be able to help teachers save time

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[60] Andrea Malek Ash, "Three in 10 Teachers Use AI Weekly, Saving Six Weeks a Year," *Gallup*, June 24, 2025, news.gallup.com/poll/691967/three-teachers-weekly-saving-six-weeks-year.aspx.

[61] For example, the American Federation of School Administrators (AFSA) describes several areas in which AI can help with school administration, including "analyzing large volumes of data . . . [automating] routine administrative tasks, such as managing student records . . . [optimizing] the allocation of resources, such as staff, classrooms and materials . . . identifying students who may require additional support . . . [and securing campuses via] facial recognition systems and video analytics. " AFSA includes the important caveat that ethics and leadership will be crucial to any implementation of AI into school administration. In some cases, implementation of AI for administrative purposes might make logical sense, but in others it will not. Distinguishing between these cases will require a clear-eyed understanding of both the technology and the social context in which the technology is being used. AFSA Web Administration, "Artificial Intelligence and Education," *American Federation of School Administrators*, June 26, 2023, theschoolleader.org/news/artificial-intelligence-and-education.

and avoid burnout by executing paperwork and administrative tasks like responding to emails, maintaining student records, developing individualized education plans (IEP), reducing the burden on teachers, and getting feedback to students more quickly.

AI chatbots, again frequently being referred to as "AI agents," "AI assistants," "AI tutors," or "AI teachers," are becoming more common, with the potential to act as agents working on behalf of educational institutions, faculty, staff, or students. Helplines and chatbots for college application preparation, financial aid, housing, data analytics, and so on are thought to be able to help students, faculty, and staff in their studies and work, potentially both saving time and increasing positive outcomes. While most chatbots or "AI assistants" are instances of generative AI, as we already mentioned, earlier symbolic models could be used to make chatbots as well. Agentic AI can also be developed to act as a chatbot. Additionally, some also suggest that agentic AI could be used to execute many of the administrative and analytical tasks that analytical AI can help with but would be able to do so more automatically and with less oversight. If AI technologies can do many of the necessary clerical and administrative tasks surrounding teaching like lesson planning, grading, corresponding with parents, filling out reports or developing learning plans, it might then help teachers spend more time working directly with students. From this view, teachers, for instance, instead of slogging through hours of grading, could focus their attention on students or support creative collaborative learning experiences.

While some tout efficiency and optimization as profound benefits of implementing various AI educational technologies into schooling, others view this efficiency and optimization as potentially harmful to the teaching and learning process and to be indications of problematic pre-existing currents in education that undermine its inherent goods.[62] Those weary of

[62] See Jonathan Malesic, "ChatGPT Is a Gimmick: AI Cannot Save Us From the Effort of Learning to Live and Die," *The Hedgehog Review*, May 21, 2025, hedgehogreview.com/web-features/thr/posts/chatgpt-is-a-gimmick.

AI adoption in education argue that there is an educational trend called rapidification that prioritizes fast results as opposed to slow and attentive learning. With this trend, schools prioritize quick, demonstrable progress, passing educational waypoints in the pursuit of the end goal: a completed grade level or certification. Since AI technologies have a core orientation toward efficiency time-wise and cost-wise, it is likely that AI educational technologies would exacerbate the existing trend towards rapidification.[63]

Rather than opening up more time for overworked teachers, AI might place even more demands on teachers. For instance, if individualized lesson plans can be generated by AI, and assignments both generated and graded by AI, then teachers may have additional tasks placed upon them or be given larger class sizes. This creates an incentive for administrators to pressure teachers into saving time through AI applications regardless of whether these improve or worsen the educational process.[64] But these additional burdens would mean that teachers would have to rely on AI to complete most of their responsibilities. The increased demands placed upon teachers could make the career less attractive, especially if a sense of fulfillment and meaning based on connection with students suffers negatively.[65]

Some have raised concerns about using AI to "decrease drudgery" and, specifically, about what practices in teaching and learning are being labeled drudgery.[66] Concerns are also being raised about the extent to which creativity and critical thinking can be separated from certain tasks,

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[63] See Paul McQuiston, "AI Is Changing How Students Learn—or Avoid Learning," September 18, 2025, today.usc.edu/ai-is-changing-how-students-learn-or-avoid-learning; Richard Adams "Pupils Fear AI Is Eroding Their Ability to Study, Research Finds," *The Guardian*, October 15, 2025, theguardian.com/technology/2025/oct/15/pupils-fear-ai-eroding-study-ability-research.

[64] See Daniel Buck, "Why Teachers Shouldn't Offload Their Busywork to AI," American Enterprise Institute, March 23, 2026, aei.org/op-eds/why-teachers-shouldnt-offload-their-busywork-to-ai.

[65] See Jay Caspian Kang, "The Despair of the Professor in the Age of A.I.," *The New Yorker*, May 26, 2026, newyorker.com/news/fault-lines/the-despair-of-the-professor-in-the-age-of-ai.

[66] Christian R. Klein and Reinhard Klein, "The Extended Hollowed Mind: Why Foundational Knowledge Is Indispensable in the Age of AI," *Frontiers in Artificial Intelligence* 8 (2025): doi.org/10.3389/frai.2025.1719019.

foundational skill sets, or entry level learning that is being labeled drudgery. Not all tasks are drudgery. There is worry that implementing AI technologies that eliminate drudgery will invite cognitive offloading and deskilling in students.[67] Complex skills involve the coordination of simpler activities. To build the complex, one must master the simpler. If students are rid of the opportunity to practice the simpler, then they may never build the confidence to tackle the complex. Additionally, many teachers have historically found great joy in witnessing the way their students learn and grow in the classroom as a result of the educator's teaching and encouragement, the student's effort, and support of other students in the classroom. While certain tasks might be labeled as "lower-level teacher tasks such as lesson planning and grading" that can and should be easily automated by AI, critics of this view assert that "only someone who has not taught would call these lower-level tasks."[68]

Some argue that there are essential teacher tasks that cannot be automated or outsourced without in some way violating the art and practice of teaching. For instance, in their article, "AI Tutors: Hype or Hope for Education," John Bailey and John Warner ask, "Would an orchestra conductor outsource the making of the performance program to AI?"[69] They view grading as "an essential teacher task because it is the best way to assess the evidence not only of what students have learned, but also how they've learned it (or haven't learned it)."[70] From this perspective, if a teacher were teaching a writing course, "outsourcing the grading would be akin to the orchestra conductor hearing only the audience's level of applause rather than listening to the performance itself, or a football coach knowing the score but not watching the game."[71]

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[67] On AI and cognitive offloading, see Michael Gerlich, "AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking," *Societies* 15, no. 1 (2025): 6, doi.org/10.3390/soc15010006.

[68] Bailey and Warner, "AI Tutors: Hype or Hope for Education?"

[69] Bailey and Warner, "AI Tutors: Hype or Hope for Education?"

[70] Bailey and Warner, "AI Tutors: Hype or Hope for Education?"

[71] Bailey and Warner, "AI Tutors: Hype or Hope for Education?"

Academic integrity has also become a topic of significant and growing concern. Nearly immediately upon the commercial release of LLMs, unscrupulous users began to attempt to pass off AI-generated text as their own words. Because learning can be quite arduous, some students often try to cut corners. Because they do not always know what they do not know or why they should endeavor to know it, some students also try to avoid learning by finding ways to merely give the appearance of having learned. AI technologies—and more precisely how AI technologies have been chosen to be built, deployed, and made commercially available—have exacerbated the problem to such a great extent that it simply cannot be ignored, with news headlines proclaiming "Everyone Is Cheating Their Way Through College"[72] and "AI Cheating Surge Pushes Schools into Chaos."[73] Though tools exist to attempt to detect AI-usage in student assignments,[74] these tools lack adequate reliability given the stakes.[75] Therefore, teachers are now often turning to other methods of evaluation, such as in-class handwritten assignments, online platforms that monitor how a text is written, oral exams, and so on. The erosion of academic integrity by students' unscrupulous use of AI technologies strikes at the heart of education itself, and the student-teacher relationship.

Educators are generally pushed to do more with less, especially in underprivileged communities. This leads to a desire for tools that will

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[72] James D. Walsh, "Everyone Is Cheating Their Way Through College," *New York Magazine*, May 7, 2025, nymag.com/intelligencer/article/openai-chatgpt-ai-cheating-education-college-students-school.html.

[73] Erica Pandey, "AI Cheating Surge Pushes Schools into Chaos," *Axios*, May 26, 2025, axios.com/2025/05/26/ai-chatgpt-cheating-college-teachers.

[74] See, for example, Jan Hendrik Kirchner, Lama Ahmad, Scott Aaronson, Jan Leike, "New AI Classifier for Indicating AI-Written Text," *OpenAI Blog*, January 31, 2023, openai.com/index/new-ai-classifier-for-indicating-ai-written-text/.

[75] Benj Edwards, "Why AI Writing Detectors Don't Work," *Ars Technica*, July 14, 2023, arstechnica.com/information-technology/2023/07/why-ai-detectors-think-the-us-constitution-was-written-by-ai; Stuart A. Thompson, "These Tools Say They Can Spot A.I. Fakes. Do They Really Work?" *The New York Times*, February 25, 2026, nytimes.com/2026/02/25/technology/ai-detection-generated-photos-video.html.

render educating more efficient. Generative AI especially presents the possibility of providing relief to teachers whose classes are too full and who teach too many classes to begin with. But if we can imagine that AI technologies will help educators in a fast-paced modern education ecosystem, we must also be careful to not create a new ecosystem with heavier burdens for teachers. For this reason, we must take care that AI technologies do not further rapidify education. In turn, we must exercise caution not to invite teachers into habits of deskilling that they take up simply because they are critically overworked. The ability to educate is a beautiful skill that takes patience to cultivate. We must balance efforts to make education more efficient with efforts to give space to the true patience that genuine education requires.

## Focusing on the Questions that Matter Most for Good Discernment

The foregoing section has sought to describe some of the key motivations for and against integrating AI into educational technologies and adopting AI more generally in education. In so doing, it has surfaced the promises, pitfalls, and challenges of AI for education as it presents itself to the general public. We see a number of important potential benefits that provide fairly compelling reasons for at least *exploring* a range of uses. It is not difficult, however, to begin identifying potential threats to the flourishing of students, the vocation of teachers, the process of education, and the health of our educational communities. We assume that readers sincerely want, as the Church also wants, to make the most of AI's genuine promise while minimizing its negative effects and avoiding harmful instantiations and uses.

To do this well, it pays to be as clear as possible about the central questions at stake. Such clarity helps at multiple levels. First, it allows us to grasp the common themes shared across various implementation challenges. Second, it equips us to name a number of implicit assumptions that frequently influence conversations about education and technology. By

making these hidden assumptions explicit, we are better positioned to address the challenges posed by AI technologies in a deep, systematic, and fruitful way rather than in a haphazard and superficial one. Finally, clarity about core questions helps us open up the wisdom of the Catholic tradition with regard to these challenges. We thus draw our readers' attention to the following five questions beneath the surface of AI and education discourse in order to gain a unifying perspective on the array of motivations, all the while clarifying how Catholicism can best serve our ongoing discernment about AI technologies in education.

### *Question 1: What Is Education? What Is Its Purpose?*

Notice that this is a question about the nature of education, and also about how we value it. In what sense is education *good*? Why is it important for individuals and communities? Although there is wide agreement that education should involve "more than" conveying information and preparation for gainful employment, people are often unclear about what this "more" is and why it matters. Without a clear sense of the nature and value of education's deeper goods, these goods cannot exercise a strong, coherent, and fruitful influence on our choices about AI use.

When these questions come up, attention often falls on the importance of critical thinking skills, creative or integrative thinking, good character, or educating the whole person. Articulating such goals *can* be a promising first step towards a more robust account of education. Doing so is, however, not particularly helpful if we do not explain concretely what these concepts mean, why they are so good for students and those around them, and how our answers to these questions bear on the role of AI technologies in education. It is possible, for example, to value these deeper aspects of education *only* with a view to a student's future labor productivity (for example, when universities sell the humanities as a way to train more creative and adaptive business leaders). Although these arguments do have a place, they differ importantly from celebrating critical and integrative thinking as intrinsic contributions to students' human

flourishing or as foundations for their broader service to the common good. Often enough, flourishing and the common good do coincide with productivity and security (financial or otherwise). But as Christians should know well from the words and example of Jesus, this is simply not always the case. Will our students have compelling reasons to prioritize truth and the common good over their productivity and security—for example, by putting the flourishing of coworkers and customers ahead of achieving maximum profits?

Given that AI's purported benefits are so centrally tied to the efficiency gains it makes possible, what would it mean to implement AI in educational settings without communicating to students the idea that efficient productivity is more important than human flourishing or the common good? Is there a way to construe education that can help us keep these latter goods squarely in view and to hold efficiency squarely in place as a *secondary* good, in educational practices as well as in life? Can we calibrate our educational practice and rhetoric in service to an ideal of good work that reaches deeper than efficiency? And what would it mean to implement AI technologies in educational settings accordingly?

### *Question 2: How Does Education Happen?*

What does it mean that it is *a human being* who is being educated? This is a question about the subjects being educated as well as about the educational process. What is it for the educational process to engage, call forth, and integrate the full range of capacities that make us human as well as the mission and gifts that are key to our unique mystery as individual persons? We need a solid answer to these questions if we hope to respond wisely to proposals for using AI technologies to liberate teachers and students from drudgery, that is, to outsource less rewarding and "basic" tasks so as to help us focus our time, energy, and attention on "what matters most" (usually a creative, stimulating, and interpersonal task). A great deal depends on how (or to what degree) supposedly basic or rote tasks matter for our ability to both attain and continually exercise higher-

order habits like integration, interpretation, insight, productive criticism, and creative reformulation. We need a way to understand the educational process that empowers us to name instances where basic tasks are foundational for higher order tasks. Only by naming these instances with care and precision can we hope to discern wisely when to outsource a burdensome task to a machine and when to embrace it personally.

Another important question about the educational process has to do with the extent to which learning consists in the mastery of discrete, serialized tasks. Companies like Khan Academy frequently seek to automate education by treating learning as the acquisition of skills, breaking those skills down into smaller tasks, and creating AI-powered experiences by which students learn to perform each task in the right order. Is it true that all learning happens by mastering one small step after another in a linear fashion? Or do some kinds of learning happen in more complex ways that do not lend themselves easily to an automated step-by-step process? Is learning simply a matter of skills mastery? What are we saying about the humans we call our students when we think of learning strictly in this way? As we will see in chapter 4, this question will require us to reflect on ideas that have shaped the longer history of educational technology over the twentieth century.

### *Question 3: What Does Our Relational and Social Nature Mean for Education?*

In what ways is being in relationship an important part of a good educational process? And what uses of AI technologies resonate with or corrode the goods of relationality in education? One instance where this question surfaces is when teachers mourn the loss of trust that can result from the surveillance needed to forestall AI-powered cheating. Trust is a necessary condition for healthy relationships and a sense of belonging. Can we, however, articulate with more precision why such trust is important for educational relationships and communities? More broadly: In what precise sense is the teacher-student relationship unique or uniquely

valuable? What is it that good teachers do for students that provides an important foundation for education? Are they simply providing encouragement, or does this relationship provide something even deeper for the structure of the learner's self-development?

If the answer to this question differs (at least somewhat) by discipline or context, what habits or principles can help us protect what matters most in this relationship? And how may a robust and precise understanding of this relationship help us identify uses of AI that serve rather than corrode it? How we answer this question bears on our uses of individualized learning applications, as well as the implementation of learning-oriented chatbots, or even whether or how we make use of AI to respond iteratively to a student's actions. For it is often in the process of receiving and implementing feedback that teacher-student relationships are cultivated.

### *Question 4: What Is It for Education to Serve Justice and the Common Good?*

Teachers have long been motivated by a desire to honor their students' dignity and improve their social conditions. This goal can be relevant for each of the central motivations discussed in the previous section, but it is especially evident in the search for AI-powered expansions of equity and access. How we put technology in service to justice, however, depends a great deal on the broader understanding of justice we bring to this task.

For example, some may think that justice is satisfied by ensuring everyone has a basic level of access to certain goods (for example, a living wage, healthcare, privacy, self-determination, a basic education, good work, etc.). On this understanding of justice, we might consider it acceptable to ensure for other people access to such goods in ways we would not think sufficient for our own lives. When it comes to education, this might mean supporting AI-driven educational options that expand access for underserved populations but which we would never deem good-enough for our own children. "At least they now have *this* much," we might say.

Whatever virtues this approach to justice may have, it falls short of a Catholic and biblical approach. In assuming underserved populations will inevitably receive the less-satisfying options (relative to other children's education), we continue to actualize a society where the poor's education (and thus, too, their self-determination and flourishing) lags behind that of others. The difference between this view and Catholicism's becomes especially clear in light of what is called the **preferential option for the poor**. This principle begins as a claim about the God of Jesus Christ: God's love prioritizes the poor, precisely because they are the ones who have been forgotten or instrumentalized by human history. God cultivates universal justice through a love that reaches out *preferentially* to the least among us, lifts them up, and gathers them to the *shalom*, the shared flourishing and peace that the Bible sees as the content of true righteousness and justice. Those of us who aim to participate in God's love for the world, then, must put the poor *first*, rather than rest content to give them our leftovers or lowest acceptable options. That is how we prove our intent to serve the poor's full agency and belonging in the human family.[76]

The preferential option for the poor raises profound and extremely challenging questions about our current educational systems and how we employ technologies like AI within those systems. What would it mean to even begin answering those questions? To a great extent, we can begin by answering the prior three questions above with the understanding that our answers apply just as much for the least among us as to those who can afford the best education. For just one example, our attempts to expand access to good education through AI need to be consistent with, if not also serve, the answers we give to the first question about education's nature and value. If an education worthy of human beings reaches beyond employment preparation toward the integral flourishing of each student, then that is what the least among us deserve, not after but before we strive

[76] Good introductions to the basic meaning and roots of the preferential option can be found in Francis, *Evangelii Gaudium*, §§178–216 and Leo XIV, *Dilexit Te*, especially §§16–34 and §§84–102.

to provide this to those with more social privileges.[77] This possibility raises massive logistical challenges. And yet a truthful consideration of the Bible and the Catholic tradition demands we look these questions in the face.

### *Question 5: What Is a Good Tool? How Do We Properly Discern and Evaluate Whether the Tools We Employ in Education Are Good?*

Discernment regarding technology is very often reduced to evaluating the moral status of individual use. Technologies themselves are thus considered neutral artifacts. But to consider technology a neutral artifact is to fail to raise important questions regarding the possibilities that a given technology makes more or less likely in a given sociocultural context. It is also to fail to question the ways in which a given technology can form us. For technologies can form in us habits of attentiveness or inattentiveness, habits of desire and imagination. When contextualized by specific discourses, technology can influence us into certain conceptual frameworks and away from questions that might revise or do away with them. Thus, an integral approach to technology will consider not only the moral status of various uses of technology, but also the social possibilities and habits that a given technology invites as well as those it impedes. This, in part, is what it would mean not to take a reductive perspective on technology as we evaluate its place in education.

Ideally, technologies are created to most fittingly achieve an end. This means that we must ask whether certain ends are truly good and whether

[77] It is often argued that students' preparation for economic stability is a primary concern for students from underrepresented backgrounds, and thus that career prep is precisely how educational institutions serve such students. However, a recent national survey in the United States reports that lower-income and first-generation students are more likely than higher-income students to cite personal growth as a primary motivation for attending college, and less likely than those higher-income peers to cite career-prep as their top motivation. Dana Humphrey and Ashley Finley, "What Students Value in College," American Association of Colleges and Universities, May, 2026, dgmg81phhvh63.cloudfront.net/content/user-photos/Research/PDFs/What-Students-Value-in-College.pdf.

certain technologies truly fit the ends they are meant to achieve. If education is normatively ordered to the integral development of the human person, then we must ask whether a given instance of technology fits this end. Perhaps we ought to treat educational technologies as unique precisely because their task is in some sense not a specific goal, but rather to assist in the development of persons who are able to participate in the common good. Thus, to properly evaluate educational technologies, we must adopt a non-reductive approach to what it means to be human. This would include ensuring that educational technologies properly respect the irreducible relationality of the human person, and that they serve justice by being commensurate with the preferential option for the poor. Of course, given that educational technologies are an instance of technology, our evaluation of them ought not to differ entirely from our evaluation of other instances of technology. They, too—like other forms of technology—form our habits and invite certain possibilities while hindering others.

When evaluating AI education technologies in particular, one must take into account two common contemporary narratives that have deep and complex histories. First, it is often uncritically assumed that technology enhances education. This is a form of technocratic progressivism: the idea that the future will be better precisely because technological advancements constitute unsubstitutable panaceas. Second, many hold that preparation for a technologically replete world must involve early and in-depth interaction with technology. In other words, educators will fail students to the extent that they do not prepare students for a labor market that will almost universally require familiarity with a certain technology by thoroughly integrating that technology into their education. We encounter many today who promote the early use of AI technologies precisely because they expect the labor market will be fundamentally transformed by AI technologies and they assume that preparation for such an environment requires early and extensive exposure to those technologies.

In the face of such narratives, we must continue to pursue a holistic vision of education both as a process and in its purpose. This will, in turn, require that we take a holistic perspective on AI technologies. As discussed above, AI technologies are many and diverse. We must be sure to raise questions regarding which types and specific applications of AI fit with the genuine meaning and purpose of education. What sorts of habits does a given AI technology promote? What sorts of educational activities do AI technologies best complement? Will AI technologies of various sorts produce equity in an educational landscape defined by structural inequity? Where does AI fit into a more holistic or integral picture of education? Is it true that we can outsource basic skills to AI and just focus on higher-level skills? What does that do to the very activities of work and learning? How helpful or corrosive is AI when it comes to other kinds of learning? What skills or habits do people actually need to use AI creatively? Are there stages or types of learning to which AI is better and worse suited? To what extent can AI be used to tailor learning experiences that are not isolating and disruptive to human relationships?

## Conclusion

With some sense of what AI is and of how AI technologies are and might be implemented in education, it is our hope that the above questions will serve as a frame for the rest of this volume. This is not to say that this volume intends to give the final or definitive answer to any of the questions. Substantive positions will be developed, however, and, perhaps more importantly, we will model the sort of dialogue from which such positions ought to arise. Again, this volume is meant as a dialogue partner, in the spirit of the vocation of the gardener. The gardener must take a radical stance in openness to listening. This, in turn, requires the forfeiture of any approach that would control. Developmental realities—such as plants and humans—are stymied by an *overbearing* control. A balance must, therefore, be struck. Direction must be given as an invitation to virtue, both moral and intellectual. But educators must give students the

space to appropriate their own cognitive agency so that they might actualize it themselves. To be clear, this does not mean that education should be a free-for-all without limits. Providing right limits to students, especially when young, cultivates genuine freedom. Pruning often allows plants to flourish more than if they are left alone. The moral law is not merely an option, but a set of norms that, when followed, form persons into right action. But to control inordinately is to refuse to allow persons to flourish as agents capable of moving themselves to the right choice.

It is for this reason that the discussion of motivations and questions above is framed in a dialogical manner. Circumstances vary. Technologies change rapidly. Society changes with them. We must not forget the need for prudence. All forms of reductivism are to be avoided. We must not substitute any part for the whole. Any partial aspect loses sight of overall complexity. Thus, as we proceed in the book, keep the above motivations and questions in mind. Discern how the topics to be approached below fit with the various perspectives explored in this chapter. Integrate what you discover with what you know and what you imagine you will encounter. For it is only in discernment rooted in dialogue and oriented to prudent decisions that we will be adequate to the task of educating in the age of AI.

# CHAPTER 2

# A CATHOLIC VISION OF EDUCATION

Education is inseparable from the Church's mission in the world. In the apostolic letter, *Drawing New Maps of Hope*, Pope Leo XIV nicely distills this mission, writing, "Education is not an ancillary activity, but forms the very fabric of" sharing the Gospel with others.[1] Because of this, "Education [has always been] one of the highest expressions of Christian charity," which in turn acts as a beacon of hope in a broken world.[2] Leo further explains that "since ancient times Christians have understood that knowledge liberates, gives dignity, and brings us closer to the truth."[3] For the Catholic tradition, education is an act of love that, like tending to a garden, seeks to cultivate human persons toward their vocations, temporal and transcendent, as gifted by God.

God calls each and every person to that which all persons are called: "to love our brothers and sisters in the truth of [God's] plan"[4] and "to

[1] Leo XIV, *Drawing New Maps of Hope*, October 28, 2025, vatican.va/content/leo-xiv/en/apost_letters/documents/20251027-disegnare-nuove-mappe.html, §1.1.

[2] Leo XIV, *Drawing New Maps of Hope*, §1.3; cf. Leo XIV, *Dilexi Te* [To All Christians on Love for the Poor], October 4, 2025, vatican.va/content/leo-xiv/en/apost_exhortations/documents/20251004-dilexi-te.html, §60; and Francis, "Address Following the Visit to the Tomb of Don Lorenzo Milani," June 20, 2017, §2, press.vatican.va/content/salastampa/en/bollettino/pubblico/2017/06/20/170620e.htm

[3] Leo XIV, *Dilexi Te*, §60.

[4] Benedict XVI, *Caritas in Veritate*, §1.

participate responsibly in God's creative action."[5] In being cultivated well, human persons, like budding roses, unfold out of the core of their being, enabling them to develop virtuously and grow to flourish. This flourishing is meant to bear fruit in the world and be a participation in salvation history. As such, we are called to be wise stewards of the young and to all those who seek wisdom and learning at any age or stage of life. Education, therefore, is neither solipsistic nor individualistic but a transcendent, social reality.[6] Since "all serious and upright human conduct is hope in action,"[7] education witnesses to the resurrection hope that all pain and mourning will cease and that every tear will be wiped away and that death will be no more (Revelation 21:4).

Given the profound and indispensable role of education to the Church, Catholicism has a long and studied tradition on how to understand the meaning and purpose of education. The wisdom of the Catholic tradition on education offers a vibrant synthesis of intellectual currents across cultures and time periods. For one example, early Christians were forced to ask how Christian thought might be integrated when faced with a well-developed system of Greco-Roman education, or *paideia*. Since then, a productive dialogue between secular philosophy and Christian theology on matters concerning human formation has continued: throughout Antiquity, with Christian appropriations of Stoicism and Platonism; into the medieval period, with the recovery of Aristotle under St. Thomas Aquinas and others; and into modernity's engagement with natural science and new forms of philosophy. During the Middle Ages,

[5] John Paul II, "Message for the 1990 World Day of Peace," January 1, 1990, vatican.va/content/john-paul-ii/en/messages/peace/documents/hf_jp-ii_mes_19891208_xxiii-world-day-for-peace.html, §6; Cf. Francis, *Laudato Si'* [On Care for Our Common Home], The Holy See, May 24, 2015, vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html, §131.

[6] See Benedict XVI, *Spe Salvi* [On Christian Hope], The Holy See, November 30, 2007, vatican.va/content/benedict-xvi/en/encyclicals/documents/hf_ben-xvi_enc_20071130_spe-salvi.html, §14.

[7] Benedict XVI, *Spe Salvi,* §35.

monasteries and cathedral schools served as centers of learning where faith and knowledge were integrated. These institutions in turn laid the groundwork for the first European universities, most notably the Universities of Paris and Oxford, which were established under Church patronage. Religious orders, including the Benedictines (sixth century), Dominicans (thirteenth century), Franciscans (thirteenth century), and Jesuits (sixteenth century) were instrumental in founding Catholic schools globally from the late medieval period into modernity. The Jesuit Ratio Studiorum (1599) became a foundational pedagogical model, emphasizing rigorous academic training and character formation. Following the industrial revolution and well into the 20th century, a number of Catholic thinkers lent their pens to the topic of education and schooling from St. John Henry Newman (1801–1890) to Maria Montessori (1870–1952) to Jacques Maritain (1882–1973) to St. Edith Stein (1891–1942) to Luigi Giussani (1922–2005), and many more. The Catholic tradition's wealth of writings on and serious considerations of education is expansive. For the purpose of this chapter, we have narrowed our focus to a few select texts and figures. Nonetheless, we believe that taking time to carefully read and enter into dialogue with works from any of the figures or religious traditions that we were not able to treat in detail would be a great benefit to one's ongoing development and discernment.

This chapter first traces the Catholic tradition's teachings on education from Scripture and then turns to the wisdom of St. Augustine and St. Thomas Aquinas. Following this, we then move to the Catholic Church's teaching on education in modernity by giving an overview of insights from Catholic social doctrine and the encyclical tradition on education. This exploration of the tradition culminates in a distillation of the purpose of Catholic education as the integral development of the human person toward her vocation as gifted by God. We then divide integral human development into two conceptually distinguishable but interrelated and inseparable aspects: individual formation and the formation of the individual for community. The chapter concludes by describing these

aspects of formation in greater depth, so that we can later articulate with greater precision how AI use relates to each aspect and to integral development as a whole.

## The Catholic Tradition on Education

### *Scripture and the Wisdom Tradition*

Education begins in wonder and awe. It finds fulfillment in the new eyes and new hearts that are born of loving encounter with the living God who calls us to meditate on God's teachings day and night (Psalms 1:2; 119:18). Listening to instruction, guarding one's heart, and cultivating wisdom through the interplay of faith and reason are recurring themes throughout the Bible and ongoing points of reflection among the communion of saints. Proverbs teaches that "the LORD gives wisdom; from his mouth comes knowledge and understanding" (Proverbs 2:6). Proverbs calls for those who pursue wisdom to love and hold fast to her since "she is a *tree of life*" who makes happy those who grasp her (Proverbs 3:18). Time and time again, Proverbs instructs, "With all vigilance guard your heart, for in it are the sources of life"; for everything you do flows from your heart (Proverbs 4:23). The Psalmist, similarly, teaches us that "the mouth of the righteous utters wisdom and his tongue speaks what is right" since "God's teaching is in his heart; his steps do not falter" (Psalm 37:30–31). Throughout the Psalms, *listening* to the LORD and keeping God's teachings are identified with trusting in God's unfailing love and the fulfillment of God's promises (Psalm 119:41–47; 81–88).

These teachings on the cultivation of wisdom are further born out in the biblical narrative itself. In Genesis, the LORD *speaks* to Abram: "Go forth—from your land . . . to a land that I will show you" (Genesis 12:1). Later on in the story God calls to Abraham again, instructing him not to be afraid but to "look toward heaven, and number the stars," promising him that his offspring will be as numerous as those stars (Genesis 15:1–5). We can imagine Abraham and Sarah awestruck as they gazed at the stars, contemplating God's covenantal promise and hoping in its ultimate

fulfilment. As Pope Francis explains, in God's voice Abram "recognizes a profound call which was always present at the core of his being."[8] In *listening* and *responding* to God's call, Abram becomes Abraham because "for Abraham, faith in God sheds light on the depths of his being, it enables him to acknowledge the wellspring of goodness at the origin of all things and to realize that his life is not the product of non-being or chance, but the fruit of a personal call and a personal love."[9] Later on in the text, Abraham's grandson, Jacob, while fleeing for his life, finds himself alone at night in the wilderness, using a stone as a pillow to rest his head. God reminds Jacob of the covenantal promise saying, "Know that I am with you and will keep you wherever you go, and will bring you back to this land; for I will not leave you until I have done what I have promised you" (Genesis 28:17). Trusting in God's unfailing love is the way of wisdom that "sees" and gains insight into reality "to the extent that it journeys, to the extent that it chooses to enter into the horizons opened up by God's word," a word which always calls us by name and addresses us personally as an "I" from a "Thou."[10]

In the Gospels, we see these themes further reinforced. The Gospel of Luke puts Mary in narrative parallel to Abraham by contrasting her visitation with that of the elderly Zechariah. Luke tells us that following the angel's announcement and entreaty to not be afraid, Mary "treasured all these things and pondered them in her heart" (Luke 2:19). As Pope Benedict XVI explains, "Mary enters into a deep *conversation* with the Word of God that has been announced to her, she does not consider it superficially but meditates on it, lets it sink into her *mind* and her *heart* so as to understand what the Lord wants of her, the meaning of the announcement."[11] Our Lady, Seat of Wisdom, embodies wisdom and

[8] Francis, *Lumen Fidei* [On Faith], The Holy See, June 29, 2013, vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20130629_enciclica-lumen-fidei.html, §11.
[9] Francis, *Lumen Fidei*, §11.
[10] Francis, *Lumen Fidei*, §9.
[11] Benedict XVI, "General Audience," December 19, 2012, vatican.va/content/benedict-xvi/en/audiences/2012/documents/hf_ben-xvi_aud_20121219.html, emphasis added.

exemplifies what it is to have one's actions founded in loving trust of the LORD and a discerning heart. Mary *actively* contemplates and pieces together "every individual element, every word, every event" in order to better understand the larger whole of what has happened and is happening since she recognizes that "it all came from the will of God."[12] In the Gospel of John, moreover, Jesus tells his disciples, "Do not let your hearts be troubled. You believe in God; believe also in me," revealing to them "I am the way, the truth, and the life" (John 14:1–6). Jesus is the Incarnate Logos; he is Truth Incarnate. Like the tree of life in Proverbs, to hold fast to Jesus, the True Vine, is to hold fast to eternal life and wisdom. Learning and the cultivation of wisdom in the biblical text is thus inseparable from trust in God, hope in the future God has promised, loving embrace of one who loved us first, and deep interpersonal relationship.

### *St. Augustine, Teaching, and Moral Transformation*

Perhaps no one has had more influence on the understanding of the nature and purpose of education in Western Christianity than Saint Augustine of Hippo. Augustine was himself a teacher of rhetoric. His conversion to Christianity did not mean a wholesale rejection of non-Christian learning. Instead, Augustine developed a method of integrating the truths of non-Christian traditions with the wisdom of the Christian tradition. This method can be described as a dialogue rooted in Christ.

In an early writing titled *The Teacher*, Augustine affirms that Christ the Truth illumines our minds and so teaches us inwardly.[13] Thus, wherever there is truth, Christ is found. But truth is not visible to the eyes of the body. Rather, truth is visible to the eyes of the mind. In *Teaching Christianity*, Augustine interprets the process of education as a journey

[12] Benedict XVI, "General Audience," December 19, 2012. On the broader relevance of Mary's treasuring and pondering to Catholic technology ethics, see Luis Vera, "Our First and Most Intimate Medium: Why Catholics Should See Media as Memory Technologies," in *Catholic Media Studies: Theology and Pedagogy*, eds. Brett Robinson, Alba Sabaté Gauxachs, and Caroline Murphy (Blanquerna Observatory on Media, Religion, and Culture, 2021), 14–35.
[13] St. Augustine, *De Magistro*, 12.40.

whose shape is Christological. Christ as Word became human so that humans might witness him and, thus having seen him with the eyes of their body, might raise the eyes of their mind to the Truth that the Word is.[14] Outer signs accessed through the senses point to inner realities accessible only by the mind and the heart. Consequently, whatever non-Christian truth leads one to embark on this Christological journey—whose destination is union with the triune God who one encounters at the deepest core of one's being—is to be taken up as integral to the Christian's own education.[15]

Fundamental to this journey is a growth in self-knowledge; for, in mistaking what we are as knowers, we mistake what the Truth is.[16] But we mistake what we are as knowers when we wrongly love the visible realities that our minds are not, thus identifying ourselves with what we are not. To know ourselves rightly as journeying in Christ toward union with the Trinity requires moral conversion. Education is, therefore, a process of moral transformation. To understand truly, we must live rightly.[17] Our capacity to make true judgments is marred by wrongful love of what is not God in the place of God. We learn, then, only to the extent that we love nothing as much as we love the Truth. Only when we learn to love the Truth above all else, and all things in the Truth, do we know everything, including ourselves, in that same Truth. And only then can we be said to be truly learned.

### *St. Thomas Aquinas, In-Formation, and the Virtues*

Thomas Aquinas wrote his famous *Summa theologiae* as a pedagogical tool for teaching students in Dominican houses of study who were training for

[14] St. Augustine, *De Doctrina Christiana*, 1.11.11–1.12.13.
[15] St. Augustine, *De Doctrina Christiana* 2.40.60.
[16] St. Augustine, *De Trinitate*, 10.5.7.
[17] St. Augustine, *De Trinitate*, 10.5.7.

ministry and, in particular, for preaching.[18] In the very first question of that text, Aquinas argues that the sacred teaching (*sacra doctrina*) revealed to humans by God is a teaching of wisdom.[19] He goes on to state that it belongs to the wise person to order and to judge, so that the wisest person is the one who orders and judges all things in terms of the ultimate source of all things—God. Thus, Aquinas's most famous pedagogical tool is meant to aid teachers in their task of leading students to inhabit the wise life. Teaching is a "spiritual work of mercy"[20] for Aquinas, and both teaching and learning require the cultivation of virtue.[21] It is evident, then, that Aquinas did not understand education as the process by which one comes to know facts. Rather, it is the process by which, beginning with faith in what God has revealed for the salvation of humans, one acquires an explanatory grasp of causes that, if undertaken properly, bears fruit in virtue.

In that famous pedagogical tool, the *Summa theologiae*, Aquinas methodically expounds on the cardinal virtues (also called "moral virtues"), the intellectual virtues, and the theological virtues in order to articulate to his students in what the good life—the life oriented to and grounded in God—consists and how it manifests itself in the character and activity of the person in daily life. Following the traditional categories that derive ultimately from Plato, for Aquinas the four cardinal virtues are fortitude, temperance, justice, and prudence.

Fortitude, also sometimes termed courage, concerns endurance through hardship and suffering. It is the active condition of the soul that

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[18] Mark F. Johnson, "Aquinas's *Summa theologiae* as Pedagogy," in *Medieval Education*, ed. Ronald B. Begley and Joseph W. Koterski (Fordham University Press, 2009), 133–142, doi.org/10.1515/9780823237913-010.

[19] St. Thomas Aquinas, *Summa theologiae*, trans. Laurence Shapcote, OP, ed. John Mortensen and Enrique Alarcón (The Aquinas Institute for the Study of Sacred Doctrine, 2012), I, q. 1, a. 6.

[20] Aquinas, *De veritate*, 11.4.

[21] Brian Davies, "Aquinas on Teaching and Learning," *New Blackfriars* 95, no. 1060 (2014): 631–647.

"binds the will firmly to the good of reason in face of the greatest evils" and guards "the will against being withdrawn from the good of reason through fear of bodily evil."[22] Temperance concerns the sensible appetite and the "moderation, which reason appoints to human operations and passions."[23] It is the active condition of the soul that "withdraws [the human person] from things which seduce the appetite from obeying reason."[24] Justice concerns right "relation to another,"[25] "regulates human operations," and renders them good.[26] It is the active condition of the soul that "directs [the human person] in his relations with other[s]" both with respect to the person's relation to individuals as well as the person's relation to community.[27] This is why justice directs to the common good and why all virtues are referrable to the common good and thus, pertain to justice.[28] Prudence concerns seeing reality clearly and rightly responding. It is the active condition of the soul that applies "right reason to action."[29] Prudence is both a cardinal virtue and an intellectual virtue because it belongs to both reason and "the application to action, which is the end of the practical reason."[30]

Following Aristotle, Aquinas identifies five intellectual virtues: art (Latin *ars*; Greek *techne*), science (Lat. *scientia;* Gr. *episteme*), prudence (Lat. *prudentia;* Gr. *phronesis*), understanding (Lat. *intellectus*; Gr. *nous*), and wisdom (Lat. *sapientia*; Gr. *sophia*).[31] Art is the habit of applying correct reasoning in making things and is therefore the intellectual virtue most closely related to building technology well. Science is the habit of drawing correct conclusions through demonstrations based on inductively

[22] Aquinas, *Summa theologiae*, II-II, q. 123 a. 4.
[23] Aquinas, *Summa theologiae*, II-II, q. 141 a. 2.
[24] Aquinas, *Summa theologiae*, II-II, q. 141 a. 2.
[25] Aquinas, *Summa theologiae*, II-II, q. 58 a. 2.
[26] Aquinas, *Summa theologiae*, II-II, q. 58 a. 3.
[27] Aquinas, *Summa theologiae*, II-II, q. 58 a. 5.
[28] Aquinas, *Summa theologiae*, II-II, q. 58 a. 5.
[29] Aquinas, *Summa theologiae*, II-II, q. 47, a. 3.
[30] Aquinas, *Summa Theologiae*, II-II, q. 47, a. 3.
[31] See St. Thomas Aquinas, *Commentary on the Nicomachean Ethics*, Book VI, Lecture 3.

affirmed first principles. Having discussed wisdom above, we can add here that, for Aquinas, prudence is wisdom regarding human living.[32] Prudence orders human life to its true end, judging future potentialities based on things past and present. Understanding is the habit of grasping fundamental matters presupposed in all knowledge. For instance, it is by understanding that one grasps the principle of non-contradiction that two opposites cannot both be true at the same time and in the same way. From this list of intellectual virtues, it should be evident that, for Aquinas, education cultivates not only knowledge of facts and knowledge of explanations, but the habits by which one recognizes *fundamental* matters and affirms what is truly the highest causes of all things, and so orders one's life according to the Truth.

The above virtues are within the natural capacity of humans to acquire through habituation. However, according to Christian faith, original sin has meant that humans now bear the weight of inordinate love and ignorance. Thus, to acquire such virtues, the human being must be healed by the grace of God. God's grace also allows humans to achieve acts beyond those of which humans are naturally capable. Such acts are the realization of habits that are likewise above the natural capacity of humans to acquire. These supernatural habits are named theological virtues. The three theological virtues are faith, hope, and love (*caritas*). Faith names intellectual assent to divinely revealed truths that are beyond human comprehension.[33] Hope names the direction of the human will to the future but difficult-to-attain supernatural good of knowing and loving God as God is in Godself.[34] Love or *caritas* names the friendship of humans with God that unites humans with God and impels them to serve their neighbor.[35] *Caritas* is being in love with God in such a limitless fashion that one loves all things that God loves as God loves them. Thus,

[32] Aquinas, *Summa theologiae*, II-II, q. 47, a. 2.
[33] Aquinas, *Summa theologiae*, II-II, q. 1, a. 1.
[34] Aquinas, *Summa theologiae*, II-II, q. 17, aa. 1 and 2.
[35] Aquinas, *Summa theologiae*, II-II, q. 23, a. 1 and II-II, q. 25, a. 1.

*caritas* is a matter of seeing the cosmos through the eyes of one's most intimate friend, God, the Creator of all things.

### *A Synthesis: Returning to the Vocation of the Gardener*

To be a gardener is to be carefully attentive to the meanings and purposes intrinsic to all that God has created. For Augustine, the true gardener loves the garden in Truth, in the God who is the source of all gardens. Resisting pride, the Augustinian gardener is attentive to the natural law made intrinsic to the garden by God. For Aquinas, to know the garden is to know it in God and so to order its good according to the ultimate Good that God is. The wise gardener judges according to the truth revealed by God about all gardens and the activity of gardening itself.

Thus, according to both Augustine and Aquinas, our call to garden is a call to participate well in a cosmos not of our own making. Education is, in part, what allows us to answer this call. To learn of God's wisdom is to cultivate in ourselves a mind habitually sensitive to the wisdom in all things. The order of things and their succession point to a Love that is beyond them all. To participate well in the cosmos is, then, to be conformed to that Love and to allow it to morally transform us. So, as Augustine reminds us, we must not only grow in love of all things, but we must also learn to know Love within ourselves, as the deepest truth within us. This is not to be dissociated from the task of learning the natures of things. Instead, to live well in relationship with creatures requires that one's life be rooted in right relationship with the Creator.

As in the life of the Blessed Trinity, to know and to love are two-in-one. A scripturally-informed education must, then, cultivate a love that kindles a desire to know that is also a desire to promote the good. If education is a matter of growing into the vocation of the gardener, then it is normatively oriented to the rest of the seventh day of creation. The end of knowledge is the peace that comes from a rest that delights in the beauty of all that is. Finally, we can find this rest when we conform ourselves to Christ, the true

Tree of Life. In Christ, all things are united. Thus, to learn is to uncover Christ in all things. He is truly the rest for which we yearn.

## The Church's Writings on Education in Modernity

Catholic schools aim to teach all academic subjects within a framework that reflects the coherence and unity of truth, preparing students to engage both critically and compassionately with the world around them. In the modern era, particularly during the nineteenth and twentieth centuries, Catholic schools proliferated in response to industrialization and, in some contexts, mass immigration. In its modern social teaching, beginning with *Rerum Novarum* (1891), the Church sought to encourage the education of children by keeping them out of factories; it encouraged adult education for laborers as well.[36] Prior to *Rerum Novarum,* in 1885 Pope Leo XIII wrote a short encyclical, *Spectata Fides*, on the good of Christian education, and in 1890 a more extensive encyclical, *Sapientiae Christianae*, on the need for the faithful to transform society through living out Christian wisdom. While neither of these encyclicals treat education or human formation extensively, they do reaffirm the Church's commitment to helping form children and adults toward their final end while also caring for their temporal needs. They also raise concerns about the contemporary state of society wherein "the tender age of childhood is threatened on every side by so many and such various dangers"[37] and progress is "made towards securing the well-being of the body and of material things without due

[36] Leo XIII, *Rerum Novarum* [On Capital and Labor], The Holy See, May 15, 1891, vatican.va/content/leo-xiii/en/encyclicals/documents/hf_l-xiii_enc_15051891_rerum-novarum.html, §42; Pius XI, *Quadragesimo Anno* [On Reconstruction of the Social Order], The Holy See, May 13, 1931, vatican.va/content/pius-xi/en/encyclicals/documents/hf_p-xi_enc_19310515_quadragesimo-anno.html, §143.

[37] Leo XIII, *Spectata Fides* [On Christian Education], The Holy See, November 27, 1885, vatican.va/content/leo-xiii/en/encyclicals/documents/hf_l-xiii_enc_27111885_spectata-fides.html, §4.

consideration that wealth, power, and resources are 'incapable of satisfying our soul created for higher and more glorious things.'"[38]

*Divini Illius Magistri*, promulgated by Pius XI in 1929, recognizes the supreme importance of education "not merely for each individual, but for families and for the whole of human society, whose perfection comes from the perfection of the elements that compose it."[39] In this, education rightly understood is "essentially a social and not a mere individual activity."[40] *Divini Illius Magistri* cautions against what we might now call "technocratic" educational methods or theories that "pretend to draw education out of human nature itself and evolve it by its own unaided powers."[41] Education is not a technique that one imposes onto a person. Education regards the very being of the human person. It should not be viewed as a mechanical process applied to the human being to achieve some predetermined result. Rather "the whole work of education is intimately and necessarily connected" to growing in relationship with and likeness to God.[42]

Several decades later, the Second Vatican Council's *Gravissimum Educationis* addresses what, amid technological developments, especially in the sphere of communication, has become an even more pressing problem: childhood and adult education. Despite growing global efforts

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[38] Leo XIII, *Sapientiae Christianae* [On Christians as Citizens], The Holy See, January 10, 1890, vatican.va/content/leo-xiii/en/encyclicals/documents/hf_l-xiii_enc_10011890_sapientiae-christianae.html, §1.

[39] Pius XI, *Divini Illius Magistri* [On Christian Education], The Holy See, December 31, 1929, vatican.va/content/pius-xi/en/encyclicals/documents/hf_p-xi_enc_31121929_divini-illius-magistri.html, §8.

[40] Pius XI, *Divini Illius Magistri,* §9.

[41] Pius XI, *Divini Illius Magistri,* §5. Building on *Sapientiae Christianae*, *Divini Illius Magistri* connects modern currents toward material progress to new social currents toward creating an educational "system infallibly efficacious, and capable of preparing the present generations for that earthly happiness which they so ardently desire" (§5).

[42] Pius XI, *Divini Illius Magistri,* §7. *Divini Illius Magistri* recommends that education take "in the whole aggregate of human life, physical and spiritual, intellectual and moral, individual, domestic and social, not with a view of reducing it in any way, but in order to elevate, regulate and perfect it, in accordance with the example and teaching of Christ" (§95).

for the education of all, many "are still deprived of even rudimentary training and so many others lack a suitable education in which truth and love are developed together."[43] *Gravissimum Educationis* recognizes and affirms the inalienable right of all human beings to an education "that is in keeping with their ultimate goal . . . and also in harmony with their fraternal association with other peoples in the fostering of true unity and peace on earth."[44]

*Gravissimum Educationis* reflects the fundamental task of the Catholic educator as thoughtfully weaving together the Gospel and one's particular culture: "True education strives to form individuals with a view toward their final end and the good of the society to which they belong."[45] If an education does not keep with the human being's ultimate end, respect the cultures and traditions of those who are being educated, and foster solidarity or fraternity, then it is not really an education. *Gravissimum Educationis* recommends that children and young people around the world be aided "to develop harmoniously their physical, moral and intellectual endowments so that they may gradually acquire a mature sense of responsibility in striving endlessly to form their own lives properly and in pursuing true freedom as they surmount the vicissitudes of life with courage and constancy."[46]

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[43] Second Vatican Council, *Gravissimum Educationis* [Declaration on Christian Education], October 28, 1965, vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_decl_19651028_gravissimum-educationis_en.html, "Introduction."

[44] Second Vatican Council, *Gravissimum Educationis*, §1.

[45] Second Vatican Council, *Gravissimum Educationis*, §1.

[46] Second Vatican Council, *Gravissimum Educationis*, §1. In addition to these writings, the Congregation for Catholic Education, now called the "Dicastery of Culture and Education" (of which this research group is a part), has also published a number of documents on education in the last several decades, including *The Catholic School* (1977), *The Catholic School on the Threshold of the Third Millennium* (1997), *Educating to Intercultural Dialogue in Catholic Schools* (2013), *Educating Today and Tomorrow: A Renewing Passion* (2014), and *The Identity of the Catholic School for a Culture of Dialogue* (2022). Each of these documents articulates the Catholic vision of education within specific contemporary contexts or in response to particular present-day challenges.

Throughout its history, the Church has tried to pursue an integral paradigm for education. In a modern context, the Church has advocated resistance to technocratic tendencies that prioritize efficiency. This is directly addressed in *Laudato Si'*, an encyclical in which Pope Francis lamented the technocratic paradigm that shapes the modern engagement with the world.[47] It is a way of seeing the world as mere material to use for whatever desire a person has. It is little concerned about the purpose and value of other beings as created by God. This technocratic framework leads to not only ecological devastation but also the instrumental use of others. In this framework, children can start to become products to manipulate through a technocratic educational process. Francis sees part of the response to the technocratic paradigm as an ecological education tied to a conversion.[48]

The Catholic Church calls us to be wise stewards and teachers of children who arrive in a world that is increasingly enthralled by its technical creations. Accordingly, Catholic educators aim to thoughtfully and critically engage with cultural developments. This is a difficult task, as modern life and contemporary education often require that we employ new technology without our consent. Seduced by the convenience and comfort new technologies bring, we risk overlooking the harm caused especially to young people. We need to be vigilant about how new technology impacts how we live and how we strive to be disciples of Christ. How should we educate in light of AI? Answering this question first requires us to explore the foundation of Catholic education. In the words of *Gravissimum Educationis*, Catholic education foundationally seeks to help children

> to develop harmoniously their physical, moral and intellectual endowments so that they may gradually acquire a mature sense of responsibility in striving endlessly to form their own lives properly and in pursuing true freedom as they surmount the vicissitudes of life with courage and

[47] Francis, *Laudato Si'*, §§106–129.
[48] Francis, *Laudato Si'*, §§209–222.

> constancy. . . . Moreover they should be so trained to take their part in social life that properly instructed in the necessary and opportune skills they can become actively involved in various community organizations, open to discourse with others and willing to do their best to promote the common good.[49]

This purpose can be conceptually distinguished into two interrelated aspects. First, Catholic education seeks to form the character of the individual as a rational creature made in the image of God and destined to eternal life with the Trinity. To do so, we must seek wisdom. Second, analogous to the way the Persons of the Trinity are substantial relationships to each other, people are also made for relationships with others. We are social and political creatures. Thus, education also and at the same time aims to prepare us for shared life with others serving a common good. It seeks an integral human development. By pursuing these ends, Catholic educational institutions prepare children for a flourishing life of love of God and neighbor, as the rest of the chapter explores.

## Institutional Catholic Education and Integral Human Development

### *Forming the Individual Person*

A fundamental feature of Catholic education is its aim to form the whole person of the student.[50] It is not merely directed toward transmitting information or facts, nor is it a behaviorist conditioning for pragmatic purposes, nor does it merely aim at creative self-development. Instead, Catholic education aims at wisdom, providing the student with the ability to discern truth in both speculative and practical matters. To discern and understand truth, it is not enough to possess a set of disconnected facts. Rather, it requires a right perception of the world. A person must

[49] Second Vatican Council, *Gravissimum Educationis*, §1.
[50] Second Vatican Council, *Gravissimum Educationis*, §1.

recognize beauty to understand literature or art; a person must recognize moral goods to engage political or economic science well. One can only perceive the world correctly, however, if one has the proper desires and sentiments that orient one toward the good, the true, and the beautiful. If a student has no taste for beauty, then he will not recognize it. If a student merely desires material goods, then she will not recognize the morally good. Thus, to attain the wisdom to know and act well in the world requires a training not only in knowledge, although that is necessary, but also a formation of affect and character.[51] Most fundamentally, this training is grounded in spirituality.

Traditionally, this character formation is discussed under the heading of **virtue**, as mentioned in the above section on St. Thomas Aquinas's view of education. Cultivating virtue is critical for the moral and intellectual formation of students. **Temperance** shapes one's physical desires, allowing them to be directed toward the good and beautiful. **Fortitude** allows one to conquer fear, so that one will not turn away from good due to the difficulty of attaining it or the risks that come from opposing a widely accepted falsehood. **Justice** allows one to perceive the conditions necessary for social harmony. **Prudence** is itself, in part, a right perception of the goods at stake in a situation. The school is supposed to be the place in which rituals, routines, and daily feedback encourage the development of these dispositions.

Of course, a school will only be able to form a student well if it holds the correct understanding of the person and her relationship to the world. That is why it is important to develop curricula within the framework of a proper Catholic theological anthropology. Fundamental to this anthropology is the understanding of the human person as made in the image of God (Genesis 1:26–27). The *imago Dei* is a concept far too rich for a full explication here, but central to it is the understanding of the person as possessing reason and free will, as relational, and as ordered

[51] See C.S. Lewis, *The Abolition of Man* (Simon & Schuster, 1978).

toward life with God.[52] This means that, first, persons should be understood not as determined by biology, social structure, or behaviorist conditioning, however much these features of the world might influence action and character. Instead, students must be treated and learn about humans as rational agents who are ultimately free to turn to the good. Second, human goals should not be seen solely under the guise of self-interest in either the school or in subjects like economics, since we are made for communion with others and find our individual good only in the fulfillment of the common good. Finally, all subjects must be seen in the context of our basic ordering toward life with God. Only in this framework can a proper vision of the world emerge for the student.

Catholic educational institutions must teach in line with the truths of the Catholic tradition and Christian anthropology, though they should not infringe on what is proper to other disciplines. The person as made in the image of God is oriented toward truth, since God is truth and is the author of all truths in the created order. That means Catholic education must be supportive of truth in whatever form it can be found and wisdom wherever it is located. The Catholic tradition only speaks normatively on a few issues, meaning that it respects other disciplines' autonomy to explore their own subject matters according to their own methods.[53] A Catholic school need not fear that contradictions will arise between genuine science and faith, for example, since truth cannot contradict truth given its ultimate source in the one God. A Catholic education should aim at an integration of faith and reason.

When considering truth, we must not think of it only under the form of analytic or reductive facts of science. Nor is it even merely a synthetic or holistic understanding of a topic. A Catholic education also seeks to shape

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[52] See Dicastery for the Doctrine of the Faith, "Declaration 'Dignitas Infinita,' on Human Dignity," April 2, 2024, press.vatican.va/content/salastampa/en/bollettino/pubblico/2024/04/08/240408c.html; John Paul II, *Evangelium Vitae* [On the Value and Inviolability of Human Life], The Holy See, March 25, 1995, vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_25031995_evangelium-vitae.html.

[53] Second Vatican Council, *Gravissimum Educationis*, §10.

a contemplative disposition in students.[54] The aim of scholarship is ultimately a contemplative relationship to reality, an ability to grasp the purposes and goodness present in the world around us. Pope Francis argues that it is only through a conversion to such a contemplative relationship to reality that society will be able to overcome the crises facing humanity because only in this way can we integrate technical power in service to truth and the common good.[55] Thus, spirituality is not an external addition to the school day. It is rather at the heart of the mission of Catholic education.

### *Forming the Individual Person for Community*

The human person is made in the image and likeness of the Triune God. Persons are not accidentally in relationship with others but are beings who are intrinsically relational. Being a member of a community is part of the very nature of the human being. This fact is reflected in the Blessed Trinity of three Persons who simply are relationships with one another, all three being one God and each being wholly God.[56] Thus, the formation of the individual person is always and in every case a formation for communion with others and for the common good. However, this is not to deny the uniqueness of personality. Rather, it is to affirm that personality is a dialogue between individuality and community. The human person can only fully achieve the unfolding of her personality or meaning and realize her vocation with the cooperation of others and within the context of the whole. To be human is to be "called to a community life that, after growing from a soil bounded by time, by space, by the earth, overcomes the limits of time and space."[57] Hence, the person flowers in the place prepared for her by her family, her teachers, her community, all those who came before

[54] Francis, *Laudato Si'*, §214.

[55] Francis, *Laudato Si'*, §§216–227.

[56] This language reflects St. Thomas Aquinas' trinitarian theology. See *Summa theologiae* I, q. 29, a. 2.

[57] Edith Stein, *Finite and Eternal Being: An Attempt to Ascend to the Meaning of Being,* trans. Walter Redmond (ICS Publications, 2023), 401.

her, and most importantly, by God. And after unfolding fully, she is "placed in a wreath that will never fade."[58] We are not ourselves without our relationships with others; most especially, we are not ourselves without our fundamental relationship with God. And yet, persons ought never to be reduced to anonymous units in a social whole. This means that the formation of persons for community must safeguard multiple interweaving goods: the good of the individual person as uniquely themself within a socio-cultural context, the good of the unique and diverse cultures in and through which persons become themselves, and the good of those virtues by which one lives well with others no matter the socio-cultural context one finds oneself in.[59]

By virtue of the common good, it is the duty of society "to promote the education" in various ways that are appropriate to a given context.[60] *The school is an educational community*. Like the family, the school community is not just any community but one that prepares human beings to enter into other types of communities and provides them with the tools to be able to recognize true community and live in relationship with others

[58] Stein, *Finite and Eternal Being*, 401.

[59] See Francis, *Evangelii Gaudium* [On the Proclamation of the Gospel in Today's World], November 24, 2013, vatican.va/content/francesco/en/apost_exhortations/documents/papa-francesco_esortazione-ap_20131124_evangelii-gaudium.html#The_whole_is_greater_than_the_part, §236. He writes: "Here our model is not the sphere, which is no greater than its parts, where every point is equidistant from the centre, and there are no differences between them. Instead, it is the polyhedron, which reflects the convergence of all its parts, each of which preserves its distinctiveness. Pastoral and political activity alike seek to gather in this polyhedron the best of each. There is a place for the poor and their culture, their aspirations and their potential. Even people who can be considered dubious on account of their errors have something to offer which must not be overlooked. It is the convergence of peoples who, within the universal order, maintain their own individuality; it is the sum total of persons within a society which pursues the common good, which truly has a place for everyone" (§236).

[60] Second Vatican Council, *Gravissimum Educationis* §3; cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church* (Libreria Editrice Vaticana/ USCCB Publishing, 2005), §157.

well.[61] School should be a place of encounter and at its best it should be "synonymous with openness to reality."[62] The school and educational institutions, when properly built in service to the common good and respecting subsidiarity, are "designed not only to develop with special care the intellectual faculties but also to form the ability to judge rightly, to hand on the cultural legacy of previous generations, to foster a sense of values, [and] to prepare for professional life."[63] Each and every teacher's class is its own community of learning. Because of this, the first task of teachers before any learning can truly begin is to make their classes into a community by sowing seeds for the development of trust and cultivating a culture of encounter with each student and among the students themselves.[64] But the members of these societies also have a responsibility to use their education to contribute to the common good.[65]

The Catholic conceptions of vocation and work are not synonymous with or reducible to paid labor or career. They are also not to be understood instrumentally as means for amassing material goods, wealth, and power or merely achieving objective outputs. To envision education and education's relationship to job preparation correctly, we must understand the proper meanings of vocation and work. A vocation is what God has created one for, both in time and in the consummation of one's life outside time in eternity. Every human life is a vocation.[66] God knows each and every one of us "profoundly; he has counted the hairs of our head

[61] Stein, *Finite and Eternal Being*, 126.

[62] Francis, "Address of Pope Francis to Students and Teachers from Schools across Italy," May 10, 2014, vatican.va/content/francesco/en/speeches/2014/may/documents/papa-francesco_20140510_mondo-della-scuola.html.

[63] Second Vatican Council, *Gravissimum Educationis,* §5.

[64] Stein, *Finite and Eternal Being*, 120.

[65] Cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §167.

[66] See the French of *Populorum Progressio*, "Dans le dessein de Dieu, chaque homme est appelé à se développer car toute vie est vocation" (§15).

and has envisaged for each person a unique path of holiness and service."[67] In this sense, vocation is "God's free gift that blossoms in the depths of our hearts"[68] and thus "begins with the awareness and experience of a God who is love" and necessarily "entails an intimate dialogue with the One who calls and invites us to respond, despite the deafening noise of the world.[69] Moreover, "The Christian vocation reveals itself in all its depth as a participation in the life of Christ, by sharing in his mission and reflecting in his beauty."[70] All are called to reflect the beauty of Christ. This is the most basic vocation of the human person and is realized in "a dynamic process of maturation sustained by intimacy with our Lord."[71]

The Catholic conception of work can then only be rightly understood in relation to vocation: "In accord with the divine plan and will, [work] should harmonize with the genuine good of the human race, and allow people as individuals and as members of society to pursue their total vocation and fulfil it."[72] Work is, according to *Laborem Exercens*, "any activity by [the human person], whether manual or intellectual, whatever its nature or circumstances," and it is through work that human persons "must earn [their] daily bread and contribute to the continual advance of

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[67] Leo XIV, "Message of His Holiness Pope Leo XIV for the 63rd World Day of Prayer for Vocations," April 26, 2026, vatican.va/content/leo-xiv/en/messages/vocations/documents/20260316-messaggio-vocazioni.html.

[68] Leo XIV, "Message of His Holiness Pope Leo XIV for the 63rd World Day of Prayer for Vocations."

[69] Leo XIV, "Message of His Holiness Pope Leo XIV for the 63rd World Day of Prayer for Vocations."

[70] Leo XIV, "Message of His Holiness Pope Leo XIV for the 63rd World Day of Prayer for Vocations."

[71] Leo XIV, "Message of His Holiness Pope Leo XIV for the 63rd World Day of Prayer for Vocations."

[72] Second Vatican Council, *Gaudium et Spes* [Pastoral Constitution on the Church in the Modern World], December 7, 1965, vatican.va/archive/hist_councils/ii_vatican_council/documents/vat-ii_const_19651207_gaudium-et-spes_en.html, §35. Cf. John Paul II, *Laborem Exercens* [On Human Work on the Ninetieth Anniversary of *Rerum Novarum*], The Holy See, September 14, 1981, vatican.va/content/john-paul-ii/en/encyclicals/documents/hf_jp-ii_enc_14091981_laborem-exercens.html, §26.

science and technology and, above all, to elevating unceasingly the cultural and moral level of the society within which [they live]."[73]

We *work* by participating in the intelligible order of the universe as created by God.[74] Every human community—be it a family, a business, a volunteer group, or a nation—has a common good.[75] Work is activity within a community in service to the common good. At the same time, all human work, "whether manual or intellectual, is inevitably linked with *toil*."[76] And yet, since the "work of salvation came about through suffering and death on a Cross," so too do those who endure "the toil of work in union with Christ crucified for us," collaborate "with God for the redemption of humanity."[77] Integral education will ultimately form human persons to be sensitive and responsive to their vocations. Integral education will teach and bear witness to the true meaning of work and will not teach or itself instrumentalize work. Education must remain centrally oriented to this understanding of work, never simply toward preparing students to remain within an instrumental conception of work focused only on remuneration or the provision of basic necessities.

Thus, Catholic education should order education toward personal and social fulfillment that inseparably intertwine at multiple levels.[78] As social creatures, people find their good not merely through their individual actions and possessions, but also through shared action with others. One aspect of that service to the common good comes through our jobs; hence, job preparation is an important component of any thoroughgoing education. However, the student's job preparation is insufficient if it does

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[73] John Paul II, *Laborem Exercens*, "Blessing."

[74] John Paul II, *Laborem Exercens*, §4.

[75] This understanding of the common good in the next few paragraphs relies on Russell Hittinger, "The Coherence of the Four Basic Principles of Catholic Social Doctrine: An Interpretation," *Nova et Vetera* 7, no. 4 (2009): 791–838.

[76] John Paul II, *Laborem Exercens*, §27.

[77] John Paul II, *Laborem Exercens*, §27.

[78] Cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §§189–191.

not serve this dual purpose.[79] Catholic education's job preparation exists in a broader context that makes it possible to see the student's job as a possible component of the vocation to serve others in imitation of Christ. Of course, vocation ought always to have primacy over one's job; for in our vocation we are called to be united to Christ and so united to the Blessed Trinity who created us. Students' studies and jobs ought to be methods by which they can contribute to their ability to live well in their family, their nation, and their Church.[80] Along with this subordination of career to the common good, there is also a shift from seeing one's job actions as of mere instrumental value to seeing them as fully personal actions that express self-gift.[81]

Given the priority of the common good, Catholic education sees *encounter* as an essential category for understanding what it means to be a social being.[82] The good realized in community is not merely a shared purpose. It is also the fact of relationship with others. There is a good in the shared work, the ordered relationships, and the fact of being together. We are not simply cooperative workers who create social bonds for the sake of efficiency. We are social animals who thrive in community.[83] Being rightly ordered to this good of relationship is an aspect of the virtue of solidarity. But solidarity ought not mean insularity, whether of a

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[79] Cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §165. Cf. also Second Vatican Council, *Gaudium et Spes*, §85.

[80] Cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §§289–290; Cf. also "The Challenge of Integral Education" in Congregation for Catholic Education, "Educating Today and Tomorrow: A Renewing Passion," April 7, 2014, vatican.va/roman_curia/congregations/ccatheduc/documents/rc_con_ccatheduc_doc_20140407_educare-oggi-e-domani_en.html, §III.1.e; Congregation for Catholic Education, "The Identity of the Catholic School for a Culture of Dialogue," January 25, 2022, vatican.va/roman_curia/congregations/ccatheduc/documents/rc_con_ccatheduc_doc_20220125_istruzione-identita-scuola-cattolica_en.html, §19.

[81] See Leo XIV, *Drawing New Maps of Hope*, §§4.1, 4.2, 5.2.

[82] For a fuller treatment of the theme of encounter, see AI Research, *Encountering Artificial Intelligence,* 7–9, 47–49.

[83] Cf. Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §149.

nationalistic or ethnic sort or otherwise. If community is the locus of encounter, then community is fundamentally a matter of dialogue. This means that community ought to be dynamic and open. We must be on guard against group biases that divide rather than unite.

Thus, a culture of encounter privileges this need for community by acknowledging the reality of difference.[84] A community is not a community because everyone is identical. Rather, a community is a community because every member has gifts to share, responsibilities to fulfill, and rights to be honored, and these members together make it possible for the community to achieve its proper ends. Encounter is a fitting word for describing what it's like to relate to others in such a context. Persons are dynamic and complex constellations of biological, moral, and social factors. So, to meet a person is to encounter a mystery. To live in a family, a nation, and a religious community is to live with other dynamic and complex constellations who have much to offer and much to learn. Catholic education should form a student to do more than tolerate others. Rather, Catholic education should form students who are delighted by the mystery of others and committed to working for their good.

A culture of encounter is especially necessary in our atmosphere of cultural pluralism. Catholic education is a global enterprise in dialogue with an array of cultures. And like all forms of contemporary education, it is sending students out from the hybrid culture of the Church into a world characterized by intense cultural pluralism. In its interaction with culture, Catholic education must respond to the context in which it is conducted. This is an essential condition of its ability to prepare students for living in their family, nation, and religious communities. Again, as Francis writes in *Querida Amazonia*, education is meant to "cultivate without uprooting, to foster growth without weakening identity, to be supportive without

[84] Cf. "The Identity of the Catholic School for a Culture of Dialogue," §§27–30, 84–93.

being invasive."[85] No single human culture has a monopoly on human flourishing. There are multiple valid cultural understandings of human well-being. This is not to deny that there are objective standards normatively and, therefore, universally determining what it is to live well as a human. Instead, it is to note that those standards can be expressed in a plurality of fashions. Thus, we must discern the difference between basic standards for flourishing and the ways that those standards are expressed variously in different human cultures as a result of the responsible freedom of human creativity. Indeed, difference can teach us how to learn from others how best to live our own cultural inheritances. Cultural pluralism is thus a fecund reality. Such pluralism should hearten and enliven Catholic education.[86]

Catholic schools should be privileged places of encounter between culture and faith, but the historical record of this encounter is painful. Too often, the Christian faith has been proposed to a culture not through encounter, but through force. This has happened especially where the Church's encounter with indigenous peoples has been polluted by racism and greed. This painful memory ought to light a Catholic school's way forward. A Catholic school's vision of cultural synthesis should be shaped by the good news that the Creator did not see difference and particularity as obstacles to love. And as the Son was mindful of our poverty, so Catholic cultural synthesis should be especially mindful of the poor and vulnerable. As Francis exhorts, "They are not just another party to be won over, or merely another individual seated at a table of equals. They are our principal dialogue partners, those from whom we have the most to learn,

[85] Francis, *Querida Amazonia* [To the People of God and To All Persons of Good Will], February 2, 2020, vatican.va/content/francesco/en/apost_exhortations/documents/papa-francesco_esortazione-ap_20200202_querida-amazonia.html, §28.

[86] Cf. Francis, *Fratelli Tutti* [On Fraternity and Social Friendship], The Holy See, October 3, 2020, vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20201003_enciclica-fratelli-tutti.html, §§147–150.

to whom we need to listen out of a duty of justice, and from whom we must ask permission before presenting our proposals."[87]

In whatever culture they find themselves, Catholic schools ought to complement the synthetic work being done in the liturgical and pastoral life of the Church. And they ought to support the organic synthesis that takes place within the family. When Catholic schools do this, they make the Christian faith a viable hypothesis about the nature and purpose of life, and they propose that hypothesis to actual persons.

To promote the common good and to enter into fruitful dialogue with those who are different from oneself, one must cultivate the habit of civic friendship.[88] This, in turn, requires "selflessness, detachment from material goods, giving freely and inner acceptance of the needs of others."[89] These habits allow one to enter into concrete solidarity with everyone they might encounter. For friendship is a form of love. Education must allow space for students to practice the love of civic friendship, to transcend oneself in careful attentiveness to the needs of others and to how those needs might be met within social structures. Of course, learning civic friendship must begin in the family. A family is the place where children develop a sense of themselves as individuals, a veneration for the cultural inheritance of their ancestors, and the virtues by which one meets the demands of the common good in relationship with others. Most especially, it is with family that a person learns of the love that is the root of all human flourishing because of an objectively true order of values. It is, therefore, only by having learned this love that one can encounter difference fruitfully, neither reducing that difference to sameness nor excluding that difference as mere otherness. The love of civic friendship is a habit by which one both recognizes the dignity of other humans and recognizes the

[87] Francis, *Querida Amazonia*, §26.

[88] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §390.

[89] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §390.

value of the uniqueness of persons amidst the communion to which they are called.

Let us end by returning to the reflection at the beginning of this section. In the Catholic theological tradition, the word "Person" refers primarily to the divine Persons of the Blessed Trinity. Human persons image this Blessed Trinity. If the Persons of the Blessed Trinity are intrinsically related to one another, then so, too, are humans intrinsically relational and communal. Our communities and the virtues by which the common good is promoted within them are modelled after and rooted in the Love that the triune God is. For, only when we live by the theological virtue of *caritas*, only when we are friends with God, are we truly civic friends in our communities.

## Conclusion

The formal education institution is of course not the only or even the most important place of moral formation. The family, as the "first school of social virtue," is "a community of love and solidarity, which is uniquely suited to teach and transmit cultural, ethical, social, spiritual and religious values, essential for the development and well-being of its own members and of society."[90] Commitment to the common good begins here with parents as the first educators (who require support in order to fulfill this role and ministry). The Church recognizes, of course, that not all families are communities of love in this way and that not all children have access to formal education. Espousing a vision of education as a work of love in which all persons may have the opportunity to learn and, ultimately, serve the community and the human family writ large, the Church is committed to a prioritization of the needs of the poor and vulnerable.[91] Accordingly,

[90] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §238.

[91] Congregation for Catholic Education, *The Catholic School on the Threshold of the Third Millennium*, §§4, 15; Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §182.

it "can and must find in the context of old and new forms of poverty that original synthesis of ardour and fervent dedication which is a manifestation of Christ's love for the poor, the humble, the masses seeking for truth."[92] It is in this more intimate situation of the home, of the extended family, and of the local community that structures of character take shape.

Nor does Catholic education end once a diploma or a degree is earned. The Church "does not tire of proclaiming the Gospel" and its social doctrine, which in itself is an expression of Christian anthropology, is to be studied and integrated over the life-long course of shaping our Christian identity.[93] Every generation has the collective responsibility of "engaging anew in the arduous search for the right way to order human affairs; this task is never simply completed. Yet every generation must also make its own contribution to establishing convincing structures of freedom and of good, which can help the following generation as a guideline for the proper use of human freedom; hence, always within human limits, they provide a certain guarantee also for the future."[94] Education is a task that is given to each individual and community over the course of a life.

Yet formal education has a significant role to play in this formation in much of contemporary society. The Church has recognized this fact and developed a wide network of institutions at every level of formation from preschool to university. These institutions form character, prepare students for practical careers, and encourage them in a life of service to society. These goals are grounded in the Catholic understanding of the human person as ordered toward truth and love. Throughout history, the Church has found resources for this formation in the surrounding society, from Greek philosophical schools to modern scientific research institutions.

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[92] Congregation for Catholic Education, *The Catholic School on the Threshold of the Third Millennium*, §15.

[93] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §§2, 9.

[94] Benedict XVI, *Spe Salvi*, §25.

Yet, aspects of societies have also resisted these goals, whether through the ideologies of slave societies either ancient or modern, imperialisms that denigrated others, or an industrial system employing child labor. The next chapter explores the Catholic vision of technology and influences in today's society that run contrary to that vision.

# CHAPTER 3

# CATHOLIC TEACHING ON TECHNOLOGY

Since technology is both a product of human creativity and that which enables humans "to exercise dominion over matter," it, for good or ill, ultimately reflects the interiority of human beings and the state of their relation to God and other creatures.[1] Technology in its proper sense is supposed to be "a response to God's command to till and to keep the land that he has entrusted to humanity, and it must serve to reinforce the covenant between human beings and the environment, a covenant that should mirror God's creative love."[2] Technology can become disordered and distort humanity's relationship to God and creation when it "seeks to prescind from the limits inherent in things" and is motivated by dominance and control rather than cultivation and care.[3]

The Church's social encyclicals offer extensive reflections and guidance on what constitutes good technology that perpetuates flourishing and what constitutes harmful technology that perpetuates the technocratic paradigm. Having established a positive vision of education that is consistent with integral human development from the Catholic perspective, it is now necessary to establish a positive vision of technology that is consistent with integral human development. In order for us, therefore, to have the necessary tools to make prudential judgments about

[1] Benedict XVI, *Caritas in Veritate,* §69.
[2] Benedict XVI, *Caritas in Veritate,* §69.
[3] Benedict XVI, *Caritas in Veritate,* §70.

AI in education, we must fully consider what differentiates harmful from beneficial technology.

This chapter aims to give an overview of the Church's insights and social teachings on modern technology in order to ultimately articulate an account of *integral technology* by which AI technologies could be morally evaluated. Over the course of this chapter, we shall term the Church's specific insights on technology ***Catholic technology teaching.***[4] The first part of this chapter explains some of the Church's key teachings on technology from the last century. While in no way exhaustive, this account spans from *Rerum Novarum* to the present day and directs the reader to the Church's continuous care and attentiveness to the impact new technologies can have on society, the environment, and the human person. The second part of this chapter provides a constructive vision of integral technology according to Catholic technology teaching and applies that constructive vision to the moral evaluation of AI technologies. From this evaluation, we develop a framework out of which the good development, deployment, and uses of these technologies can better be differentiated from harmful ones. This chapter concludes by delineating the necessary characteristics an integral technology would entail.

## Technology and the Modern Papacy: From Pope Leo to Pope Francis

Pope Leo XIII inaugurated the modern era of Catholic social teaching with the publication of *Rerum Novarum* in 1891, which called on people of faith to conscientiously evaluate the Industrial Revolution, driven by efficiency and profit motives tightly bound to technological development: "No [one] may with impunity outrage that human dignity which God treats with great reverence. . . . [The person] cannot give up his soul to

[4] We are aware that "Catholic *technological* teaching" is grammatically correct. While this is definitively the case, "Catholic *technology* teaching" has a better ring to it in English and more closely mirrors the *sound* of Catholic social teaching, the resemblance of which is the rhetorical point of using this terminology.

servitude, for it is not one's own rights which are here in question, but the rights of God, the most sacred and inviolable of rights."[5] Leo XIII ushered in a Catholic response to modern industry that turned toward the human worker and against an uncritical acceptance of the forces of markets, technology, and both the capitalist and socialist ideologies of progress.

In papal documents leading up to the Second Vatican Council, as well as in the Council itself, the Church continued to affirm this defense of the modern worker while extending a voice of dialogue to the quickly advancing fields of science and technology. The importance of the divinely-established human dignity of all people is increasingly characterized in conciliar documents in a language of the "common good" that emphasizes the active role that all persons, no matter their faith, are to take in building a better world. During the Second Vatican Council, this entreaty to persons of good will in the context of the common good was paired with positive evaluations of science and technology. For instance, *Gaudium et Spes* noted, "If methodical investigation within every branch of learning is carried out in a genuinely scientific manner and in accord with moral norms, it never truly conflicts with faith, for earthly matters and the concerns of faith derive from the same God."[6] The conciliar document ended with a call for people of faith to engage science and technology in the spirit of seeking to weave such discoveries into "Christian morality and the teaching of Christian doctrine, so that their religious culture and morality may keep pace with scientific knowledge and with the constantly progressing technology. Thus, they will be able to interpret and evaluate all things in a truly Christian spirit."[7]

In the years following the Second Vatican Council, the Church's social encyclicals frequently directed attention to the reciprocal relationship between technology and human culture. They were deeply concerned about the ways in which many modern social and technological

[5] Leo XIII, *Rerum Novarum,* §40.

[6] Second Vatican Council, *Gaudium et Spes*, §36.

[7] Second Vatican Council, *Gaudium et Spes*, §62.

"developments" in fact violate the human person, disrupt human community, and exploit the poor. For example, in order to clarify what constitutes *authentic* human development rather than "deceitful promises of would-be saviors," Pope Saint Paul VI addressed the nature of human progress in the encyclical *Populorum Progressio,* promulgated in 1967.[8] *Authentic human development* consists in an *integral* or "well rounded" cultivation of the whole person and the whole human community of persons who are created in God's image and likeness toward their ultimate end in time and beyond time.[9] Each and every person is an unrepeatable gift formed by the Creator of the universe and gifted with some life task or vocation by that Creator that serves the reconciliation and restoration of all creation.

Economic or technological developments that "distribute more fairly" or make the earth "a more suitable living place for human beings" are insufficient and will ultimately come to naught unless undergirded by a foundation of solidarity, love of neighbor, and respect for human dignity and agency.[10] Progress or authentic human development, therefore, does not consist in mere economic development and it certainly does not consist in the economic development of the few. True progress and an integral, authentic approach to human development ultimately must be oriented toward the flourishing of all human persons and thereby "reduce inequities, eliminate discrimination, free [human persons] from the bonds of servitude, and thus give them the capacity, in the sphere of temporal realities, to improve their lot, to further their moral growth and to develop their spiritual endowments."[11]

Building on this notion of integral and authentic human development, Pope Saint John Paul II's 1987 encyclical *Sollicitudo Rei Socialis* teaches that just as an "underdevelopment" is unacceptable, so too is a "super-

[8] Paul VI, *Populorum Progressio*, §11.
[9] Paul VI, *Populorum Progressio*, §14.
[10] Paul VI, *Populorum Progressio*, §34.
[11] Paul VI, *Populorum Progressio*, §34.

development" that consumes and throws away without any care for the intrinsic value of things or the toll such consumptive practices have on other persons, the environment, and the "underdevelopment" of other communities.[12] If "development" or "progress" is achieved at "the expense of the development of the masses, and without due consideration for the social, cultural and spiritual dimensions of the human being" then it is rather a decline or regression of humanity.[13] *Sollicitudo Rei Socialis* further clarifies that "the development of the whole person and of every human being is in fact *a duty of all towards all*."[14] Development is not a solo endeavor but a communal and collective responsibility of all human persons for all human persons. True development "must be measured and oriented according to the reality and vocation" of human beings in both their natural and transcendent dimensions. There is an essential and inviolable dignity that flows from the human person as a being made in the image and likeness of God to which all truly integral human development is oriented. The 1991 encyclical *Centesimus Annus* goes so far as to say that "the guiding principle of Pope Leo's Encyclical [*Rerum Novarum*], and of all of the Church's social doctrine, is a *correct view of the human person* and of [the human person's] unique value."[15] The human person as an image of the Triune God is by nature social and oriented toward community and relationship of mutual love and self-gift. As mentioned earlier, the unity of the three persons of the Trinity is the model of love itself and the exemplification of what it means to be in right relationship.

Following the rise of the internet and social media, Pope Benedict XVI was the first Pope to directly address the modern digital revolution. Throughout his papacy, he raised concerns about the future trajectory and present impact of technological developments for persons and their integral development, ascertainment of truth, and cultivation of

[12] John Paul II, *Sollicitudo Rei Socialis*, §28.
[13] John Paul II, *Sollicitudo Rei Socialis*, §9.
[14] John Paul II, *Sollicitudo Rei Socialis*, §29, emphasis added.
[15] John Paul II, *Centesimus Annus*, §11.

relationships of mutual love and self-gift. To this point, his 2009 encyclical, *Caritas in Veritate*, draws attention to the fact that "technological development can give rise to the idea that technology is self-sufficient when too much attention is given to the 'how' questions, and not enough to the many 'why' questions underlying human activity."[16] Focusing on "how" questions—*how* something works, *how* it is built, *how* it is useful—can become problematic because they can lead a person to view what they experience instrumentally (in terms of its function and utility) rather than in terms of its inherent meaning, value, and purpose as gifted by God.

Benedict concludes *Caritas in Veritate* by asserting that "human freedom is authentic only when it responds to the fascination of technology with decisions that are the fruit of moral responsibility."[17] This is why there is the "pressing need for formation in an ethically responsible use of technology."[18] The cultivation of good and true technology ultimately requires "moving beyond the fascination that technology exerts," and reappropriating "the true meaning of freedom, which is not an intoxication with total autonomy, but a response to the call of being, beginning with our own personal being."[19] Without this proper formation, technology has the potential to distort our very encounter with reality and obstruct us from encountering and coming to know the truth itself. Were this to happen "we would all know, evaluate and make decisions about our life situations from within a technocratic cultural perspective to which we would belong structurally, without ever being able to discover a meaning that is not of our own making."[20]

This technocratic cultural perspective is part of what Pope Francis terms the *technocratic paradigm*. Francis introduces the concept in his

[16] Benedict XVI, *Caritas in Veritate*, §70.
[17] Benedict XVI, *Caritas in Veritate*, §70.
[18] Benedict XVI, *Caritas in Veritate*, §70.
[19] Benedict XVI, *Caritas in Veritate*, §70.
[20] Benedict XVI, *Caritas in Veritate*, §70.

2015 encyclical, *Laudato Si': On Care for Our Common Home*. The technocratic paradigm "is the way that humanity has taken up technology and its development according to an undifferentiated and one-dimensional paradigm."[21] Within the technocratic paradigm, technology becomes so dominant that it absorbs everything else into its "ironclad logic," where progress is measured by technology's own increase in power and alternative worldviews or ways of being seem inconceivable.[22] He continues, "Technological products are not neutral, for they create a framework which ends up conditioning lifestyles and shaping social possibilities along the lines dictated by the interests of certain powerful groups."[23] In any given context, a technology facilitates and encourages some uses more than others. These built-in possibilities often result from the intentions of the people who design and deploy the technology, and they shape the effects of that technology in the world.

*Laudato Si'* draws our attention to the way in which the technocratic paradigm can dominate and has dominated every aspect of modern human life, from community to politics to the economy to our very modes of thinking.[24] The technocratic paradigm has led to "the fragmentation of knowledge" which "proves helpful for concrete applications" but in turn also "often leads to a loss of appreciation for the whole, for the relationships between things, and for the broader horizon, which then becomes irrelevant."[25] Under these conditions and within this framework, *technology* tends to be viewed "as the principal key to the meaning of existence," which results in people gradually surrendering "to situations conditioned by technology," since according to the very logic of this framework there are no "genuine ethical horizons to which one can appeal."[26] Symptoms of the technocratic paradigm include "environmental

[21] Francis, *Laudato Si'*, §106.
[22] Francis, *Laudato Si'*, §108.
[23] Francis, *Laudato Si'*, §107.
[24] Francis, *Laudato Si'*, §§108–109.
[25] Francis, *Laudato Si'*, §110.
[26] Francis, *Laudato Si'*, §110.

degradation," increased anxiety, "a loss of purpose of life and community living," and social fragmentation.[27]

Happily, Francis also suggests a return to a more integrated approach to the environment and to technology. He argues that "we have the freedom needed to limit and direct technology; we can put it at the service of another type of progress, one which is healthier, more human, more social, more integral."[28] "A better world is possible thanks to technological progress," he noted in 2019, "if this is accompanied by an ethic inspired by a vision of the common good, an ethic of freedom, responsibility and fraternity, capable of fostering the full development of people in relation to others and to the whole of creation."[29]

As theorized by both Benedict and Francis, technocracy reduces reality to economic ends by approaching reality only by way of **instrumental reasoning**. In this case, instrumental reasoning considers only what might produce material abundance. Thus, instrumental reasoning presupposes ends determined by technocratic institutions and so operates only within an economy of technical means absent deliberation regarding true ends. Because of this, instrumental reasoning involves forms of control that force conformity to mechanisms of efficiency. If our technology primarily serves the social purpose of efficiency-wrought material abundance, then it does not primarily serve the purpose of integral development. Think once again of the vocation of the gardener. *Patience* is a basic virtue of gardening. Such patience is required by a loving attentiveness to the sprouting of plants in one's garden. To reduce a garden to a means for some economic end is to destroy the garden either now or in the long term. True abundance results from a respect for the reality of the garden and each of its plants as something that must be given the space to develop

[27] Francis, *Laudato Si'*, §110.

[28] Francis, *Laudato Si'*, §112.

[29] Francis, "To the Participants in the Seminar 'The Common Good in a Digital Age,'" September 27, 2019, vatican.va/content/francesco/en/speeches/2019/september/documents/papa-francesco_20190927_eradigitale.html.

according to its own intrinsic capacities. To echo the words of Benedict, the garden is, in an important sense, not of our own making! Thus, the formation of which Benedict spoke can be understood as the formation of those virtues by which one gardens well. The scale and rapidity of technocracy does not fit with that of gardening. May we approach technology as those who are called by God to steward God's creatures to their fullness in God. That is to know all creatures in truth by knowing them in the Love that God is.

## Confronting and Encountering AI: From Pope Francis to Pope Leo

### *Francis: Listening to the Wisdom of the Heart*

Francis was the first pope of the "AI world." From the beginning to the end of his papacy, Francis signaled in word and deed a fundamental openness of the Church to AI technologies and to working with persons of good will on AI's ongoing developments for the sake of the common good. At an address to participants in the Minerva Dialogues, Francis affirmed:

> I am convinced that dialogue between believers and nonbelievers on fundamental questions of ethics, science and art, and on the search for the meaning of life, is a path to peace and to integral human development. Technology is, and has been, immensely beneficial to our human family. We think, for example, of the countless advances made in the fields of medicine, engineering and communications. In acknowledging the practical benefits of science and technology, we also see them as evidence of the creativity of human beings and the nobility of their vocation to participate responsibly in God's creative action. From this perspective, I am convinced that the development of artificial intelligence and machine

> learning has the potential to contribute in a positive way to the future of humanity; we cannot dismiss it.[30]

Francis recognizes the countless goods that have been achieved through true technological advancement that is built according to and in service of integral human development and an integral ecology. He also affirms the profound relationship between technology and the human vocation "to participate responsibly in God's creative action."[31] Francis, however, also cautioned, "I am certain that this potential will be realized *only if* there is a constant and consistent commitment on the part of those developing these technologies to act ethically and responsibly."[32] Technologies are not morally neutral according to Francis, and machine learning and AI technologies are no exception to this.

In a 2024 address to the G7, Francis discusses the potential epochal significance of AI development, noting that "we cannot doubt that the advent of artificial intelligence represents a true cognitive-industrial revolution."[33] Given who would become his successor, the choice of the words "industrial revolution" is noteworthy. Francis goes on to contextualize the significance of AI technologies within the human vocation to till and keep the earth (Genesis 2:15). As he explains in detail in *Laudato Si'*, the call for humanity to till the earth "refers to cultivating, ploughing or working," while the call to keep the earth refers to "caring, protecting, overseeing and preserving." Francis invokes this image of humanity as gardeners as a

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[30] The Minerva Dialogues is an assembly bringing together "scientists, engineers, business leaders, lawyers and philosophers—and representatives of the Church." See Francis, "Address of His Holiness to Participants in the 'Minerva Dialogues,'" March 27, 2023, vatican.va/content/francesco/en/speeches/2023/march/documents/20230327-minerva-dialogues.html.

[31] Francis, "Address of His Holiness to Participants in the 'Minerva Dialogues.'"

[32] Francis, "Address of His Holiness to Participants in the 'Minerva Dialogues,'" emphasis added.

[33] Francis, "Address of His Holiness Pope Francis to the G7 Session on Artificial Intelligence," June 14, 2024, vatican.va/content/francesco/en/speeches/2024/june/documents/20240614-g7-intelligenza-artificiale.html.

means to consider whether the tools we have created—or are creating—fulfill "their true purpose of serving humanity."[34] According to Francis, "To speak of technology is to speak of what it means to be human and thus of our singular status as beings who possess both freedom and responsibility."[35] To speak about technology, therefore, "means speaking about ethics" because at our best we create technology to fulfill our call to tend to and care for creation.[36] To discern and evaluate whether our tools fulfill "their true purpose of serving humanity," is to consider the extent to which they "reveal not only the unique grandeur and dignity of men and women, but also the command they have received to 'till and keep' the planet and all its inhabitants."[37]

Nearly a decade after *Laudato Si'* and less than a year after his address to the G7, Francis approved and ordered the publication of *Antiqua et Nova: Note on the Relation Between Human Intelligence and Artificial Intelligence* written by the Dicastery for the Doctrine of the Faith and the Dicastery for Culture and Education. While not an encyclical, *Antiqua et Nova* is the first formal document on AI endorsed by a pope. In line with the Church's teachings on technology, *Antiqua et Nova* reminds us "that techno-scientific activity is not neutral in character but is a human endeavor that engages the humanistic and cultural dimensions of human creativity."[38] As such, AI is not "an artificial form of human intelligence but" is rather "a product of" human intelligence and creativity that must be oriented towards the good and flourishing of all creation in order to be

[34] Francis, "Address of His Holiness Pope Francis to the G7 Session."
[35] Francis, "Address of His Holiness Pope Francis to the G7 Session."
[36] Francis, "Address of His Holiness Pope Francis to the G7 Session."
[37] Francis, "Address of His Holiness Pope Francis to the G7 Session."
[38] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova* [*Note* on the Relationship Between Artificial Intelligence and Human Intelligence], January 14, 2025, vatican.va/roman_curia/congregations/cfaith/documents/rc_ddf_doc_20250128_antiqua-et-nova_en.html, §11.

considered progressive or beneficial.[39] Technologies that are oriented toward the exploitation of human persons or other creatures, the distortion of social relations, the subversion of human dignity, or the perversion of the universal destination of goods are not technological *developments* in the proper sense but rather technological degradations.

*Antiqua et Nova* concludes by appealing to the "wisdom of the heart" for which Francis most incisively and authoritatively advocates in his 2024 encyclical, *Dilexit Nos*. By "heart" Francis means "the part of us that is neither appearance or illusion, but is instead authentic, real, entirely 'who we are.'"[40] It refers to the "profound core, present in every man and woman," "the entire person in his or her unique psychosomatic identity."[41] Similarly, *Antiqua et Nova* asserts that "the 'wisdom of the heart' can illuminate and guide the human-centered use of" AI technologies that "foster integral human development, favor human solidarity and fraternity, and lead humanity to its ultimate goal: happiness and full communion with God."[42]

### *Leo XIV: Building and Replanting the City Together*

Upon taking office in May 2025, Pope Leo XIV immediately affirmed the fundamental relationship between Catholic social teaching and Catholic technology teaching. When explaining his reasoning for choosing the name "Leo," the new pope drew a direct parallel between the social challenges facing the Church and the world at the time of the industrial revolution that threatened "human dignity, justice, and labor" and the social challenges facing them today with the advent of artificial intelligence and machine learning technologies that also threaten human dignity,

[39] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §59.
[40] Francis, *Dilexit Nos*, §5.
[41] Francis, *Dilexit Nos*, §21.
[42] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §116.

justice, and labor.[43] Leo XIV has also emphasized the need to view communication not as "the transmission of information" but as "the creation of a culture" wherein the technologies, especially the AI technologies we use to communicate and thereby create culture, require "responsibility and discernment in order to ensure that it can be used for the good of all."[44] Bringing together threads from his predecessors on Catholic technology teaching to respond to the contemporary situation concerning AI, in one of his more extensive statements on the topic in his first year as pontiff, Leo XIV affirmed:

> For its part, the Church wishes to contribute to a serene and informed discussion of these pressing questions by stressing above all the need to weigh the ramifications of AI in light of the "integral development of the human person and society." This entails taking into account the well-being of the human person not only materially, but also intellectually and spiritually; it means safeguarding the inviolable dignity of each human person and respecting the cultural and spiritual riches and diversity of the world's peoples. Ultimately, the benefits or risks of AI must be evaluated precisely according to this superior ethical criterion.[45]

In pursuit of contributing to pressing questions concerning the ramifications of AI technologies for society, Leo XIV promulgated the encyclical *Magnifica Humanitas: On Safeguarding the Human Person in the Time of Artificial Intelligence*, on May 15, 2026. *Magnifica Humanitas* begins by confronting us with a choice: "to construct a new Tower of Babel or to

[43] Leo XIV, "Address of His Holiness Pope Leo XIV to the College of Cardinals," May 10, 2025, vatican.va/content/leo-xiv/en/speeches/2025/may/documents/20250510-collegio-cardinalizio.html.

[44] Leo XIV, "Audience of His Holy Father Leo XIV to Representatives of the Media," May 12, 2025, vatican.va/content/leo-xiv/en/speeches/2025/may/documents/20250512-media.html.

[45] Leo XIV, "Message of Pope Leo XIV to Participants in the Second Annual Conference of Artificial Intelligence, Ethics, and Corporate Governance," June 17, 2025, vatican.va/content/leo-xiv/en/messages/pont-messages/2025/documents/20250617-messaggio-ia.html.

build the city in which God and humanity dwell together."[46] Here the image of a new Tower of Babel represents the choice to build AI technologies and the world in a time of AI—according to "the idolatry of profit that sacrifices the weak, a uniformity that neutralizes differences" and "the pretense that a single language—even a digital one—can translate everything, including the mystery of the person, into data and performance."[47] This choice "excludes God and reduces the other to a means."[48] It is "an ancient and ever-new temptation that today takes on a technical guise"[49] that results in domination and inevitably leads to dehumanization, which divides, excludes, and generates "new forms of injustice."[50]

In contrast, the image of Nehemiah rebuilding the walls of Jerusalem, following the Babylonian Captivity and exile, represents the choice to build AI technologies—and the world in the time of AI—according to our vocation as gardeners. It represents the choice to place "God at the forefront of our actions and the human person at the center of our" discernment and moral decision-making.[51] As *Magnifica Humanitas* explains, "Nehemiah heard the cry of a devastated city, brought that pain to prayer, discerned before God, asked for help, received permission to return, organized the work, confronted internal and external resistance and rebuilt the walls of Jerusalem with the assistance of the people, brick by brick."[52] He began the act of replanting. Although the encyclical does not mention it in detail, the Book of Nehemiah uses some notable garden and Edenic imagery to describe the rebuilding. Moreover, from a Christian perspective, the image of Babel and the image of Nehemiah leading the communal and collaborative rebuilding of the walls of Jerusalem point

[46] Leo XIV, *Magnifica Humanitas*, §1.
[47] Leo XIV, *Magnifica Humanitas*, §10.
[48] Leo XIV, *Magnifica Humanitas*, §10.
[49] Leo XIV, *Magnifica Humanitas*, §10.
[50] Leo XIV, *Magnifica Humanitas*, §10.
[51] Leo XIV, *Magnifica Humanitas*, §116.
[52] Leo XIV, *Magnifica Humanitas*, §10.

forward to the image in the Book of Revelation of the holy city, the New Jerusalem, a city imaged as a garden with God and the tree of life at the center of it.[53]

From the standpoint of the construction metaphor, the human vocation is "to enter the construction sites of history—research laboratories, technology companies, schools, the media, institutions and local communities—in order to rebuild what has collapsed and protect what is threatened."[54] With God and through God, the human vocation is to build communally, piece by piece and brick by brick the heavenly city, so that "precisely from the plurality of voices and visions which, even though they sometimes remind us of the confusion caused by the diversity of spoken languages," a project of shared responsibility emerges.[55] Out of choosing the way of Nehemiah and patiently rebuilding, "a solid, welcoming common home will emerge on the earth, where love and faithfulness will finally meet, and righteousness and peace will embrace."[56]

Understood in light of this image, "the creative intelligence of humanity is a gift that can alleviate suffering and open up new possibilities."[57] All persons are called to actively participate in this rebuilding of the heavenly

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[53] "Then I saw a new heaven and a new earth. The former heaven and the former earth had passed away, and the sea was no more. I also saw the holy city, a new Jerusalem, coming down out of heaven from God. . . . I heard a loud voice from the throne saying, 'Behold, God's dwelling is with the human race. He will dwell with them and they will be his people and God himself will always be with them [as their God]. He will wipe every tear from their eyes, and there shall be no more death or mourning, wailing or pain, [for] the old order has passed away.'. . . I saw no temple in the city, for its temple is the Lord God almighty and the Lamb. The city had no need of sun or moon to shine on it, for the glory of God gave it light, and its lamp was the Lamb. . . . During the day its gates will never be shut, and there will be no night there. . . . Then the angel showed me the river of life-giving water, sparkling like crystal, flowing from the throne of God and of the Lamb down the middle of its street. On either side of the river grew the tree of life that produces fruit twelve times a year, once each month; the leaves of the trees serve as medicine for the nations" (Revelation 21:1–22:2).

[54] Leo XIV, *Magnifica Humanitas*, §24.

[55] Leo XIV, *Magnifica Humanitas*, §10.

[56] Leo XIV, *Magnifica Humanitas*, §16.

[57] Leo XIV, *Magnifica Humanitas*, §129.

city and every person has a unique and irreplaceable role to play in this building. This building is an act of communion and a matter of shared responsibility wherein "the 'rejected stones'–the poor, the sick, the migrants and the least among us–will become the cornerstone."[58] In order for human creativity and intelligence to be consistent with the human vocation to rebuild and protect, it must be patient and "remain ordered toward the common good, justice, the care of the vulnerable and creation."[59] However, it must not be forgotten that caring for the vulnerable, especially persons with mental or intellectual disabilities, means *including* them in this rebuilding, so that they are not prevented from living out their vocations but are active participants, able to share their gifts, and enter into this communion.

The choice between building the Tower of Babel and replanting the city of Nehemiah must not be misunderstood. The choice with which *Magnifica Humanitas* presents us is not between a "yes" or "no" to technology, but rather between constructing Babel or rebuilding and replanting Jerusalem.[60] It is a choice not between "enthusiasm and fear, but between two paths of development: a progress that serves individuals and peoples, or a progress that subjects them to the mentality of power."[61] It is a choice "between a power that claims to dominate the heavens and a people who work together in the presence of God to rebuild the walls of fraternal coexistence."[62] Technology, after all, "has the power to heal, connect, educate and protect our common home."[63] Technology is not inherently evil, and the scientific discoveries out of which many of these new technologies arise are born from "talents entrusted to humanity so that they may bear fruit" in the world and work towards rebuilding

[58] Leo XIV, *Magnifica Humanitas*, §16.
[59] Leo XIV, *Magnifica Humanitas*, §129.
[60] Leo XIV, *Magnifica Humanitas*, §10.
[61] Leo XIV, *Magnifica Humanitas*, §129.
[62] Leo XIV, *Magnifica Humanitas*, §10.
[63] Leo XIV, *Magnifica Humanitas*, §9.

according to God's call.[64] This is precisely why the Catholic Church "does not reject science or technology, but embraces them."[65] This embrace, however, is not a naive embrace. It is an embrace of "gratitude and realism" that grounds technologies "within a higher vocation" and rightly recognizes that "technology is never neutral, because it takes on the characteristics of those who devise, finance, regulate and use it." It is for these reasons that "in the abstract, technology in and of itself is not a solution to humanity's problems."[66]

In this way, *Magnifica Humanitas* alerts us to the fact that "the construction of Babel or the rebuilding of Jerusalem begins within each one of us."[67] No technology is inevitable or unchangeable. No particular way to build or develop a technology is inevitable or unchangeable. No adoption or use of technology is inevitable or unchangeable. Technological advancement does not follow a predetermined path.[68] We have agency. We have the power and ability to build well and to build with good tools. It might seem somewhat absurd or ridiculous to assert that refusing to be architects of Babel and choosing to rebuild Jerusalem begins with us. Of course, "not everyone has the same power to make a difference" insofar as "there are those who govern, make investment decisions, lead institutions, conduct research, educate, produce or provide information, and then there are those who only seem to live their daily lives."[69] It would, however, be a kind of resignation, not realism, to think that "the problems are too big and we are too small, and that our choices, therefore, cannot make a difference."[70] All human persons as made in the image and likeness of God—gifted with their own vocations, temporal and transcendent—have their own "areas for action, and it is precisely there—and nowhere else—

[64] Leo XIV, *Magnifica Humanitas*, §9.
[65] Leo XIV, *Magnifica Humanitas*, §129.
[66] Leo XIV, *Magnifica Humanitas*, §129.
[67] Leo XIV, *Magnifica Humanitas*, §130.
[68] Leo XIV, *Magnifica Humanitas*, §238.
[69] Leo XIV, *Magnifica Humanitas*, §212.
[70] Leo XIV, *Magnifica Humanitas*, §212.

that we must choose whether to fuel the mentality of force (even if only through indifference, cynicism, lies or hatred), or to preserve the mindset of peace (with truth, moderation, closeness and care)."[71]

The construction of Babel or the rebuilding of Jerusalem begins in the depths of our hearts and at the core of our being. It begins in the choices we make and in what we do. It begins with what we ignore or how we acquiesce and in what we fail to do. Discerning which path we choose ultimately "stems from what we hold most dear" and the very "way we understand and shape relationships, work and institutions."[72] Following Saint Augustine, *Magnifica Humanitas* describes "human history as a struggle between two loves, which give rise to two ways of inhabiting the world and living together—or two 'cities,' as it were: on the one hand, the love of God and neighbor; on the other, the exclusive love of self."[73] If we hold to love of God and love of neighbor, then we will "need to disarm words, building peace through justice, adopting the perspective of victims, cultivating a healthy realism, and reviving dialogue and multilateralism."[74] A city, a civilization, a world built out of compassionate and unselfish love "will not arise from a single or spectacular gesture, but from the sum total of small and steadfast acts of fidelity that serve as a bulwark against dehumanization."[75] We are called to be artisans and gardeners of hope who do not "master all the tides of the world," but rather "do what is in us for the succour of those years wherein we are set, uprooting the evil in the fields that we know, so that those who live after may have clean earth to till."[76]

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[71] Leo XIV, *Magnifica Humanitas*, §212.
[72] Leo XIV, *Magnifica Humanitas*, §130.
[73] Leo XIV, *Magnifica Humanitas*, §130.
[74] Leo XIV, *Magnifica Humanitas*, §213.
[75] Leo XIV, *Magnifica Humanitas*, §213.
[76] Leo XIV, *Magnifica Humanitas*, §213. See J.R.R. Tolkien, *The Lord of the Rings: The Return of the King* (Ace Books, 1965), 190.

## Safeguarding Human Persons: Areas for Vigilance and Critical, Measured Consideration

Before setting out a positive, constructive vision for integral technology, it is worthwhile to spend some time here elaborating on the ways that AI technologies might distort reality and so keep us from participating in it well. To participate well in reality is to take up the vocation of the gardener or the vocation of the artisan as Leo puts it in *Magnifica Humanitas*. In order to safeguard human persons and the common good, we are called to ask ourselves whether the AI technologies we are building or have already built are good and productive of integral human development or whether they need to be bent and disarmed in any respect before they can be used well. In order to think through these questions seriously, it is necessary to take a critical, measured approach to discernment.[77] *Magnifica Humanitas* reminds us that while AI technologies can be valuable tools when created in conformity with the common good, they are, nonetheless, tools that require vigilance, especially given how they are currently being developed, built, deployed, adopted, used, governed, and regulated. In order to take a critical, measured approach to discernment and make good moral judgments without naive enthusiasm or unfounded pessimism, it is necessary to know and consider the risks posed by different types of AI technologies. What are some key aspects or areas we should pay attention to and be mindful of when discerning about AI technologies?

First, we can make a division between private and public areas for vigilance. It should be kept in mind, however, that this division is merely meant to be a helpful categorization. The private and public or social areas for vigilance are not mutually exclusive but interconnected. Here private areas for vigilance simply name what immediately concerns the individual user actively engaging generative AI or agentic AI technologies, whereas public or social areas for vigilance simply name what concerns the common good, social relations, or individuals en masse when they are or

[77] Leo XIV, *Magnifica Humanitas*, §100.

are not actively using AI technologies. Three of the key areas for vigilance *Magnifica Humanitas* identifies regarding private use are easily attainable results, the false impression of objectivity, and simulations of human communication.[78] We should be vigilant about **easily obtainable results** because easily obtainable results "encourage excessive reliance, and the search for ready-made answers," which can weaken personal creativity, memory, skill acquisition, knowledge development, and judgment. This is related to the phenomena known in AI ethics literature as "AI deskilling," "moral deskilling," and "cognitive atrophy."

Relatedly, we should be vigilant about **the false impression of objectivity and neutrality** that is so often concomitant with these easily obtainable results**.** The appearance of objectivity and neutrality of outputs from AI systems "can lead us to overlook" or simply misunderstand that those outputs or results are not words from an oracle or curated expert responses with clear source information. Rather, they are statistically-driven approximations that "reflect the cultural assumptions of those who designed and trained them, with all their strengths and limitations."[79] As we mentioned in chapter 1, current AI technologies developed from machine learning techniques do not give exact solutions but rather work toward *approximating* an optimal result through predictive or classification modeling. The false impression of objectivity is also related to the problem of large language models generating inaccurate, irrelevant, or made up responses. These phenomena are related to what have come to be termed "**AI hallucination**" and "**AI sycophancy**." As we already mentioned, AI hallucination is when given outputs are incorrect or nonsensical. Again, this term is misleading because it portrays errors as aberrations when they are in fact intrinsic to how the systems work and thus cannot be fully eradicated. AI sycophancy is when given outputs mirror or show deference to the user in ways that range from benign to disturbing. This in turn can result in the generation of misinformation and lead to attempts to entice

[78] Leo XIV, *Magnifica Humanitas*, §100.
[79] Leo XIV, *Magnifica Humanitas*, §100.

the user to continue engaging with the system over and against engagement with other persons and the outside world.

In this vein, we should also be vigilant about **the simulation of human communication** through generative AI chatbots, so called "AI agents," voice cloning, as well as video and image generation, among other things. The simulation of human communication through generative AI chatbots is especially an area for vigilance given its ubiquity and the way so many search engines, websites for businesses, and even schools are thrusting generative AI on users without their ability to easily opt out. A major problem with the simulation of human communication is that "when words are simulated, they do not build genuine relationships, but only their appearance."[80] Obscuring the division between appearance and reality in this way can be deeply misleading and create the illusion "of a relationship with a real personal subject."[81] This has been linked to cases of isolation, suicide, and what is frequently being called "AI psychosis."

**AI psychosis** refers to when chatbots affirm, reinforce, or even precipitate delusions in people. The potential anonymization intrinsic to AI technologies is evident in the growing prevalence of AI psychosis. Studies have shown that many prefer AI chatbot mental health intervention over human intervention precisely because of its anonymity.[82] However, because AI chatbot technologies are plagued by sycophancy and hallucinations, there has already been some indication that they worsen rather than alleviate the symptoms of psychosis. Thus, instead of drawing individuals out of a closed world of ideas, AI chatbots

[80] Leo XIV, *Magnifica Humanitas*, §100.

[81] Leo XIV, *Magnifica Humanitas*, §100.

[82] Jiaying Li, Yan Li, Yule Hu, Dennis Chak Fai Ma, Xiaoxiao Mei, Engle Angela Chan, and Janelle Yorke, "Chatbot-Delivered Interventions for Improving Mental Health Among Young People: A Systematic Review and Meta-Analysis," *Worldviews on Evidence-Based Nursing* 22, no. 4 (2025), doi.org/10.1111/wvn.70059.

may exacerbate the problem of individuals losing touch with reality.[83] In the world of education, this may increase the likelihood that students begin to prefer AI technologies to human teachers and tutors and, in turn, do not build the habit of checking generative AI outputs for veracity. This is part of the reason why Leo XIV and a number of Catholic scholars have strongly recommended that developers of generative AI chatbots and "AI agents" resist anthropomorphization and the generation of responses as anthropomorphized.[84]

In addition to these private areas, *Magnifica Humanitas* also identifies key public or social areas for vigilance, some of which are more obvious and well-known while others are subtler and perhaps less-known. Of the more well-known areas for vigilance are environmental impact, invasions of privacy, surveillance, information manipulation, and bias. The **environmental impact** of AI systems and the strain data centers and AI development have on the environment of local communities are extensive and problematic across the entire life cycle of AI systems. AI systems are extremely resource-intensive and, therefore, lead to much ecological devastation.[85] For many vulnerable humans, especially those in the Global Majority countries, this also means the ecological devastation of their homes and unsafe work.[86] Data centers for AI systems "[require] an extensive network of machines, cables, data centers and energy-intensive infrastructure," which impact the power grid and water table of local

[83] Kashmira Gander, "I'm a Psychiatrist Who Has Treated 12 Patients with 'AI Psychosis' This Year," *Business Insider*, August 15, 2025, businessinsider.com/chatgpt-ai-psychosis-induced-explained-examples-by-psychiatrist-patients-2025-8.

[84] See AI Research Group, *Reclaiming Human Agency in the Age of Artificial Intelligence,* 183–184; Leo XIV, "The 60th World Day of Social Communications," January 24, 2026, vatican.va/content/leo-xiv/en/messages/communications/documents/20260124-messaggio-comunicazioni-sociali.html.

[85] James O'Donnell and Casey Crownhart, "We Did the Math on AI's Energy Footprint. Here's the Story You Haven't Heard," *MIT Technology Review*, May 20, 2025, technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech.

[86] Chinasa T. Okolo, "Global Majority Countries Must Embed Critical Minerals into AI Governance," *Science* 391, no. 6789 (2026), doi.org/10.1126/science.aef6678.

communities; these impacts are likely to be further exacerbated as the desire for "computing power and storage capacity grows."[87]

Another key area for vigilance is **bias,** which can lead to prejudicial or fabricated outputs that are not only wrong in themselves[88] but can cause injustice and social inequality.[89] Bias in AI technologies tends to emerge from algorithmic bias through the "systematic and consistent errors in computer systems that may disproportionately prejudice certain groups in unintended ways" and learning bias through "training on a biased data set."[90]

**Privacy** is an additional key area for vigilance since "advances in AI-powered data processing and analysis now make it possible to infer patterns in a person's behavior and thinking from even a small amount of information."[91] Anyone who interacts with the digital world in any way and for any reason (even if only by proxy) generates data. This data "can be seen as an objectified expression of" human persons and their relational nature because this data conveys information about a person and populations as well as information we would typically classify as *personal* and *relational*. Both the data used to train AI technologies and the data generated from user interaction are potentially subject to privacy violations.[92] This then connects to the issue of **data ownership**, which

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[87] Leo XIV, *Magnifica Humanitas*, §100.

[88] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §84.

[89] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §75; Also see Francis, "Message for the 57th World Day of Peace," January 1, 2024, www.vatican.va/content/francesco/en/messages/peace/documents/20231208-messaggio-57giornatamondiale-pace2024.html, §5.

[90] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §93n46.

[91] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §92.

[92] Nadav Voloch and Ron S. Hirschprung, "Both Ends of Artificial Intelligence Impacting Privacy: A Review of Violation and Protection," *Frontiers in Artificial Intelligence* 9 (2026), doi.org/10.3389/frai.2026.1686454.

does not reside with the individual person or communities that generate that data but can and predominantly is being concentrated into private hands. Since "data is the product of many contributors," it should not be "entrusted to a select few" or "treated as something to be sold off" but "must be appropriately regulated" and treated as a common good to be collectively protected.[93]

Related to this, many AI technologies employ **surveillance techniques** whose origins are to be found in the behaviorist movement, which we will discuss in more detail in the following chapter.[94] The use of AI technologies for **surveillance** aims "at exploiting, restricting others' freedom, or benefitting a few at the expense of the many" and is therefore "unjustifiable."[95] AI technologies can nudge individuals toward habits that are not for their flourishing. Of course, this very often involves the development of **addictive patterns of behavior** through social media platforms.[96] AI technologies can be used for invasive and automated surveillance that reduces human persons to data sets.[97] This type of surveillance could be used for the purposes of social control. Through "the massive collection of data and use of algorithmic systems . . . every action—movements, purchases, relationships and preferences—leaves a trace, which can give rise to new forms of social control that use predictive and profiling techniques without those being surveilled even being fully aware of it."[98] "Social scoring" is an example of one of the most extreme uses of AI technologies for surveillance that reduces human persons to data sets.

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[93] Leo XIV, *Magnifica Humanitas*, §108.

[94] Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (PublicAffairs, 2019), 293–295.

[95] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §93.

[96] Debasmita De, Mazen El Jamal, Eda Aydemir, and Anika Khera, "Social Media Algorithms and Teen Addiction: Neurophysiological Impact and Ethical Considerations," *Cureus* 17, no. 1 (2025), doi.org/10.7759/cureus.77145.

[97] Leo XIV, *Magnifica Humanitas*, §150; Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova,* §94.

[98] Leo XIV, *Magnifica Humanitas*, §171.

Social scoring refers to the practice of using AI technologies "to evaluate individuals or groups based on their behavior, characteristics, or history."[99] This is an area of concern because of bias and prejudice against various minoritized groups of people. The future actions of *free* human persons are not definitively predictable and people's "past behavior should not be used to deny [them] the opportunity to change, grow, and contribute to society."[100] Indeed, privacy is not only a basic right to be protected, but an important freedom that allows an individual the space to become themselves and to actualize their capacity for personal agency. Overall, the general **lack of accountability**, **lack of oversight**, **lack of regulation, and lack of governance of AI technologies** are all areas about which to be aware and vigilant. A collaborative and multilateral effort is necessary. In addition to individual and local communal action, the proper cultivation and ethical treatment of AI technologies also requires "robust legal frameworks, independent oversight, informed users and a political system that does not abdicate its responsibility."[101]

There are also several less well-known and subtler areas for vigilance. These include: off-loading human decision-making and delegating responsibility, the exclusion of the vulnerable, the amplification of the powerful, the AI arms race, and the distortion of reality. The **off-loading of decision-making** to AI systems is a concern for several reasons. As we already mentioned, AI technologies are not oracles with absolute, objective knowledge of the truth; they are statistically-based systems that work towards approximating an optimal output where that output is defined by its data sets, the model's training, and the input parameters. Because of this, when AI technologies are implemented into "processes that affect people's lives," and have to do with "important and sensitive decisions,"

[99] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §94.
[100] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §94.
[101] Leo XIV, *Magnifica Humanitas*, §106.

then the output of AI systems is no longer merely a technical matter but a profound ethical matter.[102] Off-loading decision-making to AI technologies can lead "to new forms of exclusion" that reflect and reinforce "the stereotypes or ideological bias of their designers and developers" in deeply problematic ways.[103] In this sense, "delegating" or "off-loading" decision-making to AI technologies is an abdication of human moral judgment and responsibility.[104] In off-loading practical reasoning, judgment, and decisions to AI technologies, the party responsible for the decision that is made becomes obscured. **Delegating responsibility** is a necessary area for vigilance that requires that we be attentive to "who must 'account' for decisions, justify them, monitor them, and, when necessary, challenge them and remedy any harm caused."[105] Who is responsible must be "clearly defined at every stage: from those who design and develop these systems to those who use them and rely on them for concrete decisions."[106]

The **AI arms race** is at least in part motivating this unreflective turn to off-loading decision-making to AI and the failure to properly delegate chains of responsibility.[107] *Magnifica Humanitas* describes the AI arms race as "a race for ever more powerful algorithms and larger datasets, driven by the desire to secure geopolitical or commercial dominance."[108] This dominant and monopolistic arms race is directly connected to the fact that "AI tends to amplify the power of those who already possess economic resources, expertise and access to data."[109] This amplification of power can manifest itself on numerous fronts. For instance, it can manifest itself on an ethical front where "those who control AI will impose their own moral

[102] Leo XIV, *Magnifica Humanitas*, §102.
[103] Leo XIV, *Magnifica Humanitas*, §102.
[104] Leo XIV, *Magnifica Humanitas*, §102.
[105] Leo XIV, *Magnifica Humanitas*, §105.
[106] Leo XIV, *Magnifica Humanitas*, §105.
[107] Leo XIV, *Magnifica Humanitas*, §110.
[108] Leo XIV, *Magnifica Humanitas*, §110.
[109] Leo XIV, *Magnifica Humanitas*, §108.

vision, which will become the invisible infrastructure of these systems."[110] It can manifest itself in the political sphere "since small but highly influential groups can shape information and consumption patterns, influence democratic processes and steer economic dynamics to their own advantage, undermining social justice and solidarity among peoples."[111] It can also manifest itself in the economic sphere. AI technologies would not be so heavily invested in if they were not expected to turn large profits. But to turn a large profit in a competitive market, AI technologies must increase efficiency. Beyond this, however, AI surveillance techniques can be used to hasten human behavior for the sake of efficiency.[112] For humans, this means rapidification. In a pattern like the Jevons paradox, the more work that is automated by AI technologies, the more work humans would be expected to do.[113] *Magnifica Humanitas* calls for the disarmament of AI in order to dispel these logics of power that equate "technical power" with "the right to govern" and in so doing restore "it to the plurality of human cultures and ways of life" in ways that are truly ecological and respect subsidiarity and the common good.[114]

The **exclusion and exploitation of the vulnerable** by AI technologies can take many forms. All of the areas for vigilance are directly connected to specific ways that AI technologies exclude and have the potential to exploit the vulnerable. One of the ways in which AI technologies can be particularly insidious is how they can cloak their injustice "in a veneer of neutrality and objectivity, against which it becomes difficult to raise objections."[115] It must be remembered and it is worth saying over and over again that "every technical tool embodies

[110] Leo XIV, *Magnifica Humanitas*, §108.
[111] Leo XIV, *Magnifica Humanitas*, §108.
[112] See Crawford, *Atlas of AI*, 53–88.
[113] Aruna Ranganathan and Xingqi Maggie Ye, "AI Doesn't Reduce Work—It Intensifies It," *Harvard Business Review*, February 9, 2026, hbr.org/2026/02/ai-doesnt-reduce-work-it-intensifies-it.
[114] Leo XIV, *Magnifica Humanitas*, §110.
[115] Leo XIV, *Magnifica Humanitas*, §103.

choices and priorities through what it measures, ignores and optimizes, and how it classifies people and situations."[116] There is no such thing as a technical tool that is neutral and objective. Whether or not AI technologies exclude the vulnerable is not reducible to whether people can access certain AI applications and know how to use them. Likewise, whether or not AI technologies exploit the vulnerable is not reducible to use. Vigilance is required beyond mere access and use because "if a system is designed or used in a way that treats some lives as less worthy, or excludes them without the possibility of appeal, then it is not merely a tool 'to be used well.'"[117] Any technical tools or AI technologies that introduce or have embedded within them "criteria that contradict the inalienable dignity of the human person" are incapable of being used well and contributing to integral human development.[118] Any tools or AI technologies that "normalize an anti-human vision" or make efficiency "the ultimate measure of value" for human beings are technologies primed and ready to exclude and exploit the most vulnerable.[119]

When considered in continuity with the Church's social teaching on technology, it becomes clear that AI technologies pose epistemic and existential harms in addition to the more commonly (and rightly!) enunciated harms of bias, privacy invasion, and environmental degradation. AI risks **undermining the very meaning of the human person** which in turn can undermine our orientation to and right relationship with ourselves and other persons. It also has the power to **distort our relationship to reality itself**. This is partially why Pope Francis refers to AI as a tool *sui generis*.

As we have already affirmed, education is of and for community insofar as humans are irreducibly communal. We are not first individuals and then in communion with others. Rather, we are persons because we

[116] Leo XIV, *Magnifica Humanitas*, §104.
[117] Leo XIV, *Magnifica Humanitas*, §104.
[118] Leo XIV, *Magnifica Humanitas*, §104.
[119] Leo XIV, *Magnifica Humanitas*, §112.

are always already in communion with others in some real sense. AI technologies present quite a few dangers for one who would answer the call to be a gardener in God's creation. We have already noted that gardening requires a love of the truth of the garden, patient attentiveness, and the willingness to allow a world not of our own making to flourish according to its own intrinsic impetus. Such patient, loving attentiveness is a self-transcending movement, drawing us out of any self-absorption toward a world that points beyond itself to the absolutely Transcendent. This self-transcending movement does not fit with the anonymity and rapidification into which AI technologies can draw us.

To "rapidly and uncritically" adopt AI technologies "exposes us to a range of risks."[120] Calling for "a slower pace in adopting AI" that would allow for prudential reasoning and measured, critical evaluation is not an opposition to progress.[121] It is rather "an exercise of responsible care for the human family."[122] Ethical discernment about AI technologies is necessary, and this ethical discernment cannot simply "be limited to asking whether we are using a system for good or bad purposes."[123] Ethical discernment about AI technologies "must also examine how that system is designed and what vision of the human person and society is embedded in the data and models that guide it."[124] Invoking ethics abstractly is not an exercise of responsible care for the human family but a culpable abdication of responsibility. The need to discern and make judgments with rigor "is all the more urgent given the frequent imbalance between the speed of technological growth and the slower development of awareness, norms, safeguards and institutions capable of governing its effects."[125] Above all, we must resist anonymity, abdication of responsibility, and rapidification if we are to promote integral development. The agency of humans cannot

[120] Leo XIV, *Magnifica Humanitas*, §101.
[121] Leo XIV, *Magnifica Humanitas*, §106.
[122] Leo XIV, *Magnifica Humanitas*, §106.
[123] Leo XIV, *Magnifica Humanitas*, §104.
[124] Leo XIV, *Magnifica Humanitas*, §104.
[125] Leo XIV, *Magnifica Humanitas*, §106.

flourish when contexts are relatively a-relational, chances for cultivating patience are mitigated at every turn, and careful growth and discernment are uprooted.

## Integral Technology: A Positive, Constructive Vision for AI Technologies

What might an integral approach to technology look like, and how could it contribute to the ethics of AI?[126] The Catholic tradition offers us a way to think about the human person through our interconnectedness—that we are beings embedded in a web of relationships with one another, with technology, and with the earth. In a beautiful passage from his final encyclical, *Dilexit Nos,* Pope Francis directs us towards the acts, moments, and relationships that give human life shape and meaning, which we should consider when trying to understand the full scope of AI's ramifications:

> In this age of artificial intelligence, we cannot forget that poetry and love are necessary to save our humanity. No algorithm will ever be able to capture, for example, the nostalgia that all of us feel, whatever our age, and wherever we live, when we recall how we first used a fork to seal the edges of the pies that we helped our mothers or grandmothers to make at home. It was a moment of culinary apprenticeship, somewhere between child-play and adulthood, when we first felt responsible for working and helping one another. Along with the fork, I could also mention thousands of other little things that are a precious part of everyone's life: a smile we elicited by telling a joke, a picture we sketched in the light of a window, the first game of soccer we played with a rag ball, the worms we collected in a shoebox, a

[126] Warren J. von Eschenbach, "Toward an Integral Technology: An Integral Human Development Approach to the Ethics of AI," paper presented at the NHNAI International Workshop at the Université Catholique de Lyon in Lyon, France on March 10–11, 2022. This particular approach, *integral technology*, takes its cue from "Integral Ecology," the fourth chapter of *Laudato Si'* that outlines an integrated method for addressing environmental concerns.

> flower we pressed in the pages of a book, our concern for a fledgling bird fallen from its nest, a wish we made in plucking a daisy. All these little things, ordinary in themselves yet extraordinary for us, can never be captured by algorithms. The fork, the joke, the window, the ball, the shoebox, the book, the bird, the flower: all of these live on as precious memories "kept" deep in our heart.[127]

The power of this passage lies in how its details evoke our senses: We can feel the fork pressing into the pie dough, hear the joy of the children at play, smell the flower drying between the pages of the book. And even if we have never plucked a daisy or played with a rag ball, the passage leads us down the meandering paths of our *own* memories and evokes in us the moments of meaning in our *own* lives. For Francis, making pies is an act of "culinary apprenticeship" that teaches how hard to press the fork, but also how to be responsible and to care for one another when learning the art of pie-making. In a similarly tender passage in *Magnifica Humanitas*, Leo XIV directs us toward the interpersonal acts of care and recognition that are the very measure for a civilization of love: "Reading stories to a child, offering company to an elderly person and arranging a home so that it is welcoming are simple gestures often rooted in family life. They teach us to value care at a societal level and train us to recognize others as persons worthy of attention."[128]

How, then, might the Catholic vision of technology offer a distinctive approach to discernment about the adoption, use, and development of AI technologies? Integral technology requires that the use and development of technology be ordered toward the full development of persons as individuals and individuals in community. This means resisting the technocratic paradigm that values technology for its power to dominate and exploit for material gain. Instead, we must view technology as a tool to promote individual and collective flourishing. This flourishing requires a

[127] Francis, *Dilexit Nos,* §20.
[128] Leo XIV, *Magnifica Humanitas*, §114.

rejection of the inevitability of so-called technological progress that would instrumentalize humans and nonhumans alike. Furthermore, genuine flourishing must critique individualism and so be true to the insight that everything is interconnected and that no creature is isolated and self-sufficient. We propose, then, a set of criteria for integral technologies: [129]

*An integral approach to AI technologies will take a dialogical and interdisciplinary approach*. This orientation recognizes that technology and issues related to artificial intelligence are complex and interrelated. Philosophy, law, social sciences, and engineering, among others, each have a role to play in shaping our understanding of these technologies and their impact on our social, political, and natural world.

*An integral approach to AI technologies will recognize that the use of technology and AI have global reach and consequences and so will consider these issues from the perspective of Global Ethics*. That approach will ask whether the development and use of AI will exacerbate or alleviate existing disparities between the global North and South and within both regions. Questions about how benefits and burdens of technology are distributed across populations and generations must be considered, as well as how the use of AI and associated technologies may contribute to or help remedy environmental degradation.

*An integral approach to AI technologies will safeguard subsidiarity and confront issues of intergenerational justice*. It must consider how the development and use of AI will impact younger and future generations and whether the benefits and burdens are equitably distributed. Equally as important, an integral approach to technology must consider how the use of technology and AI, especially in areas of education, develops younger generations' intellectual, social, and emotional capabilities needed for human flourishing.

Concerns about economic justice will be central to an integral approach to AI technologies. Questions about how technology and AI

[129] Leo XIV, *Magnifica Humanitas*, §23. These criteria are inspired by von Eschenbach, "Toward an Integral Technology."

affect existing wealth, income, and health disparities within communities must be addressed. An integral approach to technology also would advocate for deploying these technologies in a way that promotes justice for the most vulnerable and marginalized within our communities. An integral approach to technology also will champion developing and deploying technologies for the sake of human welfare and not profit alone.

*An integral approach to AI technologies will seek to understand the impact that technology and AI will have on the future of work and the dignity of labor*. Empirical research into how automation of manufacturing and services impacts the labor market will be essential to an integrated approach to technology. Artificial intelligence coupled with robotics has great potential to displace workers from well-paying and meaningful employment. Understanding how these technologies are impacting the labor market, especially mid-level jobs, will be an important focus.

*An integral approach to AI technologies will place considerations of human solidarity and the common good at the center of any inquiry*. Deepfakes, disinformation, social media, and the metaverse all have enormous potential to undermine social cohesion and trust. An integral approach to technology will seek to understand how technology can augment and reinforce our collective identities and solidarity and to discover ways to reduce worrying trends regarding increased social fragmentation and isolation, especially among adolescents.

*An integral approach to AI technologies will be a committed advocate for universal rights to protect human dignity*. Bias in algorithms, lack of transparency, increased digital surveillance, data mining, and the development of automated weapons systems all are potential threats to human dignity. An integral technology will seek to influence policy and laws to protect basic human rights, especially those related to privacy, non-discrimination, and the common destination of all goods.

*An integral approach to AI technologies will reject the technocratic progressivism that instrumentalizes humans and nonhumans alike*. The

Catholic understanding of salvation history does not fit with technological progressivism—the idea that technological innovation is inevitable and will inevitably make life better for all. For the Christian, the movement of history toward the consummation beyond itself in the eschaton does not guarantee an increase in convenience, ease, or comfort. History is a journey of joy in which the disciple of Christ must learn to pick up the cross and follow Christ in the work of justice. Additionally, in Christ, a victory beyond our imagining has already been won for all that is true, good, and beautiful. Christian hope therefore demands not a pragmatism that compromises on questions of justice to the detriment of the most exploited, but a steadfast readiness to suffer in solidarity with the least among us. A good education will teach students to hope in a way that imagines futures beyond the constraints set by the horizons of power dynamics. Thus, Catholic education will approach technology in a way that resists the empty promises of a future determined entirely by the technocratic paradigm.

*An integral approach to AI technologies will reject the mechanistic interpretation of intelligence and human persons. Any implementation of technology that habituates human beings and society more generally to a mechanistic interpretation of persons that treats them as machines that merely operate automatically according to fixed rules is to be refused*. For instance, the dignity of work requires that human labor not be forced to assimilate to the patterns of the functioning of machines. In turn, humans are not to be reduced to data points analyzed anonymously at the population level. Additionally, human rationality is not to be reduced to instrumental reasoning precisely because the transcendent orientation of the human must be respected as basic to human dignity. Finally, education should approach humans as capable of discovering their own capacity for intelligence through wonder and love and of doing so in a conscious and knowing fashion.

Finally, *an integral approach to AI technologies will aim to safeguard aesthetic and cultural goods*. Though perhaps less obvious, aesthetic and

cultural experiences, too, are essential to integral human development and flourishing. An integral approach to technology will seek to foster ways in which technology and AI can be used to enhance artistic and cultural expression as well as to understand how the deployment of technologies is supplanting our experience with the natural world.

## Conclusion

These suggestions, while only a starting point, begin to provide a foundation for a distinctive Catholic approach to the ethics of technology and AI that is informed by and responsive to our complete nature as social, intellectual, and spiritual beings. Catholic institutions, scientists, and researchers working in the field of technology and artificial intelligence have an opportunity to heed Pope Francis's and now Pope Leo's prophetic call to place technology in the service of a more integral and authentic humanity. We must consider more than ethical principles by seeking to understand the proper place and purpose of technology in human life with all its dimensions. The above characteristics for an integral approach to technology fit with an understanding of education as effecting integral development. The next chapter explores influences in today's society that run contrary to this Catholic vision of technology, especially as they concern education technology. Understanding these negative influences will allow us to better address them in our later constructive chapters.

# CHAPTER 4

## BEHAVIORISM, PROFITS, AND MODERN EDUCATION TECHNOLOGY

Much contemporary discourse surrounding AI education technologies praises these technologies for opening the possibility of democratizing and personalizing education.[1] Here, democratization means a process by which institutional and economic barriers to knowledge acquisition are diminished or removed altogether. In turn, the term personalization means the process by which education is tailored to individuals and so made less rigid and impersonal. Again, we are told that students can turn to AI chatbots for tutoring and that these chatbots will present information in such a way that students are more likely to learn. These narratives are quite compelling because of a long tradition that critiques modern mass education for being too standardized and therefore inflexible and anonymous. According to this critique, by being a general approach to education, modern mass education suits no one in particular. AI educational technology is thus spoken of as solving the most fundamental problems plaguing modern mass education.

We ought not accept these narratives too quickly, however. If humans are essentially relational, then a technology that democratizes by individualizing education will not fit what we are and will contradict the goal of personalizing education if personalization means an increase in

[1] See Mark Pittman, "AI and the Democratization of Knowledge," *Forbes*, June 25, 2024, forbes.com/councils/forbestechcouncil/2024/06/25/ai-and-the-democratization-of-knowledge.

personal encounter. Learning is not a process that can be realized to its fullest in isolation. In turn, we should question whether the personalized presentation of information genuinely decreases the extent to which an education is standardized. Much is presupposed in the promise that technology will be a panacea for education. If AI educational technologies are being presented as tools that will once and for all get education right, then we must take the time to ask what vision of education is at play in such a claim and whether any such singular solution is in concert with our humanity.

To understand what vision of education might, in fact, be at play in the claim that AI education technologies will be a panacea for education, we must look to the past. More specifically, we must look to promises made regarding past instances of educational technologies. In this way, we will see that the promises made regarding contemporary AI education technologies are nothing new. Fundamentally, the promise that technology will fix education or solve all social ills tends to be tied to ideologies whose vision of education does not make for the integral development of the human person.

This chapter will focus on one such ideology: behaviorism. Behaviorism has played an important role in the history of modern educational technologies. Perhaps more importantly, behaviorism presents a deeply reductive vision of the process of learning. And yet, it is important to note from the outset that the educational technologies developed by behaviorists for the most part did not enjoy initial commercial success.[2] Consequently, this chapter will also touch on the profit motive as a significant influence on the shape of educational technologies (and as a driver behind continuing behaviorist influence upon our learning methods and approaches to educational technology). These histories will help us to see that no educational technology can serve

[2] For an example of this, see Audrey Watters's discussion of the difficulty that B.F. Skinner had selling his teaching machines in *Teaching Machines: The History of Personalized Learning* (MIT Press, 2021), 81–133.

as a panacea. Discernment, prudence, and creativity are required in every case.

## On Early Teaching Machines and Behaviorism

Let us begin by considering the teaching machines developed by proponents of behaviorism in the middle of the twentieth century. Here we are deeply indebted to Audrey Watters's invaluable work on the history of educational technologies, especially in *Teaching Machines: The History of Personalized Learning*. Our purpose here is not to summarize every step of modern educational technology development. Rather, it is to help readers notice and understand some important basic commonalities between today's AI educational tools and some of our earliest modern teaching machines. Those commonalities have to do with basic structuring features of how (and for what purpose) teaching tools are designed, and thus with the particular understanding of education with which they are designed. The more we can notice specific understandings of education at work in the design and use of teaching tools, the more we can disarm problematic accounts of education and bend our tools in service to integral learning.

Sidney Pressey was an inventor and professor at The Ohio State University who created a rudimentary mechanical grading device (imagine a precursor to a Scantron machine) designed to automate testing and grading as early as 1923.[3] He wrote that this machine would not bring about "the mechanization of education," but would instead "free the teacher from the drudgeries of her work so that she may do more real teaching."[4] Pressey developed this machine when mass education was increasing in popularity in early twentieth century America, and used this

[3] Watters, *Teaching Machines*, 36. On Pressey, see also Stephen Petrina, "Sidney Pressey and the Automation of Education, 1924–1934," *Technology and Culture* 45, no. 2 (2004): 305–330.

[4] Sidney Pressey, "A Third and Fourth Contribution Toward the Coming 'Industrial Revolution' in Education," *School and Society* 36, no. 934 (1932): 672, cited in Watters, *Teaching Machines*, 59. "What Pressey seemed to overlook, of course, was how much his own work and his own profession, by promoting practices like standardized testing, had contributed to these mundane working conditions in the first place" (Watters, *Teaching Machines*, 45).

fact as a central argument in his case.[5] He insisted that his machine would make education more efficient and more personal: it would meet the demands of a growing student population, decrease the drudgery of grading for teachers, and free teachers to give more individual attention and focus on "inspirational and thought-stimulating activities."[6] Here we see a robust display of the rhetoric by which education technology continues to be promoted.[7]

Pressey's machine was too expensive to be practical or profitable, and he spent his career pitching machine after machine across the country, never finding the commercial success he desired but cementing a narrative nevertheless.[8] After the Second World War, a Harvard professor named B.F. Skinner sought to accomplish the individualization of education by developing a teaching machine according to his notion of behavioral conditioning.[9]

Skinner is considered one of the early pioneers of behaviorism.[10] The school of behaviorism dominated much of mid-twentieth century experimental psychology.[11] The leaders of early behaviorism, including Ivan Pavlov (famous for his experiments with dogs), sought a psychological method that would avoid any reference to the internal life and experiences of their subjects by only examining a person's responses to

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[5] Watters, *Teaching Machines*, 41–43.

[6] Sidney Pressey, "A Simple Apparatus Which Gives Tests and Scores–and Teaches," *School and Society* 23, no. 586 (1926), 373, cited in Watters, *Teaching Machines*, 9.

[7] Also on display is how students will tend to respond to these tools. In 1931, a student-run publication commented on Pressey's machine by noting that the only thing missing is a machine that can enter the right answers on the student's behalf. "Exams by Machinery," *Ohio State University Monthly* 22, no. 8 (May 1931), 339, cited in Watters, *Teaching Machines*, 55.

[8] Watters, *Teaching Machines*, 50–54.

[9] Watters, *Teaching Machines*, 81.

[10] This discussion of behaviorism draws on John B. Watson, *Behavior: An Introduction to Comparative Psychology* (Henry Holt & Co., 1929); B.F. Skinner, *Beyond Freedom and Dignity* (Knopf, 1971); B.F. Skinner, *About Behaviorism* (Knopf, 1974); Barry Schwartz, *The Battle for Human Nature* (W.W. Norton & Company, 1986).

[11] For a discussion of B.F. Skinner and behaviorism see Thomas C. Hunt, *The Impossible Dream: Education and the Search for Panaceas* (Peter Lang, 2002), 175–189.

external stimuli.[12] The goal of behaviorism was a technology for the control and manipulation of human action. This control of behavior took place through careful training and education.

For both Pavlov and Skinner, this behaviorist methodology allowed for an easy generalization from animal experiments to human beings. By observing only external behavior and eliminating human subjectivity (especially thought or rationality), the behaviorist claimed to be able to model the human as simply a more complex animal. Pushing beyond Pavlov, Skinner argued that there was nothing remarkable about human reason that deserved special dignity. In his book *Beyond Freedom and Dignity,* he argued that social planners and educators should ignore freedom and dignity in order to manipulate people to do what is desired.[13]

Skinner's greatest success was in training pigeons for a program initially tied to World War II goals of developing pigeon-guided bombs.[14] Extending Pavlov's work to pigeons (deprived of most stimulation and food), Skinner was able to quickly train them to do simple tasks using food as a reward. A key aspect of this training was to isolate the pigeon from other stimuli so that it interacted primarily with the training mechanism.[15] His methodology, called "operant conditioning," drew on Pavlov's experiments conditioning dogs to salivate at the sound of a bell. The model showed that by associating a particular behavior with a stimulus and a reward, the experimenter could make that behavior automatic.

These experiments could, in Skinner's mind, lay the basis for children's education; this is where behaviorism connects with educational technology. Skinner directly used this theoretical model to develop his aforementioned teaching machine based on rewards and punishments. Skinner's teaching machines reinforced behavior through mechanical

[12] Watters, *Teaching Machines*, 21–22.

[13] B.F. Skinner, *Beyond Freedom and Dignity* (Hackett Publishing Company, 2002). See also Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (PublicAffairs, 2019), 321–323.

[14] Watters, *Teaching Machines*, 23–26.

[15] Watters, *Teaching Machines*, 21–22.

signals based on the responses of students in their interactions with them, such as a light that would shine when the answer was correct.[16] Using this machine, Skinner theorized that students could work through material at their own pace.[17] This individualization, however, necessitated increased standardization since the teaching machines required programmed instruction that broke material into small, testable lessons that built upon one another programmatically.[18] Like Pressey, Skinner found little commercial success with his machine, as the technology remained too expensive for most schools and educators.[19]

While his machines were not financially successful, their implementation of his behaviorist psychological models laid the practical foundation for later educational technologies. Even as behaviorist theories faded in importance in psychology, the theories became quietly embedded in practical educational tools. Let us first get clear on why this matters from the perspective of Catholicism's insistence on integral learning, and then explain how these problems persisted into current educational technology.

## Behaviorism and the True End of Education

A behaviorist educational system defines knowledge as that which is to be gained in education and can be found in either discrete chunks of information or a discrete form of action. In either case, the goal of education must be the assimilation of the smallest bits of behavior, one at a time. Skinner, for example, thought technologies should teach a little bit at a time and not allow a student to advance until that chunk of knowledge was mastered. While seemingly innocuous, this approach actually discounts the way humans learn: sometimes through bits and pieces, sometimes all at once, sometimes after a good night's sleep, or sometimes by reflecting on other subjects. To overly focus on the smallest individual bits of

[16] Watters, *Teaching Machines*, 24–25.
[17] Watters, *Teaching Machines*, 27.
[18] Watters, *Teaching Machines*, 14–15.
[19] Watters, *Teaching Machines*, 32, 104–106, 210–212.

information is to miss the forest for the trees. Catholic education, on the other hand, aims to form or transform students' understanding of the world. It aims at an ongoing conversion, which requires not merely the accumulation of bits of data but the formation of a total worldview. Discrete facts, skills, and knowledge gained are at the service of a broader formation in wisdom. Thus, the Catholic focus on the whole person is a very different task than behaviorist conditioning.

Second, behaviorist systems depend upon the stimulus/response method and instruction primarily through providing rewards or, much less frequently, punishment. Schools and technologies cannot provide the equivalent of the pigeon's birdseed for each correct answer, but they can provide the psychic equivalent through positive feedback. Various technologies are designed to provide reward-like mechanisms to correct responses to test questions. This is most frequently found in the *gamification* of the learning environment, in which learning directly leads to the psychic rewards of victory. This early behaviorist goal largely accounts for why so much educational technology today takes the form of games. Contrary to this, Catholic education ideally aims to inspire a love of the intrinsic good of learning to motivate students, instead of a system of rewards and punishments. Although discipline is frequently a part of education, especially at the primary and secondary school level, reward and punishment should never be the main or central tools for motivation and inspiration. Relatedly, educational games have their place in a well-rounded curriculum. Games can be used to review knowledge, assist in memorization, or as a fun way to try a new language, like the app Duolingo. If systems of rewards and punishments, however, become the primary tools for education, the love of knowledge suffers and has little chance to continue throughout life. Catholic educational philosophy holds that knowledge is an intrinsic good and love of wisdom should drive the educational process.

Third, behaviorist programs claim that a student's character should be understood solely as a set of discrete, conditioned habits. If a program seeks

to form character, that project must be envisioned in terms of directing behavior through a stimulus-response mechanism in order to elicit a better response to training. Catholic education supports the proper formation of good habits in children but situates such habits not in the context of conditioned responses but in the context of the formation of *virtue*. In this way, Catholic education aims to foster and guide a character of virtue in children, which cannot be reduced to mere conditioned habits. Virtue, instead, is the development of forms of action and perception guided by the conscious understanding of the good. It is a formation ordered toward freedom and responsibility in a way that behaviorism explicitly denies.

Fourth, a behaviorist model can easily be automated and done alone. There is no intrinsic reason to expose a student to a teacher or to other classmates in this model. In fact, other classmates would be detrimental to behaviorist technology because they would affect the conditioning that is being adapted to an individual student. Each child learns at a different speed, making it difficult to coordinate the progressive conditioning of multiple children. Therefore, learning must be individualized.

On the contrary, a Catholic model of education must inherently be human and intersubjective. Students need a teacher to form their character, to show why a topic is important, and to foster a love of learning. Teachers are also *learners* in this model, allowing themselves to grow and change in their interactions with the student. Classmates are not just helpful but *necessary* in this model, as they help to shape the virtues of both the student and the teacher, who together work to model a virtuous society and the joy made possible through the joint pursuit of a common good. True human intersubjectivity, a core principle of a Catholic educational philosophy, cannot be automated.

## Profits, Behaviorism, and the Commercial Success of Digital Educational Technologies

The instructional inventions of behaviorists like Skinner and Pressey did not match the business interests of technology companies and manufacturers

at the time, nor were they perceived by educational institutions en masse to be the solution to existing problems or the salve for anxieties about the future. Because of this, they were rarely, if ever, profitable. The trajectory of digital educational technologies at the turn of the millennium is, however, a very different story. Where the teaching machines of the twentieth century floundered, digital instructional technologies expanded exponentially in the rapidly growing world of the internet. These technologies also arrived in an educational landscape that increasingly demanded accountability and job preparation.[20]

While behaviorism fell out of fashion for most educational technologists by the turn of the century, behaviorist principles or assumptions can still be found in certain design features of digital instructional technologies.[21] The design and development of educational technologies for instruction not only requires the developers to take a stance (whether explicitly or implicitly) on what ought to be learned but also on *how* learning happens. Signs of an underlying behaviorist understanding of how learning happens in digital instructional technologies (like adaptive learning applications, "intelligent" tutoring systems, or online learning platforms) include the use of consistent reward-based reinforcement techniques, the employment of constant testing with immediate feedback, and the evaluation of prior knowledge through behavioral assessments.[22]

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[20] See Hunt, *The Impossible Dream*, 235–287.

[21] John K. Burton, David M. Moore, and Susan G. Magliaro, "Behaviorism and Instructional Technology," in *Handbook of Research on Educational Communications and Technology* (Lawrence Erlbaum, 2004), 6.

[22] See Burton, Moore, and Magliaro, "Behaviorism and Instructional Technology," 9–13; Kent L. Gustafson and Robert Maribe Branch, "Revisioning Models of Instructional Development," *Educational Technology Research and Development* 45, no. 3 (1997): 73–89; Erik Drasgow, "Behaviorism," in *Encyclopedia of Educational Reform and Dissent*, eds. Thomas C. Hunt, James C. Carper, Thomas J. Lasley, II, and C. Daniel Raisch (SAGE Publications, 2010), 91; Margaret Gredler, "Programmed Instruction," in *Encyclopedia of Educational Reform and Dissent*, eds. Hunt et al. (SAGE Publications, 2010), 735.

Many of the algorithmic techniques at the basis of contemporary AI technologies were developed in the second half of the twentieth century: backpropagation, neural networks, deep learning, and even language models. Connectionist AI models did not flourish until the twenty-first century due to the high cost of storage and computing power. Prior to the emergence of search engines like Google,[23] social media platforms like Facebook,[24] and e-commerce websites like Amazon, the scale of data necessary to train contemporary AI was not reasonably available. The consolidation of wealth in the hands of a few large technology corporations allowed for investment in large infrastructure projects and the refinement of massive datasets.[25] These corporations could fund the construction of large data centers with the processing power, memory, and storage necessary to train and run large language models like ChatGPT. When contemporary AI systems surpass benchmarks, such as image recognition or text generation, they do so only because of the availability of data and processing power enabled by the recent consolidation of wealth in the technology sector.[26] The successes of contemporary AI in the 2010s and 2020s have thus in many ways been concomitant with the widespread adoption of online learning platforms or learning management systems (LMSs) by schools.

Online education platforms possess the same structure as many of the other products created by technology companies in the first two decades of the twenty-first century: effective data collection and regulation of user behavior.[27] Screens replace boards. Videos replace lectures. E-textbooks

[23] On the nature of the emergence of Google's surveillance profit model, see Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (PublicAffairs, 2019), 74–81.

[24] On Facebook within the behaviorist tradition, see Zuboff, *The Age of Surveillance Capitalism*, 298–308.

[25] Meredith Whittaker, "The Steep Cost of Capture," *Interactions* 28, no. 6 (2021): 50–55, doi.org/10.1145/3488666.

[26] Whittaker, "The Steep Cost of Capture," 53.

[27] See Audrey Watters, "Hack Education: Education Technology and The Age of Surveillance Capitalism," September 9, 2019, nepc.colorado.edu/blog/education-technology.

and online lessons replace their physical counterparts. All assignment, assessment, and attendance information is moved from the classroom and teacher-student relationship to the online platform which schools either manage themselves or pay a corporation to manage for them. As such, educational technology platforms, especially learning management systems, allow for the quick collection of student data, the tight regulation of student behavior, the oversight of teachers, and a multiform interactivity that mediates or in some cases even replaces non-digital, person-to-person encounters.

Although the adoption of digital devices and transitions to digital educational technologies and online educational platforms were sold as tools for personalization, more effective learning, and beneficial job preparation, it must be recognized that there is a strong incentive for all for-profit technology companies and online platforms to generate wealth. Indeed, it is precisely this generation of wealth that has driven investment in education technologies in the recent past. The financial success of educational technologies systems in the last thirty years has led to an increased influence of market pressures for their development and deployment. The widespread adoption of educational technology, especially during the Covid-19 pandemic, has transformed the economic landscape. Every year, venture capitalists invest several billion U.S. dollars in new education technologies.[28] During the Covid-19 pandemic, investments in education technologies soared to $8 billion, and U.S. tech firms, many of which provide platforms for educators and students, added $3.4 trillion in market capitalization, according to some estimates.[29] Technology use in the classroom soared and has continued to be well above 2019 averages despite the pandemic having come to an end.[30] For

[28] Anna Merod, "Ed Tech Investments Slow after Sizable Pandemic Bump," *K-12 Dive*, March 7, 2024, k12dive.com/news/ed-tech-investments-decline-pandemic/709399.

[29] Trevor Norris, "Educational Futures after Covid-19: Big Tech and Pandemic Profiteering versus Education for Democracy," *Policy Futures in Education* 21, no. 1 (2023): 34–57.

[30] Anna Merod, "Ed Tech Investments Slow after Sizable Pandemic Bump."

example, the popular online learning platform Canvas is owned by the for-profit corporation Instructure, which has gone through multiple acquisitions. In 2024, it was purchased by two investment companies, KKR and Dragoneer, for $4.8 billion. In 2025, Instructure announced a global partnership with OpenAI to weave AI tools throughout Canvas.[31] This is not to condemn any one learning platform, but to point out that *profit* is a major goal of most, if not all, online learning platforms.

As the increase in the use of digital technologies in the classroom brings a windfall in profits for technology companies, comparable benefits have not emerged for educators and students. Rates of teacher anxiety and depression are at an all-time high, especially among early-career teachers and teachers of color.[32] A similar decrease in mental health has been witnessed in the student population.[33] This is especially troubling given the twin facts that classrooms are now replete with digital technology and that a high amount of time spent on screens has been linked to increased rates of anxiety and depression.[34] Besides declining mental health, racial inequities in education only worsened during and after the Covid-19 pandemic.[35] Taken together, these facts lead one to question the narrative

[31] Ray Ravaglia, "Instructure and OpenAI Harness the Power of AI to Transform Learning," *Forbes*, July 23, 2025, forbes.com/sites/rayravaglia/2025/07/23/instructure-and-openai-harness-the-power-of-ai-to-transform-learning; Iris Dorbian, "KKR and Dragoneer Complete $4.8bn Take-Private Acquisition of Edtech Firm Instructure," *PE Hub*, November 14, 2024, pehub.com/kkr-and-dragoneer-complete-4-8bn-take-private-acquisition-of-edtech-firm-instructure.

[32] Leigh McLean, Crystal Bryce, and Brooke Johnson, "Describing Teachers' Well-Being Prior to and 18 Months After Covid-19 School Closures, with a Focus on Early-Career Teachers and Teachers of Color," *SAGE Open* 13, no. 4 (2023), doi.org/10.1177/21582440231217872.

[33] Fengxiao Li, "Impact of Covid-19 on the Lives and Mental Health of Children and Adolescents," *Frontiers in Public Health* 10 (2022), doi.org/10.3389/fpubh.2022.925213.

[34] Yihong Zhao, Martin Paulus, and Marc Potenza, "Brain Structural Co-Development Is Associated with Internalizing Symptoms Two Years Later in the ABCD Cohort," *Journal of Behavioral Addictions* 12, no. 1 (2023): 80–93.

[35] Kevin A. Gee, Vigdis Asmundson, and Tseng Vang, "Educational Inequities Related to Race and Socioeconomic Status Deepened by the Covid-19 Pandemic," *Center for Poverty*

of technological progressivism that educational technology and AI companies sell. As explained earlier, technological progressivism is the idea that better technology is equivalent to a better society: more health, more wealth, more good, more happiness. But technological progressivism has failed to make good on these promises. Indeed, the opposite seems to be the case. Despite the stated aims of countless educational technology companies, it seems that technology has failed to secure an increase in the welfare of teachers, in part by decreasing the amount of drudgery in their work. Despite this mounting evidence, schools and companies continue to be confident that the *next* technology will be the one to change everything, and all we have to do is be patient and invest just one more time. AI is currently a high-investment, low-profit industry, yet the investments in its development and proliferation are yielding staggering returns, especially in terms of attention. The looming questions are: how will AI be monetized and how will this impact education?

These online educational tools, however, in many cases ultimately serve the purposes of the corporations and the funders behind them, enabling massive data collection, surveillance, and controlled behavior modification, which have become the greatest drivers of wealth in the modern economy. This is not to put all online platforms in the same bucket as Facebook, Amazon, and TikTok, but to note that the profit model within surveillance capitalism requires businesses to "render our lives as behavioral data for the sake of others' improved control of us."[36] In other words, even if individual instances of such platforms are not by nature exploitative, it is important to keep in mind the structural features of the technologies that are profitable within surveillance markets.

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*and Inequality Research Policy Brief* 12, no. 4 (2023), poverty.ucdavis.edu/post/educational-inequities-related-race-and-socioeconomic-status-deepened-covid-19-pandemic.

[36] Zuboff, *The Age of Surveillance Capitalism*, 94.

## Surveillance for Profit

The most valuable asset in the modern technology marketplace, perhaps in the world, is user data.[37] For-profit educational technology companies—and some nonprofit ones—depend on student data to offset their costs and be able to offer software cheaply, with some offering seemingly free services. When discussing the modern tech industry, scholars have begun to use the term "surveillance capitalism" to describe a new economic philosophy in which personal data is the resource, machine learning algorithms (AI) are the means of production, and modified human behavior is the product to be sold. Within surveillance capitalism, tech companies entice individuals to provide data to collection and analysis companies through personally tailored digital experiences. Companies promote increased surveillance as a means toward the desired end of the ultimate "personalized" experience. In the case of education, surveillance—the collection of human data—is touted as the ultimate tool to offer personalized education practices. This impulse can feel positive: teachers need to know students to teach effectively. But the mass collection of student data by tech companies has opened up a dangerous side of the modern educational technology economy. Besides data collection, surveillance also entails various methods for influencing human behavior. According to the social psychologist Shoshana Zuboff, the prediction of human behavior is the product sold within surveillance capitalism.[38] Predictions regarding human behavior are made by machine learning technologies. Tech companies, especially social media companies, know that they can make such predictions with a high degree of accuracy.[39]

The intersection of behaviorism, surveillance, and capitalism that companies offer in educational technology systems recalls the origins of

[37] "The World's Most Valuable Resource Is No Longer Oil, but Data: The Data Economy Requires a New Approach to Antitrust Rules," *The Economist*, May 6, 2017, economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data.
[38] Zuboff, *The Age of Surveillance Capitalism,* 93.
[39] Zuboff, *The Age of Surveillance Capitalism,* 297–308.

the modern surveillance state, which lies at the intersection of capitalism, industrialization, and control. Indeed, the origins of modern industrialization can be traced to slave plantations and industrial factories.[40] Before a minimum wage and a forty-hour workweek, the brutality of North American slavery defined peak human work efficiency: labor for profit, surveilled, measured, and analyzed.[41] Across the Atlantic, the origins of modern industry offered minimally better conditions. Child labor laws exist today because of the vast exploitation of children as laborers under the guise of education and apprenticeship in early British factories.[42]

The very idea of workplaces as efficient machines, which came to dominate the language of the industrial revolution, was borrowed from terms describing large-scale cotton plantations in the early 1800s United States, and argued for by Charles Babbage himself, the inventor (alongside Ada Lovelace) of the first theoretical computing machines.[43] Efficiency runs through all systems, Babbage argued, and such efficiencies can even be made to operate a computing machine. This insightful wisdom was accompanied by dangerous philosophies: he condemned labor unions, arguing that factories should be as efficient as possible; he argued against the slave trade, but only so that Britain's factories would remain competitive with American factories; and he excelled at valuing humans only inasmuch as they could produce economic value on the factory floor.[44] For Babbage, and for many others at the dawn of the industrial era, surveillance, capitalism, and human indignity went hand in hand. You cannot have one without the other.

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[40] Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Duke University Press, 2015); Meredith Whittaker, "Origin Stories: Plantations, Computers, and Industrial Control," *Logic(s)*, no. 19 (2023), logicmag.io/supa-dupa-skies/origin-stories-plantations-computers-and-industrial-control.

[41] Caitlin Rosenthal, *Accounting for Slavery: Masters and Management* (Harvard University Press, 2019).

[42] Brian Merchant, *Blood in the Machine: The Origins of the Rebellion Against Big Tech* (Little, Brown, and Company, 2023).

[43] Whittaker, "Origin Stories."

[44] Whittaker, "Origin Stories."

The modern vision of surveillance capitalism combines ideas of efficiency with less obtrusive notions of surveillance in the technological marketplace. Zuboff recalls the desires of Facebook, Google, and Microsoft to transform "all physical and institutional spaces, people, and social relationships" into data that is "indexable and searchable: all of it subject to machine reasoning, pattern recognition, prediction, preemption, interruption, and modification."[45] Building on past practices, modern tech giants use surveillance to increase efficiency in factories and workplaces, constantly tinkering with new algorithms and pushing the limits on acceptable human abuses in the workplace.[46] Differing from the past, modern tech giants also created a new use for surveillance practices, capturing petabytes of human data in order to sell to others both the data and the predictions regarding human behavior that can be made with it, transforming surveillance data into profits. Surveillance is no longer only an instrument of control but is now also a way to monetize the essence of human relationships. As Eric Schmidt, former CEO of Google, observed, "We know where you are. We know where you've been. We can more or less know what you're thinking about."[47]

In discussions of education, especially in the United States, surveillance capitalism is a given. From textbook corporations that rent textbooks by the semester and track reading frequencies, to testing agencies who can track students across classes and schools, to youth sports systems that track every aspect of a child's bodily development, to social media companies like Google that offer their own massive education platforms, educational technology offerings fit naturally at the new intersection of surveillance and capitalism. Surveillance may be used differently by these companies, but the underlying desire for wealth at the cost of integral human

[45] Zuboff, *The Age of Surveillance Capitalism,* 495–525.

[46] John Logan, "Corporate Union Busting in Plain Sight: How Amazon, Starbucks, and Trader Joe's Crushed Dynamic Grassroots Worker Organizing Campaigns," *Economic Policy Institute*, January 28, 2025, epi.org/publication/corporate-union-busting.

[47] Zuboff, *The Age of Surveillance Capitalism,* 495–525.

development ties the surveillance of the past directly to the unmitigated surveillance economy of the future.

## Algorithmic Bias

In the present day United States, there exists an effect of racial and ableist bias known as the school-to-prison pipeline.[48] Studies show concretely that children who are suspended or reprimanded more in school are more likely to end up in jail as adults. Statistics also show that educators are more likely to suspend students of color and students with disabilities. In one study, black students were found to be 3.5 times more likely than their white classmates to be suspended or expelled.[49] While all children with disabilities fare worse than non-disabled students, the racial disparities increase when concomitant with disability. In the same study, about one in four black children with disabilities have been suspended more than once, versus one in eleven white children with disabilities. On the whole, children with disabilities make up 8.6% of public school children but 32% of youth in juvenile prisons. The school-to-prison pipeline offers us three applicable lessons. First, it shows how behaviorist impulses reach deep into the school system today, with suspensions used ostensibly to change a student's behavior. Second, it shows the societal connection between schools and prisons, both sharing high levels of surveillance and control. Third, it shows the ways in which social biases can have extreme outcomes that are unforeseen by the actor or disciplinarian. None of the educators in the

[48] Marilyn Elias, "The School-to-Prison Pipeline," *SPLC Learning for Justice*, Spring 2013, learningforjustice.org/magazine/spring-2013/the-school-to-prison-pipeline. Cf. Patricia Burch, ed., *System Failure: Policy and Practice in the School-to-Prison Pipeline* (Routledge, 2022); Sam Davis et al., *The Consequences of Cops in North Carolina Schools* (American Civil Liberties Union of North Carolina, 2023), www.acluofnorthcarolina-bts.org/cops-in-schools; Michael Phillips, *Wrong Lanes Have Right Turns: A Pardoned Man's Escape from the School-to-Prison Pipeline and What We Can Do to Dismantle It* (WaterBrook, 2022); Laura Vernikoff, *Disabling the School-to-Prison Pipeline: The Relationship Between Special Education and Arrest* (Lexington Books, 2021); Mark R. Warren, *Willful Defiance: The Movement to Dismantle the School-to-Prison Pipeline* (Oxford University Press, 2022).

[49] Marilyn Elias, "The School-to-Prison Pipeline," *Teaching Tolerance* 52, no. 43 (2023): 39–40.

study were conscious of the racial or ableist bias in the suspensions they gave.

Technologies that produce outputs based on data from human behavior will reflect the biases characterizing that behavior. Thus, with the aforementioned social biases in mind, we must be attentive to the fact that many studies have confirmed the presence of social biases in artificial intelligence systems such as large language models (LLMs).[50] Some studies even show that LLMs heighten the biases of the original data in their outputs. The problem is so ubiquitous that some tech companies have begun to issue "model cards" that show the known biases and problems of each LLM when it is trained and produced. These historical biases have been well documented in image and text generation; companies that produce such models need to artificially constrain the model before releasing it to the public in order to curb the worst behaviors. Usually, such preliminary restrictions on AI model outputs is a matter of reinforcement learning according to which humans evaluate those outputs and thereby train the models. For instance, humans can evaluate imagery for accuracy (Did this model properly identify cats in pictures?) or biases (Who is left out of the images of CEOs that this model generated?). Education technology companies with novel AI applications, however, are readily integrating these biased models without a clear solution to the known problems of bias, even with mitigating factors in place. These biases include preferences for specific social groups, alignment of ethnicities with specific jobs, alignment of genders with jobs and behaviors, and the hypersexualization of women in stories and images.

We see here that the content mediated by these technologies often reinforces other social or cultural problems, including those already

[50] Meredith Broussard, *More than a Glitch: Confronting Race, Gender, and Ability Bias in Tech* (MIT Press, 2024); Isabel O. Gallegos et al., "Bias and Fairness in Large Language Models: A Survey," *arXiv*, July 12, 2024, arxiv.org/abs/2309.00770; Adeba Birhane, "Algorithmic Bias," in M.C. Frank and A. Majid, eds., *Open Encyclopedia of Cognitive Science* (MIT Press, 2026), doi.org/10.21428/e2759450.50c7e139.

present in the education system. At one level, we certainly encourage educators to think carefully about such biases when they implement any of these technologies in their classrooms. However, we also want to encourage them to think about the deeper legacy of behaviorism, which shapes basic tendencies in how educational technology works. This is not to say that all AI systems have the same biases or that all educational technology companies participate in the same way in the system of surveillance capitalism. However, the foundational principles of behaviorism define the space in which the educational technology community operates. These principles consistently help to create and sustain any modern educational technology system available today and should give pause to all people invested in education.

Significantly, the foregoing issues (profit, surveillance, bias) are structurally linked and persist in the present. The principles of behaviorism allow for the economical streamlining of schooling, the collection of data on behavior, more efficient behavior modification, and a veneer of objectivity that obscures social biases. But this is all made possible by systems that purport to personalize user experience and to make it more convenient and interactive. As the next section will show, this purported personalization is itself rooted in a myth.

## Marketing Education Technology: The Factory Schools Myth

We have seen that, for nearly a century, proponents of education technology have patterned their tools upon specific assumptions about people and learning, while presenting these tools as a path to liberation from drudgery and more individualized education. Readers may be wondering why these patterns and their endurance make such a small difference in current conversations about educational technology. An important part of the answer is that, more than simply overemphasizing the novelty of what their tools represent, education technology companies frequently put forward a different narrative that is both captivating and

deeply inaccurate. We can call that narrative the "myth of factory schools." This myth conceals the legacy we have described, demonizes a significant swath of twentieth-century education, presents AI technologies as an anthropologically and ethically neutral panacea, and conceals the degree to which pressures to implement these tools have more to do with economic efficiency than with providing a quality education. Here again, Watters' work is of central significance.[51]

The myth is usually some version of the following: Modern mass education is perpetually bound to an outmoded "factory model" or "industrial model" of schooling that imitates industrial wage labor and reproduces this way of being in students' bodies and minds. This is supposedly evident in practices like grouping students by age cohorts, having a single educator take the whole class through the same standardized lesson, and moving these cohorts along a "conveyor belt" curriculum regardless of how well each student learned earlier lessons. Education technology offers the only economically viable way to break through this allegedly mechanistic system by offering "personalized" learning experiences where students do not progress to the next skill until they have mastered the previous one. Education technology (and now AI) thus emerges as the savior of an education system. More recently, identifying schools with factories helps to frame them as "no longer

[51] The argument that follows draws especially from Audrey Watters, "The Invented History of 'The Factory Model of Education,'" *Hack Education*, April 25, 2015, hackeducation.com/2015/04/25/factory-model; along with Watters, *Teaching Machines*, 1–18; Sherman Dorn, "The Myth of Industrial-Era Classrooms," in *23 Myths About the History of American Schools: What the Truth Can Tell Us, and Why It Matters*, ed. Sherman Dorn and David A. Gamson (Teachers College Press, 2024), 50–58; and Michael Caulfield, "The Original Factory Education Was a Personalized Learning Experiment," *Hapgood*, July 9, 2014, hapgood.us/2014/07/09/the-original-factory-education-was-a-personalized-learning-experiment. For an illuminating discussion of these issues from that time period, see Frederick John Gladman, *School Work, Part II: Organization & Principles of Education* (Jarrold and Sons, 1886), 13–29.

equipped to address the needs of a *post*-industrial world."[52]

This narrative is inaccurate in multiple ways. For our purposes, its key problem is that it labels the wrong educational system as "factory schooling," which obscures the concerns that brought our current standard approach into existence. The practices that education technologists critique (e.g., single-age cohorts moving through the same curriculum with one teacher) in fact became prominent in mid-nineteenth century Europe and the U.S. as an *alternative* to an older (early nineteenth century) model that was widely judged to be more economical and which resembled industrial labor far more closely. This model (variously called the monitorial, Bell, Lancaster, or Madras systems) put hundreds of students in a single large room watched over by one teacher. Smaller groups of students were divided by skill rather than age and were aided by a few advanced students ("monitors"). Students learned by working individually and in a self-paced manner through carefully progressive textbook lessons that built knowledge or skills piece by piece (that is, in a serialized fashion). The resemblance of this structure to factory work was not lost on contemporaries, who in fact celebrated the way it minimized student idleness by making the classroom function like a machine.[53]

The monitorial system was unpopular with teachers and parents, in part because monitors (like students today) had inconsistent attendance. Moreover, their parents resisted their children being used as free labor much more than the learning.[54] Over time, monitorial schools were largely replaced by the Glasgow or Prussian models (which Horace Mann then

[52] Watters, "The Invented History," which also provides copious examples of this myth in education reform discourse. Further examples can be found in Dorn, "The Myth of Industrial-Era Classrooms," 50.

[53] Watters, "The Invented History," who cites, e.g., James Cordiner's comment in 1820: "On entering the school, you can discover no individual unemployed, no boy looking vacantly round him: the whole is a beautiful picture of the most animated industry, and resembles the various machinery of a cloth or thread manufactory, completely executing their different offices, and all set in motion by one active engine." *A Voyage to India* (D. Chalmers & Co., 1820), 87.

[54] Dorn, "The Myth of Industrial-Era Classrooms," 51.

popularized in the U.S.). These put fewer single-age students in a smaller classroom in direct engagement with a trained teacher. Supporters of this approach, which we now tend to associate with "modern schooling,"[55] were seeking an economically viable way to bring students into closer contact with highly trained educators who could empower students to think for themselves and understand particular facts in light of deeper principles (rather than move mechanically through a progressive set of operations).[56]

Notice the important implication of this history: proposals for technology-powered individualized learning (beginning with Pressey in the 1920s) have unwittingly retrieved the monitorial system's reliance on progressive skills acquisition; its cost-saving teacher-student ratio; and its relative lack of commitment to awakening the student's self-possession, curiosity, and insight into the principles that explain surface-level facts and skills. Now, however, the human monitor is replaced by a machine. Today such machines are sold as improvements upon mainstream twentieth- and twenty-first century models by associating those models with factories. This strategy hides something important: the monitorial system has long been judged inadequate precisely because it mechanizes learning as a progressive habituation of skills that can be planned in advance, while failing to provide substantively for students' moral and communal growth in close contact with a wise mentor who can cultivate their reflective journey toward the truth.

Thus, on the one hand, the "factory schools" myth demonizes the very model that sought to resist the mechanization of learning in an economically viable way. On the other hand, it presents technology-

[55] This model never reached a complete monopoly, however. It, of course, has its own shortcomings, and has continued to coexist with various alternatives and detractors. See especially Dorn, "The Myth of Industrial-Era Classrooms," 51–52.

[56] Gladman, *School Work*, 21–25, and Watters, "The Invented History." Of course, the initial intentions behind a reform are not a full explanation for its success. As Dorn notes, it is really its flexibility that has given the single-teacher classroom such staying power in modern education ("The Myth of Industrial-Era Classrooms," 52).

powered individualized learning as humanizing and empowering, all while concealing two things. First, it conceals the fact that cost savings have always been the central advantage of "monitorial" individualized learning. Second, it conceals how monitorial learning's structural features—features that later fit well with behaviorist pedagogy—have long been judged to be an *obstacle* to humanizing and deeply personal learning.

## Conclusion

The goal of this chapter was to disrupt the narratives of technological optimism and progressivism. At present, the champions of generative AI are confidently proclaiming the benefits it brings to education, predicting that more positive outcomes for education are on the horizon.[57] It is important to emphasize that AI technologies are presented as providing the possibility of realizing the personalized education that Skinner hoped his early teaching machines would enable. If, however, a behaviorist understanding of education does not fit with the integral development of the human being, then we should be wary of an education that is structured according to behaviorist AI technologies. Learning is driven by wonder and so cannot be reduced to stimulus-response. AI technologies will mirror behaviorist principles if they invite students into the habit of understanding education as a process driven by extrinsic rewards. Education ought to be a genuinely personal journey in the sense that it capacitates students for the full actualization of their intellectual agency. This full actualization occurs when students make questions their own so that they feel a personal commitment to and responsibility for their judgments. Given the profit incentives that fuel technological innovation and proliferation, Catholic educators should be cautious and thoughtful

[57] Andrea Willige, "From Virtual Tutors to Accessible Textbooks: 5 Ways AI Is Transforming Education," *World Economic Forum*, May 10, 2024, weforum.org/stories/2024/05/ways-ai-can-benefit-education.

about how to proceed.[58]

In this chapter, we have focused on behaviorism and the profit motive at the foundation of AI technologies. These are, of course, not the only sociocultural forces operative in the push to integrate these technologies into education. This being the case, this chapter models how those other forces might be approached as educators seek to implement methods in education that genuinely lead to integral human development. This challenge was necessary here as an act of disruption but should not be read as a condemnation of every educational technology platform and practice. On the contrary, many of the authors of this text utilize educational technology applications and platforms on a regular basis as educators and find value amid the challenges. The approach of this chapter is meant to cast away any remnants of technological idolatry in the course of education. The history of educational technology is not one of perfect progress. The promise of perfectly individualized educational technologies has been unfulfilled since the mid-twentieth century!

By identifying one of the dangerous philosophies that influenced the rise of educational technology, unacceptable uses of technology, and the pressures that new technology faces today both in society and in the classroom, we hope to define bounds and borders from which we can begin to construct a positive Catholic vision of AI and educational technologies that upholds human dignity, reinforces human community, reverses biases, and helps to educate the whole person.[59] In hastily changing or altering educational practices, we risk losing goods that we have in order to chase perceived goods that are uncertain.[60] This prudential care toward

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[58] On this stance toward technology, see Francis, in *Laudato Si'*: "Technology, which, linked to business interests, is presented as the only way of solving these problems, in fact proves incapable of seeing the mysterious network of relations between things and so sometimes solves one problem only to create others" (§20).

[59] Francis, *Laudato Si'*, §§107, 195.

[60] On this note, see especially Socrates' critique in Plato's Phaedrus directed at the enthusiasm about writing as a promising new technology that will advance education: "One man [sic] can give birth to the elements of an art, but only another can judge how they can benefit or harm

innovation is not born of anti-technology reactionism but rather draws inspiration from the wisdom of a Catholic approach to technology that discerns how it might help or hinder human flourishing.

those who will use them. And now, since you are the father of writing, your affection for it has made you describe its effects as the opposite of what they really are. In fact, it will introduce forgetfulness into the soul of those who learn it: they will not practice using their memory because they will put their trust in writing, which is external and depends on signs that belong to others, instead of trying to remember from the inside, completely on their own" (275a). Plato, *Phaedrus*, in *Plato: Complete Works*, ed. John M. Cooper, trans. Alexander Nehamas and Paul Woodruff (Hackett, 1997), 551.

# CHAPTER 5

## EDUCATION AND PREPARATION FOR GOOD WORK

As we have seen, our approach to education needs to ground and envelop students' job preparation within a broader and deeper process centered on their complete flourishing and their preparation for loving service to the common good. The way we educate can never be determined primarily by the demands of the job market. And yet, a discussion of AI technologies in education has to address the question of work. Why is this?

To begin with, integral human development includes a range of goods that are normally attained through work. These include what we get through a stable income (for example, food, housing, medical care) and the way relative economic security equips us to focus on other worthwhile pursuits. But work also provides important opportunities for social interaction, serving the common good, and pursuing our own ongoing integral flourishing by facing challenges well. Teaching for integral human development, then, includes helping students toward access to good work—work that provides not only economic security but a genuine opportunity to seek one's own perfection, serve others, and anticipate God's kingdom. An integral education must also equip students to make good on these opportunities by doing such work not only effectively but also with wisdom and virtue.

Meanwhile, beyond raising doubts about the future supply of gainful employment, the advent of AI raises or reactivates much deeper questions about work. A good education must prepare students to face these

questions in a way that serves rather than hinders their own self-development and their service to the common good. Moreover, the challenges that AI poses to work and to education resemble each other in important ways, and this calls for a concerted response. For example, a reductive view of labor focused only on the monetary value of a worker's product both encourages and is encouraged by a reductive view of education focused only on equipping students with the skills they need to be efficient problem solvers. Allowing ourselves to perpetuate this vicious cycle or fall into this tendency only hurts our students in the long term: the more education narrows into job training, the less equipped students are with the deeper formation they need for responding to job market fluidity with wise creativity and in service to a truly good life.

Teachers owe it to their students to approach their task with a clear awareness of these pressures and an adequate concerted response to them. Sometimes this response can shape course content and pedagogy. But even when it does not, teachers can always prepare their students for good work by how they themselves model a good attitude to the work of teaching and to the proper place of AI technologies in that labor. In other words: how teachers use technology in general and AI specifically in their classes matters not only because of the impact on their course content but also because of the example it gives students of how to comport oneself as a laborer today.

As we have said above, this book aims not to assert the final word but to stimulate and augment further conversation. AI technologies' impact on labor, moreover, is still emerging and calls for ongoing responsive discernment.[1] Hence, our goal here is to *enrich educators' own ongoing pedagogical discernment* in relation to the question of work in a society heavily influenced by AI technologies. We do this in three steps. First, we

[1] See, e.g., Arvind Narayanan and Sayash Kapoor, "AI as Normal Technology," *Knight First Amendment Institute at Columbia University*, April 15, 2025, knightcolumbia.org/content/ai-as-normal-technology; and Arvind Narayanan and Sayash Kapoor, "AGI Is Not a Milestone," *AI as Normal Technology*, May 1, 2025, normaltech.ai/p/agi-is-not-a-milestone.

identify some of the deeper questions about work that the advent of AI technologies pushes us to confront even more thoroughly than before. The point here is to help orient educators to what is at stake in these questions and to how our answers to those questions can impact how we teach. Second, we articulate key foundations for a Catholic theology of work that can ground deeply fruitful responses to those questions. Finally, we model how to apply those foundations by articulating a brief account of the educator as a worker. At each step, then, our goal is to inspire and help educators to take an active role in the task of shared ongoing discernment about what it means to educate students toward good labor in an AI-dominated society.

## The Question of Labor in the Context of AI Technologies

The threat of AI-based destabilization of the job market is at best a partial starting point for reflecting on the future of good work in the twenty-first century. It remains unclear how exactly this destabilization will play out. More importantly, aspects of this upheaval that we *can* predict with confidence show that adequate responses must be guided by something deeper and more robust than an imperative to maximize the supply of gainful employment. For example, AI technologies may create new jobs that can replace those they render obsolete. However, it would not be surprising if these new jobs were characterized by the same relative precarity (regarding income, job security, and benefits) already associated with the gig economy—an economy in which temporary laborers work on their own schedule with few or no benefits.[2] This forces us to broaden our reflection to include more longstanding problems regarding the way

[2] Jobs created by technological automation tend to require less skill than the jobs that were rendered obsolete. This is a major reason why automation is perceived as profitable. Deskilled jobs mean that workers have less bargaining power, and this leads to decreased or stagnant wages. See Sylvain Leduc and Zheng Liu, "Automation, Bargaining Power, and Labor Market Fluctuations," *American Economic Journal: Macroeconomics* 16, no. 4 (2024): 311–349. Not surprisingly, AI development is often itself dependent upon precarious labor. See Crawford, *Atlas of AI*, 53–87.

contemporary labor is structured and to seek clarity on what justice demands for workers, as well as what kinds of labor are *good* and worth actively supporting. In general, *the potential for AI technologies to destabilize the job market indicates far deeper problems in our basic attitudes to work and ultimately a crisis of meaning long in the making*. How educators calibrate their work to address these problems depends on a clear grasp of these deeper concerns. In this first section, we outline six specific ways in which the advent of AI technologies indicates the need for deeper thinking about work; we also show how these questions bear directly on the task of educators.

### *Worker Burnout*

The threat of AI job replacement and the possibility of outsourcing grueling administrative work sharpen longstanding concerns about worker burnout. Building on the work of Herbert Freudenberger and Christine Maslach since the 1970s, Jonathan Malesic argues that burnout is not simply a result of bad working conditions or of overwork but stems principally from a growing gap between (a) workers' ideals regarding their work and (b) workplace environments that pressure workers to compromise on those ideals. In other words, burnout is primarily a crisis of meaning. That crisis can manifest in a variety of ways. We might experience the work itself as meaningless, if not also directly contrary to our moral commitments. Or we might approach work with problematic ways of seeing work as meaningful. If we expect work to *bestow* meaning on our lives and personalities, we are acting as if we ourselves have no meaning unless we work. If we think work's main value lies in the objectives we achieve through it, we render our sense of work's meaning dependent on factors we cannot control, which increases the chances that subpar work environments will lead us to experience labor as meaningless and alienating. In the face of these challenges, it is reasonable to ask whether we should let machines take our so-called meaningless administrative work

so that we can focus our lives on intrinsically meaningful activities and stop idolizing labor as a source of meaning and self-worth.[3]

Such proposals generally presuppose (and provide a strong argument for) a just transition into something like an automation-powered universal basic income (that is, income redistribution meant to provide everyone a basic financial foundation regardless of their employment status). This is itself a very tall order. But even supposing such a transition were feasible, important questions remain. Without a clear sense of what other activities are worth pursuing, being "released" from paid labor would not lead to more human flourishing. Moreover, some kinds of work (such as health-care and education) are not just intrinsically meaningful to practitioners but are also the sort of work in which our societies have a strong stake in keeping humans deeply and directly involved. This is in great part because the human performance of those activities benefits other people in unique and important ways. This points to a broader question of whether and why deeply challenging or taxing work might be worthwhile for reasons other than economic productivity. Good answers to this question might help those in difficult jobs make the best of their situation when their societies fail to offer them better work.[4]

Teachers often face work situations that render them vulnerable to burnout. How they deal with this challenge—for example, by advocating for better wages and working conditions, or by exploring how they can make the best of adverse conditions—sets an important example to their students. It may be that sometimes this pressure could be eased by

[3] Jonathan Malesic, *The End of Burnout: Why Work Drains Us and How to Build Better Lives* (University of California Press, 2022), 50–56, 64–138, and 218–230.

[4] For two good introductions to debates about whether or how work is good and to the theological questions at stake, see David Cloutier, "The Worker's Paradise: Eternal Life, Economic Eschatology, and Good Work as the Keys to Social Ethics," *CTSA Proceedings* 75 (2021): 37–55, and Kate Ward, *Making a Life: Catholic Social Teaching and the Meaning of Work* (T&T Clark, 2026). Malesic himself argues that the crisis of burnout should lead us to revisit our ideals about work and the structures that frame it in service to a better account of human flourishing (*The End of Burnout*, 141–217).

outsourcing certain tasks to AI technologies. But notice, again, that burnout is a crisis of meaning and not just overwork. Once we see this, it becomes easier to imagine how some AI applications that offload burdensome tasks may actually heighten the likelihood of burnout by deskilling teachers in ways that lower their sense of self-efficacy (that is, their belief in their ability to successfully perform a specific task or negotiate a situation, leading to a greater sense of agency).[5] In general, we should think hard about how AI interventions will help or hinder teachers' and students' ability to cultivate meaningful and self-efficacious engagement with their current or future work.

### *What is Leisure?*

Lack of clarity about good uses of unpaid time indicates a longstanding crisis of leisure. The philosopher Josef Pieper is deservedly a key point of departure for modern Catholic reflection on this topic. Pieper argued that we should define leisure in terms of activities worth doing for their own sake rather than primarily for an extrinsic end. Defined in this way, leisure can involve a fair amount of effort. But leisurely effort frees us *from* the imperative to subordinate all our actions to the pursuit of things like money, food, or security as well as *for* the realization of our deepest human capacities in the most rewarding activities, ultimately for our joyful affirmation of creation and of the God who lovingly creates and redeems the world. Pieper contrasts this definition of leisure with our common tendency to think of leisure as a break from work that refreshes us for *more* work. When we think of leisure in this way, it becomes completely subservient to the goals our workplace imposes on our lives: what does not refresh us for (or at least distract us from) work ceases to attract us as worthwhile leisure.[6] Once leisure is construed in this way, it is more

[5] See especially Albert Bandura, *Self-Efficacy: The Exercise of Control* (W.H. Freeman and Company, 1997), 36–78.

[6] Josef Pieper, *Leisure: The Basis of Culture,* trans. Alexander Dru (Ignatius Press, 1963), 15–51, 65–74.

susceptible to becoming a consumer good, and thus to being practiced in ways that are oriented to market demands rather than each person's integral flourishing. This trend is particularly evident in digital social media, whose architectures encourage the user's maximal ongoing participation (rather than the pursuit of truth, good habits, or deep connections with others) to the point of fostering anger, idealized self-presentation, and a profound anxiety about (if not outright dissatisfaction with) oneself and the present moment.[7] Thus, rather than deepening our humanity, enriching our lives, or even refreshing us for the next workday, the activities some turn to for leisure mostly just intensify a growing mental health crisis.[8]

These problems reinforce the importance of fostering in students the "contemplative relationship to reality" discussed earlier. Equally important may be helping students practice conscious reflection about their prior experiences of true leisure. What happens at these moments? Why are they meaningful? What kinds of effort do they inspire? Also: What is it like to get lost in distractions that deplete our energies and the habits that empower us for worthwhile activities? How does this depletion affect our attitude to work?

### *The Goodness of Manual Labor*

The threat of AI replacing many white-collar jobs highlights the importance of arguments in defense of the deeply human meaning and goodness of skilled manual labor.[9] Beyond a pragmatic argument in favor

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[7] See Felicia Wu Song, *Restless Devices: Recovering Personhood, Presence, and Place in the Digital Age* (IVP Academic, 2021), 39–89.

[8] See Conor M. Kelly, *The Fullness of Free Time: A Theological Account of Leisure and Recreation in the Moral Life* (Georgetown University Press, 2020).

[9] Matthew Crawford, *The World Beyond Your Head: On Becoming an Individual in an Age of Distraction* (Farrar, Straus and Giroux, 2016). See also Albert Borgmann, *Technology and the Character of Contemporary Life: A Philosophical Inquiry* (University of Chicago Press, 1987) and Mike Rose, *The Mind at Work: The Intelligence of the American Worker* (Penguin Books, 2004). Alasdair MacIntyre's account of practices offers an important bridge between

of jobs that *may* be harder to outsource to machines, or a critique of the meaninglessness of many white-collar jobs, this literature focuses our attention on the relationship between skilled agency and the development of mature freedom. It also offers compelling accounts of how the attainment and exercise of embodied skill open and enrich our perception of—and our resonant attunement with—natural and human ecologies. Now more than ever, then, the case for manual skill invites Catholics to articulate an account of work that insists on the priority of true leisure without thereby reducing manual skill to a "servile art" of merely instrumental value and thus with no deep significance for our flourishing.

Such arguments can provide important support for the place of sports, the arts, or trade skills within a well-rounded education and thus a well-functioning school.[10] Of course, it frequently happens that, for example, programs aimed at building physical or motor skills, such as athletic programs, fail to integrate well with a school's educational mission. Often this is due to a similar pressure felt in both work and education—the overly narrow focus on the acquisition of skills needed for maximizing extrinsic objectives (for example, winning). Hence, it is equally important for schools to foster a rich conversation about why these activities have intrinsic goods and provide important opportunities for cultivating integral flourishing. In the realm of sports, for example, such conversations can explore the ways in which a sincere practice of that sport calls forth a number of important things: virtues like courage and justice; a growth-oriented mindset; and a deeper appreciation for and willingness to protect and cultivate the internal goods that make the sport worth playing even when one is losing or otherwise failing to achieve extrinsic goods. Furthermore, beyond nurturing sharper attention to (and resonant

this literature and Aristotelian-Thomistic virtue theory. See *After Virtue: A Study in Moral Theory*, 3rd ed. (University of Notre Dame Press, 2007), 181–225.

[10] Three recent notable attempts at a "liberal trade education" include Harmel Academy in Grand Rapids, MI, the College of St. Joseph the Worker in Steubenville, OH, and San Damiano College in Springfield, IL.

attunement with) the world, many of these activities cultivate "spaces of concrete encounter" where people can experience what it means to acquire and exercise robust but still fallible expertise in a particular sphere of activity.[11] For example, as one acquires a sense of how to choose and work upon various pieces of wood in the construction of a complex structure or piece of furniture, one also gains a deeper and firsthand sense of how much such expertise costs in the way of attention, commitment, and effort. One also learns what it means to slowly attain sharper and more reliable judgment in a *specific* area of activity. This leads also to a deeper humility regarding forms of expertise one does *not* yet have, for example, in working with wiring or metal.

However, opportunities for reflection on these things remain largely dormant unless educators find ways to speak about them in more productive ways. For example, instead of talking about professional coursework or majors as a begrudging concession to careerism among students, humanities faculty in secondary schools and colleges can help transform the conversation about these disciplines by focusing on how serious training in any specific skill provides us an important experience of developing mature judgment—and thus a rich opportunity for reflecting on what it means to become a responsible knower more generally.[12]

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[11] Such experiences are all the more important when data superabundance, the threat of digital nudges, persistent messaging that machines can judge better than humans, and the ongoing breakdown of political discourse combine to create a sense that our own capacities for pursuing knowledge are hopelessly unreliable. See AI Research Group, *Encountering Artificial Intelligence*, 212–217; and Paul Scherz and Luis Vera, "AI and the Subjective Crisis of Knowledge," *Journal of Religious Ethics* 53, no. 2 (2025): 193–216.

[12] We are grateful to Jessy Jordan for this point (personal conversation). It is also true that a great deal of pre-professional education inculcates a managerial culture that resists concrete encounter by emphasizing the scalable optimization of extrinsic goods without any meaningful connection to difference within or among particular places. However, talking about the links between serious technical training and mature judgment can be the beginning of a conversation about the deeper meaning of these disciplines, the practices they prepare for, and the common good. On scalability and displacement, see Anna L. Tsing, "On Nonscalability: The Living World Is Not Amenable to Precision-Nested Scales," *Common Knowledge* 18, no. 3 (2012): 505–524. On how the advent of AI pushes pre-professional

### *Skilled Creativity*

The ability of AI technologies to create new images and videos or to emulate specific artistic styles has raised questions about the nature and acquisition of skilled creativity. We have seen in earlier chapters the frequently voiced view that it is acceptable or even good to let machines handle the "grunt work" associated with various kinds of cultural creation (for example, outlining, grading, initial research, drafting the pieces or raw material for a more synthetic work) so we may focus on the more interesting, rewarding, and deeply human work associated with creativity, interpretation, or education.[13] A central problem with this argument is that the skills necessary for producing (or even recognizing) such high-level work are acquired in part through those tasks we might consider onerous, repetitive, and basic. Scales and other drills teach musicians focused attention, disciplined bodily movements, and a deep embodied awareness of the range of possibilities in their instruments and, indeed, of music itself. Outlining one's own essay trains one not only to formulate more complex compositions but also to better trace the structure and potentialities of one's own thought or of someone else's writing.[14]

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training to find deeper ground, see Matthew Crawford, "Ownership of the Means of Thinking," *Commonplace*, December 10, 2025, commonplace.org/p/matthew-b-crawford-ownership-of-the. On the importance of making explicit the deeper common goods that sustain a great deal of private businesses, see Mark Hoipkemier, *The Price of the Common Good: Markets, Corporations, and Political Economy* (University of Notre Dame Press, 2025).

[13] For a fuller treatment of this issue, see AI Research Group, *Encountering Artificial Intelligence*, 217–220.

[14] Skilled practitioners have long known this from experience. But the point also finds support in a recent MIT brain scan study of LLM-assisted essay writing. The study found significant differences in a number of measures (e.g., brain connectivity, memory recall, and a sense of ownership of one's writing) between students writing with LLM assistance and those without. Moreover, when asked to write with an LLM, those who initially wrote without one showed an *increase* in these same measures. One question not asked here is whether these latter benefits remain over time with persistent LLM use. In any case, these findings also support the idea that the most deeply creative uses of AI call for formative preparation that abstains significantly from recourse to generative AI. See Nataliya Kosmyna, Eugene Hauptmann, Ye

Importantly, however, we don't mean to confuse the insistence upon the importance of these subordinate and seemingly outsourceable skills with Skinner's view of learning as the result of serialized mastery of separable tasks.[15] Rightly understood, the educational process is building toward something deeper and involves other kinds of learning. Hence, we need ways of thinking and acting that help us remember (and live by) the fact that creativity does not simply flash spontaneously from a naturally gifted mind. Rather, it requires *grounding* (that is, it depends on simpler skills for engaging and responding to the world) and it is also *interpretive* (that is, it involves synthetic insights, ones not reducible to serializable parts, and focused, intentional effort grounded in habits built by repeated practice). This requires curious exploration by the student (a point we will return to in chapters 6 and 7).

As with previous points, these considerations suggest that preparation for good work calls not only for exposure to key formative experiences but also for conscious reflection about the meaning of these experiences. In this case, the experiences are of deep creativity built up from (and frequently maintained by) basic and less interesting building-block skills to a sufficiently exploratory and interpretive engagement with the most rewarding higher-level tasks. This kind of reflection would need to include questions such as: Why must creativity be cultivated in this way? What does this say about a flourishing life or about good technology use? How can I bring this awareness into future growth experiences in my workplace so as to continue deepening my fruitful creativity and sense of self-possession?

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Tong Yuan, Jessica Situ, Xian-Hao Liao, Ashly Vivian Beresnitzky, Iris Braunstein, and Pattie Maes, "Your Brain on ChatGPT: Accumulation of Cognitive Debt When Using an AI Assistant for Essay Writing Task," *arXiv*, December 31, 2025, doi.org/10.48550/arXiv.2506.08872.

[15] As happens, for example, in Alexander Sidorkin, "The Right to Leapfrog: Redefining Educational Equity in the Age of AI," *AI in Society*, August 19, 2024, aiczar.blogspot.com/2024/08/the-right-to-leapfrog-redefining.html.

### *The Worth of Human Work*

AI technologies prompt us to think more deeply about why distinctively human work matters. The threat of outsourcing work to bots encourages us to reflect on what kinds of activities are especially human and thus harder for machines to perform. But not all approaches to defending the value of such work are equally fruitful. Some tasks ought not to be taken from humans, not because humans are better at them, but because their human performance is distinctively good for those who do them as well as for those who receive from them. Take, for example, work that foregrounds interpersonal attunement: teaching, healthcare work, ministry, therapy, sales, or at least some forms of management. Consider also work that does not technically require such attunement but is frequently accompanied by it in ways that enrich life, especially by sustaining a broader network of weak social ties that contribute to our sense of belonging (for example, numerous forms of retail work).

To make better sense of this aspect of work, the sociologist Allison Pugh speaks of "connective labor," that is, regulating one's attention, emotions, and behavior in service to an interactive process of "seeing" another person empathically and reflecting that understanding back to them.[16] It makes good sense to shore up connective labor in our time: it is a frequently underappreciated and poorly understood aspect of a wide spectrum of professions; it is closely linked with the flourishing of human interpersonal capacities (and thus, too, with our living into the divine image through communion with our neighbors); it addresses broadly voiced concerns about loneliness and depersonalization (themselves associated with modern technologies); and it is difficult for machines to replace. Moreover, a rich account of such work is important for broader conversations about the labor of women (quite often underpaid or unpaid) and about the place of people with disabilities in the world of

[16] Allison Pugh, *The Last Human Job: The Work of Connecting in a Disconnected World* (Princeton University Press, 2024), 16–17.

work. However, as Pugh shows, we can easily misunderstand the importance of connective labor if we focus only on its *direct instrumental value*—that is, the way it encourages students to learn, clients to open up to therapists, patients to stick to a medical treatment plan, or customers to consider a product. Connection matters for deeper and more intrinsic reasons (for example, mutual understanding, or a mutual affirmation of purpose or shared dignity). Moreover, a narrow focus on connection's instrumental value makes it easier to treat such connection as a commodity to be bought and sold and that employers can seek to maximize for profit, leading to the degradation of connection and a greater willingness to automate it.[17] As we see here, our search for a clearer affirmation of distinctively human work—and our preparation of students for such work—needs an equally clear sense of its meaning and value if we hope to keep AI clearly in service to a rich human life.

This need is a key reason why teachers should redouble and refresh their shared reflection on the intrinsic worth of their daily work. The possibility of AI offloading calls into question the value of tasks they have long taken for granted, but which a deeper evaluation *could* reveal are in fact more significant and worthwhile. Even when that evaluation reveals that these tasks are just as marginal or unimportant as was previously thought, the process of asking these questions remains a wonderful opportunity. Teachers can emerge with a more precise sense of why their work matters and how the goodness of this work needs protection in an AI-influenced society. Teachers could then ask how this deeper understanding could be communicated to students in implicit or explicit ways. Doing so would help expand students' ability to wonder about and protect the goods inherent in *their* future work.

### *A Focus on Careers and Instrumental Solutions*

Questions about the full worth of our work lead us back to a more general problem: current discourse about education, labor, and AI technologies is

[17] Pugh, *The Last Human Job*, 38–53 and 161–200.

happening in a context where career success and instrumental solutions to social problems command our primary attention. As discussed in chapter 3, instrumental reasoning focuses narrowly on the pursuit of material abundance, avoids sorting out the true goals that should orient our action, and thus ends up setting up efficiency (including the efficient accumulation of wealth or other resources) as the only goal that really matters. When instrumental reasoning sets the terms in which we understand the value of what we do, the intrinsic goods of both education and labor, along with a more robust sense of the common good, are persistently marginalized. The reasons for this trend are complex, including not only the technocratic paradigm's insistence on maximizing efficiency in service to utility and security,[18] but also a cultural pluralism in which multiple robust conceptions of the good must at times compete with one another, leaving career success and instrumental solutions the only goals we seem able to agree upon publicly as the purpose of education.[19] The expressions of this trend are also diverse and continue to evolve—including, for example, various forms of "accelerationism," that is, an insistence upon the dogged and risk-open pursuit of technological development for the sake of instrumental goods (and a corresponding antipathy to slow discernment, substantive regulatory frameworks, and sometimes even democratic practices).[20] Especially relevant to this project is how these cultural trends set the priorities with which we approach education and thus also education technology. Now, more than ever, Catholic education communities must strengthen and deepen a language and set of practices that can keep integral human development as a clear and consistent priority over merely instrumental success.

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[18] Francis, *Laudato Si'*, §105.

[19] Joseph E. Davis, "The Basis of Everything: The Fragility of Character in a Truth-Challenged World," *The Hedgehog Review* 26, no. 1 (2024), hedgehogreview.com/issues/missing-character/articles/the-basis-of-everything.

[20] For a good introduction, see Andy Beckett, "Accelerationism: How a Fringe Philosophy Predicted the World We're Living In," *The Guardian*, May 11, 2017, theguardian.com/world/2017/may/11/accelerationism-how-a-fringe-philosophy-predicted-the-future-we-live-in.

These examples indicate how AI technologies push us to reflect on the nature of labor in a number of important directions. We encourage readers to make these questions their own and to seek to resolve them precisely as educators. In the remainder of this chapter, we model for teachers two tasks we think will be particularly fruitful in this ongoing reflection: identifying key foundations in the tradition for a deeper theology of work, and seeking a deeper account of the intrinsic worth of a teacher's daily work.

## Work as a Personal Act

One good start toward a Catholic response to such questions is to reclaim a richer vocabulary for labor. Here we can build on important distinctions introduced in chapter 2. We can speak of labor as *toil* insofar as it involves a burden of pain, fruitlessness, or strife with creation that Genesis identifies as a consequence of sin (Gen 3:17–19). We can talk about *jobs* or *careers* as the social arrangements by which, in modern conditions, we procure a stable income (often along with various social goods and opportunities for self-development). Sometimes we use the word *work* in this sense, too, as, for example, Pieper does to speak of activities we do for the sake of something *else*, usually to sort out our material existence and satisfy our bodily needs.[21] But as with our earlier example of manual labor, we often also speak of work as having intrinsic meaning or as a service to the common good. The language of a *vocation* (a call) brings these last ideas more deeply into the language of faith and especially of divine providence. It identifies specific kinds of work as part of our unique and total vocation to perfect ourselves and anticipate God's reign.[22]

These different things frequently do not overlap (for example, when we struggle to put our gifts in service to others because we have not found a

[21] Pieper, *Leisure*, 38–40, 59–63.

[22] Second Vatican Council, *Gaudium et Spes*, §§35, 39. For a more extensive introduction to how Catholic understandings of work relate to many of the problems discussed above, see Ward, *Making a Life,* especially 1–40.

way to be remunerated for it). Or they can overlap in ways that hinder people's integral flourishing (for example, when managers weaponize the language of vocation or meaningful work to exploit their employees). Catholicism can help us identify what is at stake in these terms and coordinate them fruitfully in our pursuit of justice and shared integral flourishing. This is partly a matter of prioritizing *vocation* but also about articulating the intrinsic value of good *work* and seeking labor justice on those terms. Here too, then, Catholic educators are in an important position to help their students seek good work.

To present an example of this, let us consider a key landmark in Catholicism's engagement with the question of labor: Pope Saint John Paul II's encyclical *Laborem Exercens*. What can we gather from this document, and how may it further illuminate the work of teachers or the process of preparing students for good work? John Paul II describes human work not only as that activity which differentiates humans from other animals but also as an essential condition that offers human beings the unique opportunity to participate "in the activity of God," as Creator.[23] The encyclical provides both an anthropological and a theological account of work that underscores human labor as an activity essential to our wellbeing according to our nature as material and spiritual beings. "Work is one of the characteristics that distinguish man from the rest of creatures," John Paul II writes, for only human beings are capable of work in the sense of an intentional and ongoing activity (or range of activities) in which we transform the natural world to provide for our needs and subsistence.[24] Through work, we not only provide our daily bread but also transform the human experience and the natural, visible world through scientific, cultural, technological, and intellectual progress. From the very first pages of Genesis and by observing the political, cultural, and economic history of human civilizations, it is evident that "work is a

[23] John Paul II, *Laborem Exercens*, §26.
[24] John Paul II, *Laborem Exercens*, §1.

fundamental dimension of human existence on earth."[25] We are not simply condemned to toil for our basic needs because of original sin. Through work, we are able to participate in the image and likeness of God by subduing—that is, stewarding—the earth. In carrying out this mandate, we reflect the actions of God the Creator.

John Paul II makes an important distinction between work in the subjective sense (the subject who performs the labor) and work in the objective sense (that born of the work performed). Work in the objective sense refers primarily to the products of our labor, whether those be agricultural, industrial, intellectual, or service products. Work in the objective sense focuses on the output and effects of human labor. Work in the subjective sense refers to the fact that work is a rational, intentional process of an agent who engages in a range of activities as a means of realizing one's essential nature and dignity: "as a person he works, he performs various actions belonging to the work process; independently of their objective content, these actions must all serve to realize his humanity, to fulfill the calling to be a person that is his by reason of his very humanity."[26] Work is intimately tied to our calling as beings made in God's image. Through work, we exercise responsibility for creation by manifesting our rational, creative selves; we are fully conscious and free when we carry out human work, and in deciding about and for ourselves, we become fully autonomous.

Technology occupies an interesting position between work in the subjective and objective sense in that it is the product of work in the objective sense but can also mediate between the human worker and the material world in the subjective sense. It is a product of our labor that then becomes an instrument of work and in this sense becomes human beings' "ally" by perfecting, augmenting, accelerating, and improving our work. Technology, however, becomes our "enemy" when it supplants us in our work, when it takes away "all personal satisfaction and the incentive to

[25] John Paul II, *Laborem Exercens*, §5.
[26] John Paul II, *Laborem Exercens*, §8.

creativity and responsibility, when it deprives many workers of their previous employment, or when, through exalting the machine, it reduces man to the status of its slave."[27]

This disruption by technology is possible only when we forget that it is work in the subjective sense that bestows value and worth on labor *as* labor. In other words, work takes on value because it is essentially an expression of our human subjectivity and dignity. The value of work is not to be found in the product or work in the objective sense, but in the fact that it is being carried out by a person. An important conclusion of this truth is that "however true it may be that man is destined for work and called to it, in the first place work is 'for man' and not man 'for work.'"[28] Humans are the source of the value and purpose of work; we are not merely means of production.

*Laborem Exercens* points out that the error of the modern age, or what are referred to as trends of *materialistic and economistic* thought, is to obscure or invert this right order of value and to confuse the worth of labor with its production value, or work in the objective sense. The error of capitalism is to reduce humans to a means of production and to elevate capital over labor, whereas the Church has always prioritized the value of labor over capital.[29] Work is essential and good because human dignity requires work; one therefore has a right to work, to a just wage, and to humane and safe conditions. Work is not only good in the sense that it is useful or something to enjoy; it is also good as something that "corresponds to man's dignity, that expresses this dignity, and that increases it . . . Work is a good thing because through work people . . . achieve fulfillment as human beings. Through work, each of us 'becomes more a human being'."[30]

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[27] John Paul II, *Laborem Exercens*, §7.
[28] John Paul II, *Laborem Exercens*, §9.
[29] John Paul II, *Laborem Exercens*, §16.
[30] John Paul II, *Laborem Exercens*, §14.

Work can also make possible the foundations for a family, which is a natural right. Work is necessary for family life because a family requires a means for subsistence, which humans secure through work. Additionally, as the primary means for education and human development, the family also requires industriousness and work. Work is essential to the family because "the family is simultaneously a community made possible by work and the first school of work, within the home, for every person."[31]

Work also has value by virtue of contributing to the common good, to one's community, and "to the heritage of the whole human family" through advances in culture and civilization.[32] In this sense, humans must work not only because God commands it but because they have obligations to others to build upon what was given to them and to contribute to the common good and future generations.

In these ways, work is bound to the natural end or purpose of human beings—our dignity and our essential physical nature. However, work also has a theological significance related to human beings' spiritual ends. These ends have to do with what John Paul II refers to as the "Gospel of Work." Although humanity is condemned in Genesis to toil to produce bread "by the sweat of our face" until death, by virtue of the Paschal Mystery of Jesus Christ, this toil has redemptive power: "By enduring the toil of work in union with Christ crucified for us, man in a way collaborates with the Son of God for the redemption of humanity."[33] Christ, the fully actualized human being, gives new (that is, redemptive) meaning to human labor; the toil of sin is transformed into a labor of love. Through work aimed at justice and the common good and because of Christ's sacrifice on the Cross, human beings can participate in God's plans for human salvation.

What can we gather from John Paul II's account with regard to the work of teachers or the future work of students? How might it apply to

[31] John Paul II, *Laborem Exercens*, §14.
[32] John Paul II, *Laborem Exercens*, §14.
[33] John Paul II, *Laborem Exercens*, §38.

the problems or questions we have identified in this chapter? Let us begin the conversation by exploring two thoughts:

First, John Paul II helps explain why self-efficacy in our tool use (and through our tools to our interaction with the world) is so important. We frequently lose self-efficacy when technology becomes our "enemy" by removing from our work "personal satisfaction and the incentive to creativity and responsibility."[34] Here, the pursuit of work's objective sense has taken priority over work in its subjective sense. When the self-efficacy and creativity of teachers and students are sidelined in favor of maximizing the demonstrable achievement of learning goals, teachers and students become appendages to a process focused only on generating a product, rather than members who collaborate toward integral learning through the free investment of their intelligence and personality.

Second, John Paul II helps us understand why teachers' personal presence to and relationships with students matter for reasons that go deeper than gains made in student learning. No doubt these frequently help with achieving learning outcomes. But to stop here would be to evaluate teachers' presence or relationship to students merely in terms of work's objective sense. John Paul II helps us notice a qualitatively deeper value in teachers' presence. That value lies in the gift that teachers make, the investment of their free and wise creativity, the very fact that free persons are putting themselves and their faculties in service to the self-development of others. This free, attentive, and prudent self-gift has intrinsic worth. It also models for students how to give a similar gift in their own work—both later in their careers and now in their school exercises. Teachers know already what a gift it is when students "show up" to their work with full attention and sincerity. This sincerity is not just valuable because it makes it easier to teach course content. Far more deeply than this, it matters because it is a personal gift. It transforms education from a mere exchange of goods (that is, skills and knowledge) by the occupants of a social role (teacher and student) into a fully reciprocal meeting of human

[34] John Paul II, *Laborem Exercens*, §7.

persons who share the joy of discovering reality and realizing themselves. This giving of gifts does not replace the value of learning skills and content; rather, it ennobles this layer of education and reframes it within the central human vocation, that is, to know and love God as the ultimate truth and goodness, and to know and love each other and the rest of creation into that same knowing-loving.

## The Educator as Worker

The preceding sections have sought to help teachers in two ways. First, they have aimed to equip them to become active participants in conversations about AI's impact on work and about education's role in preparing students for good work in an AI-influenced society. Second, they have sought to provoke teachers into deeper reflection about the meaning of their vocation *as work*, both because of the value of this self-awareness to teachers themselves and because it may help teachers to better model for their students a good posture toward their work.

We would like to close with one more proposal related to this second goal of deepening our conversation on the labor of teaching in an AI-dominated context. As we have seen, many AI applications to education involve offloading tasks previously done by teachers themselves onto the machine so that teachers can focus more time and attention on the most meaningful or fruitful teaching tasks. There is, of course, a real risk that the extra time gained by using these applications will be channeled in other directions that add more burdens (for example, performing more administrative duties that cannot themselves be outsourced easily to AI applications). Making sure that technology-powered efficiency gains are used well is itself part of a teacher's labor—and one that frequently requires from them a fair amount of courage and wisdom (not least when it comes to fruitfully advocating for adequate administrative support). However, even after we can assume these gains are redirected in the best of ways, there remains a question about whether the tradeoff itself was wise.

To know whether a task would be wise to hand off to a machine, we need a clear sense of its value—not just in its instrumental or "objective" sense (to return to John Paul II's language), but precisely as performed by a human. We may be tempted to think that mastery of a practice like teaching comes by default with a full grasp of how much each of its tasks is worth. But this is not necessarily the case. When the task is relatively "basic," associated with entry-level practitioners, and/or burdensome to perform, there is instead a risk that practitioners may carry on for much of their careers without thinking deeply about that task. Perhaps its relatively basic quality leads us to assume that it only has instrumental value. Or maybe the difficulty associated with its performance creates a constant sense of frustration while preventing us from noticing other ways in which it might be worthwhile. Hence, the possibility of AI outsourcing, and the reflection it provokes on whether such outsourcing is a good idea, offers us an opportunity to see the practice of teaching, and the goodness of its labor, more fully and deeply than before.

As an example of what such a "second glance" might look like, let us consider the task of grading. Grading student work is perhaps the most universally despised aspect of teaching. It fills large amounts of time (often outside of daytime work schedules) with repetitive labor requiring tedious attention, forces teachers to stare directly at their students' technical and moral faults, reminds teachers of how they could have better taught the material or framed the instructions, calls forward insecurities about their capacity to judge fairly, and comes with the potential anxiety of having to report a student for cheating. It is easy to see why many teachers find AI grading an appealing option that would open up their time to give themselves more of their best to their students (or their families). Perhaps sometimes AI grading *will* be a wise decision, but, to really make this judgment well, we have to give it its day in court. What can be said on grading's behalf beyond its mere instrumental value, that is, as a way of "producing" a reliable assessment of the student's learning? We will return

to this question again from the perspective of student learning (in chapter 7). Here, however, let us ponder it as part of the teacher's work.

Grading is—or at least it can be—an act of loving interpretation of students in their present concrete situation as persons called to seek the truth, standing in a particular place along that journey, and burdened by limits, bad habits, or distractions. It is an academic mode of striving to see people exactly as they are. As a personal act, grading involves not simply judging the quality of student work but also making sense of students' mistakes and beginning to plan for a fruitful response. Even when some of this processing can be done well by machines (and not all of it might), we must still reckon with the worth of this personal act as a free sacrifice of attention given to the task of regarding another human being in his or her concrete conditions. Insofar as it reveals the teachers' own faults, grading also becomes not just an opportunity to see and understand one's own shortcomings but a particularly relentless and repetitive confrontation with those shortcomings in their various iterations across the students' different performances. The honesty and love called for here is intrinsically worthwhile. It is also deeply related to our ability to confess our sins and love our more inconvenient neighbors.

In other words, grading can be thought of, and in some sense already is, a meaningful spiritual practice. We might even call it the teacher's equivalent of washing another person's feet. Seeing it in this light may matter for many reasons—for example, helping to protect against burnout, which, as we explained above, has a lot to do with expecting the highest or central value of our work to lie in its *consequences* rather than in its *performance* (that is, its objective rather than its subjective sense). Of course, it may well be that some decisions to grade with AI will still be the wisest way for teachers to integrate their various goals. But to say that these choices were wise, they must be seen truthfully as choices to cease engaging a particular practice in a certain context—which is also to say one is choosing not to practice certain skills in favor of practicing others. This kind of truthfulness in our tool use is part of the model of virtuous work that we can give to students.

## Conclusion

We have explored the question of how to evaluate AI applications as potential aids to the labor of teaching, and how the labor of teaching as a way to model and, at times, discuss comprehensive answers to the labor questions that our students will have to confront in the time of AI technologies. But what about AI as a potential aid to the student's learning process? Addressing this question will involve bringing all of the foregoing to bear on the question of what it means to teach for students' integral development. The next chapter will do just this, in order to offer us deeper philosophical foundations upon which to practice teaching according to the way of the gardener. The following chapter will apply this approach to a number of concrete questions that frequently arise concerning AI technologies in education.

# CHAPTER 6

# PHILOSOPHICAL FOUNDATIONS FOR THE WAY OF THE GARDENER IN EDUCATION

AI technologies shape not only the world in which we live, work, and learn but shape the way we grasp the reality of that world and interact with one another in it. Given the nature of what AI technologies are and what education is, to what extent are there uses or deployments of these technologies that are actually appropriate for and conducive to cultivating human learning and development? What does it mean to build, deploy, and use AI technologies in ways that are conducive to the integral development and formation of the human person in a technocratic world? How do we begin to move towards a richer account of morally responsible AI in the sphere of education?

To many, especially those building and selling these technologies, AI is a panacea. It promises to heal social and economic inequality through administering personalized learning and job training to each and every person. Modern life and contemporary education often impel educators to employ new technologies portrayed in this light without sufficient time for discernment and sometimes even without the right to refusal. The Catholic tradition on education and technology points to a thoughtful engagement that resists simplistic dichotomies that condemn innovation or overly celebrate it. Pope Francis's final monthly meditation offers wise counsel on how to proceed: "Let us pray that the use of the new

technologies will not replace human relationships, will respect the dignity of the person, and will help us face the crises of our times."[1]

This sixth and penultimate chapter sets out philosophical foundations upon which to ground prudential judgments about education and AI technologies when discerning what developments, deployments, and uses of AI are conducive to the ends of learning, teaching, and integral human development as a whole. The first part of this chapter reframes the ethical discourse concerning AI technologies and education away from overly simplistic optimistic narratives about how AI will solve all of humanity's ills or overly simplistic pessimistic narratives about how it will be the source of humanity's ultimate downfall. Instead, we seek to reframe the discourse around the heart and the human person. The second part of this chapter proposes an integral approach to AI and education that serves integral human development by attending to the personal and social dimensions of the human being and to the cultivation of her right relationship with reality and the world. This chapter concludes with six essential features education and educational technology must have to serve integral human development.

## Catholic Technology Teaching on AI and Education

Given the long and studied tradition of Catholic teaching regarding technology and labor in the modern era, our contemporary situation concerning education in the age of AI compels us to ask: Are today's AI tools designed and configured for the flourishing of communities with varied interests and of varied cultural contexts? Or does their anonymity as tools of "technological progress" serve the interests of the powerful while subverting the communities and ethical claims of others—of the vulnerable and the marginalized? Might the technocratic paradigm even deceive us into thinking that anonymous AI systems represent the common good? Might the efficiency and convenience promised by AI

[1] See "The Pope's Monthly Intentions for 2026," United States Conference of Catholic Bishops, usccb.org/prayers/popes-monthly-intentions-2026.

systems create dependencies and deskilling that benefit some to the detriment of others—specifically, to the detriment of those who have the least power in social institutions? Once again, these moral hazards extend to other technologies, beyond AI. Yet Catholic social teaching urges us to think *critically* about how people—ourselves and others—imagine and use these tools. Who benefits? Who is left out? How do these tools contribute to shared flourishing? And when do they fail to do so?

In his June 2024 address to the G7, Pope Francis set the groundwork for thinking through these important questions when he raised concerns about AI's potential to undermine not only the *content* and institutional *structure* of education but the very *activity* of learning itself. AI technologies do not simply have the potential to impact education negatively. They also have the potential to disrupt or subvert education in its most fundamental purpose and meaning. Francis draws attention to the fact that AI "not only runs the risk of legitimizing fake news and strengthening a dominant culture's advantage, but, in short, it also undermines the educational process itself" because "it rearranges existing content, helping to consolidate it, often without checking whether it contains errors or preconceptions."[2] Because of the way AI systems reinforce already dominant information regardless of its veracity, reduce knowledge of reality to formalized mathematical terms,[3] and inhibit

[2] Francis, "Address of His Holiness Pope Francis to the G7 Session," vatican.va/content/francesco/en/speeches/2024/june/documents/20240614-g7-intelligenza-artificiale.html.

[3] For a helpful introductory discussion of the modern mathematization of nature, see Jacob Klein, "Modern Rationalism," in *Lectures and Essays*, ed. Robert B. Williamson and Elliot Zuckerman (St. John's College Press, 1985). Klein explains "As the Greeks put it, we receive the world in our mind by means of the *logos*. *Logos* comes from *legein*, which means 'to speak.' By speaking we do not mean merely the pronunciation of a conglomeration of words, but the telling of something to someone. The literal and correct Latin translation of *logos* is *ratio,* which implies that speaking about a thing is understanding it, although the understanding may not be perfectly clear. . . . *Modern* thought issues not from the understanding of man through speech but from the idea of a universal science, the *mathesis universalis* . . . to a general mathematical science which does not apply to numbers or figures or anything else but to relationships and proportions between mathematical objects in general. . . . The general doctrine

"authentic reflection," AI has the capacity to "limit our worldview to realities expressible in numbers and enclosed in predetermined categories, thereby excluding the contribution of other forms of truth and imposing uniform anthropological, socio-economic and cultural models."[4]

Here Francis is warning that AI can exacerbate the drive within technocracy to expand the "undifferentiated and one-dimensional paradigm"[5] of a globalized economy that "has a levelling effect on cultures, diminishing the rich variety that is the heritage of all humanity."[6] This is not disconnected from the challenge of the current ecological crisis. A one-size-fits-all solution cannot help humans achieve the common good as it exists in diverse ecosystems around the world. There is the threat that AI might perpetuate the tendency within the globalized economy to reduce reality to what can be captured by a single perspective; that is, to that which can be captured by instrumental reasoning via statistical analysis. Thus, AI might serve as a hindrance to a genuine ecological education. Francis urged that education should not take a colonizing shape, but instead be made "to cultivate without uprooting, to foster growth without weakening identity, to be supportive without being invasive."[7] We must therefore ask ourselves: In what ways might the implementation of AI in education further the levelling effect of the contemporary globalized economy? This question is especially significant as the ecological effects of AI technologies become more apparent. Can AI technologies be integrated well into an authentic vision of education if they play a fundamental role in the environmental injustice disproportionately suffered by the marginalized and vulnerable? Francis further connects these specific concerns about AI and education to a more foundational concern that "at a time when

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of proportions became identical with the general theory of equations [and algebra] . . . the idea of the universal science in the form of algebra . . . develops ultimately into the system of our mathematical physics" (58–59).

[4] Francis, "Address of His Holiness Pope Francis to the G7 Session."

[5] Francis, *Laudato Si'*, §106.

[6] Francis, *Laudato Si'*, §144.

[7] Francis, *Querida Amazonia*, §28.

artificial intelligence programs are examining human beings and their actions, it is precisely the *ethos* concerning the understanding of the value and dignity of the human person that is most at risk in the implementation and development of these systems."[8]

In *Magnifica Humanitas*, Pope Leo XIV articulates similar concerns about the risk AI technologies pose to the human person. While technology "has the power to heal, connect, educate and protect our common home," it also has the power to "divide, exclude and generate new forms of injustice."[9] When the human person is treated not as a gift with a unique vocation ordered to salvation history, but as "something to be perfected or surpassed, it becomes easier to accept that some lives are less useful, less desirable or less worthy."[10] It becomes easier and more likely to justify "in the name of progress, 'necessary sacrifices'" or to place "the burden on the most vulnerable in pursuit of a supposed optimization of the species."[11] Safeguarding humanity is, therefore, measured "by the care it is able to offer, by its ability to recognize the other as a face not merely as a function" and consists in our "ability to care for one another" which is "a fundamental dimension of our humanity, one that is learned and mastered through lived experience."[12]

According to *Magnifica Humanitas*, an *integral education* recognizes that teaching and learning require "patience" and "time for development and for engagement with reality beyond appearances."[13] It further emphasizes education as a site for encounter with reality and as a journey that the human person rightfully acquires over time. Since the truth is a common good, families and schools have an indispensable role to play in the age of AI. It is from this vantage point that an integral education seeks to "protect our young people from the promise of the perfect machine,

[8] Francis, "Address of His Holiness Pope Francis to the G7 Session."
[9] Leo XIV, *Magnifica Humanitas*, §9.
[10] Leo XIV, *Magnifica Humanitas*, §117.
[11] Leo XIV, *Magnifica Humanitas*, §117.
[12] Leo XIV, *Magnifica Humanitas*, §114.
[13] Leo XIV, *Magnifica Humanitas*, §140.

from that subtle temptation which renders human thought seemingly superfluous precisely when it is most needed."[14] We live in a time "when truth is often distorted in order to serve particular interests and communication strategies" and source verification is becoming increasingly difficult.[15] Truth is a common good that must be protected because the truth is "the living standard for guiding concrete choices, inspiring paths of personal and communal conversion, promoting structural reforms and supporting new forms of evangelical witness in public life."[16] Concerning learning in particular, the more knowledge is fragmented, the more difficult it is "to grasp reality as a whole, to ask profound questions about meaning, or to develop authentic, critical and creative thought."[17]

AI technologies, if not properly understood and contextualized, can inadvertently give students a distorted view of both the purpose of education and how learning works. "*Every technology shapes those who use it*."[18] Therefore, families, teachers, and administrators need to have a clear and robust understanding of how the AI technologies they give to or adopt for students will shape them. Some types of shaping might be good and conducive to the ends of integral education. Some types of shaping might be harmful and destructive to the ends of integral education. Families, teachers, and administrators need to be aware of the fact that "educating people about the use of AI, then, involves teaching them to decide when and for what purpose it ought *not* to be used."[19] Families, teachers, and administrators, moreover, need to be aware of the fact that ethically evaluating AI technologies cannot be reduced to whether the tool is used well or poorly. It must consider the technology itself. AI technologies, especially those being designed or adopted for education, require a critical, measured evaluation of their operations and outputs, their view of the

[14] Leo XIV, *Magnifica Humanitas*, §140.
[15] Leo XIV, *Magnifica Humanitas*, §139.
[16] Leo XIV, *Magnifica Humanitas*, §22.
[17] Leo XIV, *Magnifica Humanitas*, §146.
[18] Leo XIV, *Magnifica Humanitas*, §140, emphasis added.
[19] Leo XIV, *Magnifica Humanitas*, §140.

nature of the human person, their understanding of teaching and learning, and their inclusivity (or lack thereof) of the vulnerable.

*Magnifica Humanitas* names some specific difficulties surrounding education in the time of AI. For instance, many AI applications promote "a culture of immediacy and hyper-stimulation, which gives rise to fatigue, boredom and apathy concerning the effort required for seeking the truth."[20] This harks back to concerns the encyclical raised about the ease with which one acquires results with AI technologies as well as their false appearance of neutrality and objectivity. The advent and growth of AI technologies are occurring within a digital context in which many families and schools are already struggling to manage adolescent engagement with the digital world and electronic devices. Much can be gleaned from what is now well known about how "having a personal mobile device at too early an age and using it without adult supervision can exacerbate young people's vulnerabilities, foster addiction and expose them to isolation, bullying and cyberbullying, as well as to pressures to share intimate images or sensitive information."[21] Again, teaching people to use AI well involves teaching them to recognize circumstances or purposes for which it ought *not* to be used. The task of integral education and protecting children from harmful applications of AI tools are not simply the tasks of families and educational institutions but necessitate a communal effort that includes "far-sighted public policies . . . to oppose the immediate interests of platforms . . . when they conflict with the wellbeing of minors."[22]

## Reframing the Discourse: Restoring the Heart to the Center of Education

We follow Leo XIV, Francis, and *Antiqua et Nova* in asserting that a morally responsible and integral approach to AI and education must be founded in the *heart*, promote the supreme value and dignity of the

[20] Leo XIV, *Magnifica Humanitas*, §141.
[21] Leo XIV, *Magnifica Humanitas*, §141.
[22] Leo XIV, *Magnifica Humanitas*, §140.

human person, and be in service to the vocational unfolding and fulfillment of all human persons in time and beyond time. On occasion, Francis uses the word "liquid" to describe our fallen, technocratic world. When he does this, he is referring to the way the world in which we find ourselves causes many of us to feel "confused and torn apart, almost bereft of an inner principle that can create unity and harmony in [our] lives and actions."[23] Rather than finding ourselves in societies that show up to us as stable, disclosive of meaning, and filled with deep friendships and love, many of us instead "find ourselves immersed in societies of serial consumers who live from day to day, dominated by the hectic pace and bombarded by technology, lacking in the patience needed to engage in the processes that an interior life by its very nature requires."[24] What feels most real, enduring, and valuable to many of us *is* our momentary consumption and unfulfilling instrumentalization of the things of experience. There is an enticement within consumerism to reduce all value to use-value. In this unstable or liquid world, desire gives birth to ever further desire as the self that bears such recurrent desires shapeshifts constantly, never stopping to inquire into more substantive ends. Instrumental reasoning becomes the only reasoning when one imagines that there are no other ends beyond the satisfaction of immediate interests. In this way, the deepest longings of the heart remain unattended to—those longings which serve as signposts toward a peace that surpasses understanding. This inattentiveness is exacerbated within an individualistic and meritocratic understanding of society. While rewards based on merit might be legitimate in specific instances, the notion of competition must be balanced with that of cooperation, and historical inequities must not be ignored. But in a liquid world, very few tools are available for promoting a cooperation oriented to more than instrumentally determined ends and for approaching a reconciliation that addresses the present as shaped by past injustice. How might we answer Francis's call to restore the heart to the center of education

[23] Francis, *Dilexit Nos,* §9.
[24] Francis, *Dilexit Nos*, §9.

and integral human development in a world heavily influenced by AI technologies?

Amid these conditions of daily life and this crisis of meaning, turning to the heart leads us to what is most authentic and real in us since love is "the inmost core of reality"[25] and the heart is "entirely 'who we are.'"[26] Founding an integral approach to AI and education in the heart grounds our ethical thinking in the most sacred and illuminating reality. Without this reality and under the liquid conditions of modern society, "people risk losing their centre, the centre of their very selves."[27] The "unique power of the heart" is that it "helps us to understand why, when we grasp a reality with our heart, we know it better and more fully" than other things we might know or experience but that do not touch us in the depths of our soul and at the core of our being.[28]

*Antiqua et Nova* reminds us that "an essential part of education is forming 'the intellect to reason well in all matters, to reach out towards truth, and to grasp it,' while helping the 'language of the head' to grow harmoniously with the 'language of the heart' and the 'language of the hands.'"[29] Intelligence is a gift, and this gift is a core component of being made in the image of God that encompasses the whole person as a psychological and embodied unity.[30] This is true of all persons. It is true of "persons with disabilities, injured persons, immature persons," and elderly

[25] Francis, *Dilexit Nos*, §16.

[26] Francis, *Dilexit Nos*, §5.

[27] Francis, *Dilexit Nos*, §9.

[28] Francis, *Dilexit Nos*, §16.

[29] Dicastery of the Doctrine for the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §81. See also Francis, "Meeting with the Students of the Barbarigo College of Padua in the 100th Year of Its Foundation," March 24, 2019, vatican.va/content/francesco/it/speeches/2019/march/documents/papa-francesco_20190323_istituto-barbarigo.html; Francis, "Address to Rectors, Professors, Students and Staff of the Roman Pontifical Universities and Institutions," February 25, 2023, vatican.va/content/francesco/en/speeches/2023/february/documents/20230225-univ-pontificieromane.html.

[30] For further discussion on reason and intellect as it relates to questions of disability ethics, see AI Research Group, *Encountering Artificial Intelligence*, 55, note 54.

persons, all of whom are gifted with intelligence and have "the apprehensive power of *intellectus*" even when the operation of "explicit reasoning (*ratio*)" might be inhibited in some respect.[31] Because of this, all persons are able to "respond spiritually to God's gifts in a fully human way," even if some do so "in a manner hidden from full outward expression or explicit engagement with other created persons."[32] For St. Thomas Aquinas, our intelligence is a gift in the sense that we are *given* to ourselves as a participation in the divine mind. Our ability to understand the world around us is an ability to grow in familiarity with the ultimate cause of that world. To discover in wonder and awe the beautiful intelligibility of our cosmos is to head further and further into the infinite Source of all things that eternally knows and loves everything into existence.

We are open to the cosmos around us insofar as our wonder is a participation in God, a reaching towards divine Truth. The limitless human potential to ask questions is a finite reflection of the infinity of God. Those who have experienced a child's incessant "Why?" know this by experience! Moreover, it is only because we wonder, only because the beauty of truth beckons us to expand our horizons and because we are the sort of creatures sensitive to beauty's call, that we engage in inquiry and so grow in understanding. This sensitivity is properly named love. Thus, our mind gives birth to understanding only under the impetus of wonder and in the direction of our love. In this way, the life of the mind and the life of desire and affect (the life of the heart) coincide and, therefore, are not two but one. In turn, this reflects the mutual co-inherence among the Persons of the Trinity—the Spirit as the Love shared by Father and Son. Francis's attentiveness to the heart as a core component of the human being that has been forgotten in our times is, therefore, a reclamation of a venerable

[31] AI Research Group, *Encountering Artificial Intelligence*, 55, note 54. See also Miguel Romero, "The Happiness of 'Those Who Lack the Use of Reason,'" *The Thomist: A Speculative Quarterly* 80, no. 1 (2016): 56–57, doi.org/10.1353/tho.2016.0003.

[32] AI Research Group, *Encountering Artificial Intelligence,* 55, note 54. See also Miguel Romero, "The Happiness of 'Those Who Lack the Use of Reason,'" 64.

tradition of reflection on how we image the Blessed Trinity in our wonder and love.

Aquinas, furthermore, holds that our understanding follows upon our wonder not in an automatic or unconscious fashion, but in a conscious and knowing fashion.[33] When we understand, we know *why* we understand; that is, we know in what sense our understanding is a genuine response to our own questioning. Indeed, it is only because we know in what way our understanding responds to our own questioning that we can give expression to what we have understood. For this reason, every teacher knows that the expression of what the student has understood is an essential element of genuine learning. Our understanding does not, therefore, proceed according to fixed laws that we passively follow and cannot understand or explain—as if we were machines whose operations are determined extrinsically by the laws of electromagnetism. Instead, our understanding proceeds according to our own intellectual agency, insofar as we have consciously grasped the sufficiency of an explanation or of evidence.

Think of a moment when you understood something basic, perhaps what a circle is. Here is not meant recognizing certain shapes as circles but the understanding of what makes a circle a circle. When you came to understand what a circle is, you did so not by following some recipe or formula. Instead, you followed your own desire to understand, not yet knowing which formula would properly express what a circle is. Moreover, when you came to understand what a circle is, you were aware of the sufficiency of the explanation that you had grasped—a perfect curve is formed when all points are the same distance from a center. Instead of merely following a rule to identify a circle as a circle, you arrived at an understanding of *why* a circle is a circle through your own intellectual agency. We have the ability to consciously grasp the sufficiency of an

[33] This claim and what follows is inspired by Bernard Lonergan's interpretation of Thomas Aquinas' trinitarian theology. See especially, Bernard Lonergan, *Verbum: Word and Idea in Aquinas* (University of Toronto Press, 2014), 46–59.

explanation or evidence precisely because our intellect is a participation in—a reflection of a desire for—the divine Truth. In other words, just as God lacks extrinsic determination because God is intrinsically the cause of all things and caused by nothing, we are a partial likeness of God in that our intellectual life arises from and is shaped by a reality interior to it: our innate desire for truth and our ability to understand in a conscious and knowing fashion.

The mind in a liquid world is inattentive to this fact about itself. This inattentiveness opens one up to the evacuation of the self; for it is the attentive self that *knows* itself to be in search of the truth—to be dissatisfied with a lack of sufficient explanation or evidence. Again, it is the self-aware person who refuses to outsource understanding and judgment and decision. But to refuse this outsourcing is to recognize oneself as intrinsically oriented to Truth. To misrecognize oneself as intelligent leads to a self that, like liquid, is intrinsically shapeless and so takes the shape of the moment's passion or of the contours of one's sociocultural context. Education, therefore, ought to be ordered to the cultivation of familiarity with one's intelligence as a participation in Truth—the capacity to feel and to understand and to judge according to one's own agency through the impetus of one's own wonder and love and their implications for what constitutes human flourishing.[34]

Precisely because the wisdom of the heart does not proceed from intelligence automatically and in an unconscious fashion, true education

[34] Those without the capacity to understand and to judge what a circle is—to use the example given above—reflect the divine according to their own capacities. For no matter one's capacities, wonder and love are self-transcending orientations that participate in God. In turn, it is important to note that wonder and love are given full expression in the life of the human only in the context of loving relationships that reflect divine love. In this sense, though we each individually wonder and love, it must also be affirmed that wonder and love are irreducibly relational in their actualization. We humans feel comfortable enough to give full expression to our wonder and love only when we feel secure in our belonging to one another. As such, the human life of wonder and love, and how we belong to one another in our wondering and loving, reflects the divine Persons of the Trinity insofar as the Persons belong to one another essentially.

is the opposite of a mechanical task. For this reason, the critique of the behaviorist interpretation of education presented in chapter 2 of this volume is incredibly pressing. Genuine learning is necessarily an intrinsically motivated cognitive process. Extrinsic rewards might provide a context in which wonder is stoked, but they cannot replace wonder. In turn, teaching must be understood as an invitation for the student to answer the call of their own wonder rather than as a process of conditioning that results in discrete behavioral habits. For, while the latter understanding of teaching is unconcerned with the difference between rote learning and genuine understanding, this distinction makes all the difference for the former understanding of teaching. We follow Aquinas by affirming that genuine understanding is an interior reality of which the student is aware and which can bring joy precisely because of the intrinsic goodness of truth and its apprehension.

The implementation of AI technologies in education might inculcate an imaginative horizon in which students understand the process of learning as an approximation of extrinsic norms rather than as a growing familiarity with oneself as one who by nature pursues truths and, ultimately, Truth Itself. We must ensure that education invites students to know themselves according to their own intellectual light, so that they might grow in sensitivity to their own internal impetus toward truth, their own orientation to the divine. Otherwise, we will allow education to be shaped in such a way that the image of God is present but obfuscated in the minds of students. And such obfuscation will inevitably lead to larger social and cultural abuses which do not respect the dignity of the human person as a source of meaning and healing in a world much in need of both.

Moreover, the development of human cognitive capabilities is not merely a matter of the cultivation of facility with intellectual tasks. For such cultivation requires that one feel at home with oneself. In other words, one will wonder to the extent that one feels confident in one's ability to respond adequately to one's wonder. Students therefore must be given the opportunity to feel that they are neither alone in the journey of

learning nor being stifled by overbearing control. In this way, many would affirm that filling the classroom with technology does not solve the problem of teacher shortages. Teachers do more than impart information or provide guidance; that is, teachers build relationships in and through which students feel comfortable taking possession of their own intellectual agency. Our wonder can be given full expression when we feel confident that we are fundamentally worthwhile because we know we are loved. The heart of education is personal encounter because the goal of education is the integral development of the human being.

## Foundations for Integral Education in the Age of AI: The Personal, the Social, and the Real

The Catholic intellectual and moral tradition provides us with resources needed to develop a fuller understanding of artificial intelligence and its proper relation to human persons. The philosophical anthropology and understanding of human flourishing it articulates remind us that human beings are not only rational, but social, cultural, economic, emotional, spiritual, physical, and interconnected beings, whose welfare and flourishing require a comprehensive and integrated approach to exercising and satisfying all these dimensions. Human dignity requires the full development of each and every person according to her complete nature. *Integral human development* can be a corrective to reductive tendencies and provides us with a wide array of conceptual resources and a more complete understanding of personhood, intelligence, and ethics that can supplement extant work in the ethics of AI.

The safe, ethical, and morally responsible development, deployment, and use of AI in education must be founded in the heart and devoted to serving the dignity of the human person and human communities. In what does an integral approach to education and technology—founded in the wisdom of the heart and in service to integral human development—consist? Integral human development insists on personal as well as social development: "To be authentic [the development of persons] must be

well-rounded; it must foster the development of each [person] and of the whole [person]."[35] In order for this to occur, an integral approach must help cultivate the personal and social dimensions of the human person as well as enrich her right relationship and responsiveness to reality. This section details what an integral approach to AI technologies and their use in education would require in each of these three domains.

### *The Person in an Integral Approach to Technology and Education*

The term **"person"** in the title of this section is meant to indicate the Catholic theological anthropology that teaches that human beings are not isolated individuals but gifts made in the image and likeness of a Triune God. God's ownmost being and interior life reveal to us the true and perfect meaning of being a person. The Most Holy Trinity forms "a unique and absolute unity" of fully illumined mutual self-gift.[36] The three divine Persons *are* their relations to one another since God *is* love and "the reciprocal transparency among the divine Persons is total and the bond between each of them complete."[37] As such, God reveals to us that the highest and most perfect expression of being a person is not being an *I* but being a *we.* To be a *we* in this perfect sense is to be the complete unity of an *I* and a *Thou*.[38] To be a *person* is, therefore, to be the kind of being who is essentially relational and free in her responses to reality, including her extension or reception of the total gift of self.[39]

*Human* persons are distinct from divine or angelic persons insofar as

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[35] Paul VI, *Populorum Progressio*, §14.

[36] Congregation for Catholic Education, *Educating to Intercultural Dialogue in Catholic Schools*, §37.

[37] Benedict XVI, *Caritas in Veritate*, §54. See also Congregation for Catholic Education, *Educating for Intercultural Dialogue in Catholic Schools*, §37.

[38] Edith Stein, *Finite and Eternal Being: An Attempt to Ascend to the Meaning of Being*, trans. Walter Redmond (ICS Publications, 2023), 281–282. Cf. AI Research Group, *Encountering Artificial Intelligence*, 56.

[39] Congregation for Catholic Education, *Educating to Intercultural Dialogue in Catholic Schools*, §34. For a more extensive discussion of the meaning and history of the term "person" see AI Research Group, *Encountering Artificial Intelligence*, 43–68.

they are temporal and material. Human persons are embodied; they become themselves over time and come to know in steps. Human persons are not born into the world complete or with absolute knowledge but grow in wisdom and unfold (or not) the identity and vocation with which God has gifted them over the course of their lives. Like the seeds of a plant, they grow, develop, and bloom into themselves over time if properly cared for and tended to. St. Edith Stein explains that "just as an inner form resides in the seeds of plants, an invisible force making a fir tree shoot up here and a beech there, there is in this way an inner [form] set in human beings which urges the evolution into a certain direction and works towards a certain *gestalt* [form] in blind singleness of purpose, that of the personality which is mature, fully developed, and uniquely individual."[40]

This blind singleness of purpose is not antithetical to Aquinas's understanding of intellectual agency as conscious and knowing. We humans are given the task of consciously discerning our gifted identity, the "who" that God has eternally foreknown and so made us to be. This is a "who" that always already is because it is eternally willed by God, but which we must grow into historically. The Epistle to the Colossians puts this in the following way: "Your life is hidden with Christ in God. When Christ who is your life appears [is revealed], then you too will appear [be revealed] with him in glory" (Colossians 3:3–4.) In this sense, we discover rather than determine the basic meaning of our life because that meaning is defined by the will of God. Education is, therefore, not only a matter of growth in knowledge (*scientia*), but a process of growth in wisdom (*sapientia*) by which we become progressively more aware of and sensitive to our identity as eternally present to God in Christ. Wisdom in this sense is a familiarity with our life as a concrete, historical process created by and ordered to God. Thus does Stein direct our attention to the contemplative component of genuine education: to mature as a human is to develop the spiritual senses by which one recognizes oneself as one always is and cannot but be, alive to God in Christ (Romans 6:11). Simply put, genuine education

[40] Edith Stein, *Essays on Woman*, trans. Freda Mary Oben (ICS Publications, 2010), 130.

cultivates one's capacity to discern through one's own wonder and love, and in cooperation with grace, the will of God in and for one's life.

Education as the integral development of *the whole person*, therefore, regards both the body and spirit together. As such, education should aim to contribute to the person's holistic formation (intellectual, physical, spiritual, moral, cultural).[41] Since "the physical and spiritual faculties attain their proper development only by participating in activities suitable to them," it is necessary to train the body and senses as well as the intellect, will, and feelings or affect.[42] Just as the growth of a plant develops not solely from within but also by means of external influences, so too do the senses develop "through impressions which they receive and process," "the intellect through mental performance," "the will through achievements which are characteristic to it," and affect "through the variety of feelings, moods, and attitudes."[43]

Given this anthropology of the human person, education is "'never a mere process of passing on facts and intellectual skills'" but is the unfolding and formation of the whole embodied spiritual person.[44] The development and application of AI technologies to education are profoundly susceptible to problematic theories and methods for understanding the anthropology of education. Some of the most common anthropological misconceptions about education that could have disastrous effects if

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[41] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §77. Cf. Congregation for Catholic Education, *Instruction on the Use of Distance Learning in Ecclesiastical Universities and Faculties*, ducatio.va/content/dam/cec/Documenti/Insegnamento%20a%20distanza%20EN.pdf, §1; Second Vatican Council, *Gravissimum Educationis* §1; Francis, "Message for the XLIX World Day of Peace," January 1, 2016, vatican.va/content/francesco/en/messages/peace/documents/papa-francesco_20151208_messaggio-xlix-giornata-mondiale-pace-2016.html, §6.

[42] Stein, *Essays on Woman*, 209.

[43] Stein, *Essays on Woman*, 98.

[44] Dicastery of the Doctrine for the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §77. Cf. *Instruction on the Use of Distance Learning in Ecclesiastical Universities and Faculties*, I; Second Vatican Council, *Gravissimum Educationis* §1; Francis, "Message for the XLIX World Day of Peace," §6.

paired with AI are those that consider the human person to be a blank slate or an empty bucket to be filled with encyclopedic knowledge or "facts."

To treat human children as blank slates for facts to be imprinted upon or skill sets to be acquired misunderstands *what* the human person *is*. No person is born a blank slate. God creates each and every person as a being gifted not only with her own existence but with her own inherent and inalienable meaning and value. Each and every person is born into specific families, social relationships, cultures, and political attitudes that make them particularly sensitive to some values and less so to others. Education is about training the human person for the susceptibility of values such that she is "predisposed to love the beautiful, inspired by the morally exalted" and above all "open to the highest" earthly and transcendent values.[45] Information can also not be *imprinted* on the human mind. As Stein firmly reminds us, "Education is not an external possession of learning but rather the *gestalt* [form] which the human personality assumes under the influence of manifold external forces, i.e., the process of this formation."[46] Learning is not a passive activity. A true education is an active endeavor which the person must desire and realize in herself. Information that merely reaches the person at the surface of her being but does not touch her heart or soul becomes a mere *possession*. It is something that is separate from her and therefore easily lost and forgotten if ever truly remembered at all. *Only* what reaches the person at the depths of her heart can form her and be appropriated by her as an interior part of her rather than an external possession.

According to *Antiqua et Nova* and echoed by Leo XIV, "The commitment to ensuring that AI always supports and promotes the supreme value of the dignity of every human being and the fullness of the human vocation serves as a criterion of discernment for developers, owners,

[45] Stein, *Essays on Woman*, 136.
[46] Stein, *Essays on Woman*, 130.

operators, and regulators of AI, as well as to its users."[47] In order for AI to support and promote the dignity of every person, it should not subvert human agency or undermine the capacity of prudence and human moral judgment. This criterion "remains valid for every application of the technology at every level of its use."[48] When discerning the role of AI in education, one should take care to think deeply about the ways specific AI technologies and specific uses of AI technologies impact personal agency, identity or personality formation, sensitivity to values, embodied knowledge, and interpersonal relationships.

### *The Social Elements of an Integral Approach to Technology and Education*

Here the term **"social"** indicates what Francis highlighted by making the concept of ecology central to *Laudato Si'*—that "everything is interconnected."[49] Nothing can thrive in isolation. However, unlike the technocratic paradigm, ecological interconnectedness is not "undifferentiated and one-dimensional."[50] Diversity is an essential component of any thriving ecology, human or otherwise. Thriving social institutions, then, ought to promote fraternity through solidarity in a way that respects the multiple understandings of "wellbeing" present within the human community.[51] This respect will strive to ensure that each human and each community maintains a sense of rootedness and solid identity that resists acquiescence to the abovementioned liquid world.[52] Such a sense of rootedness and identity must be grounded in intergenerational justice and the passing on of traditional knowledge by which we know who we are and

[47] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §43.
[48] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §43.
[49] Francis, *Laudato Si'*, §§70, 138, 240.
[50] Francis, *Laudato Si'*, §106.
[51] See Francis's articulation of "*buen vivir*" in *Querida Amazonia*, §§26, 71.
[52] On "rootedness" and "identity," see Francis, *Querida Amazonia*, §§21, 30, 33–35.

how to care well for ourselves and our world in all the particularity that such care entails. That is, rootedness and identity must be built up through personal encounters of intergenerational and intercommunal mutuality that do not treat the concrete presence of the other as a datum to be substituted by any other datum in some universal, abstract, and flattening account of reality.

Such intergenerational and intercommunal mutuality has traditionally perpetuated the skills required to live well within the uniqueness and complexity of particular ecosystems. Familiarity with the dynamic and intricately interwoven reciprocities constituting ecosystems demands a patient and participatory attentiveness across long periods of time. While the technological innovations proffered by the technocratic paradigm advertise increased efficiency and convenience, they often also create dependencies that render the passing on of traditional knowledge quite difficult. This is especially the case because the contemporary globalized economy creates homogeneity through its incentivization of standardization for scalable production.[53] To meet the demands of a competitive market often requires that one adopt patterns of living defined by rapidification and so lose the space and time for patient attentiveness. In this way, technocracy puts pressure on the cultural diversity that makes it possible for humans to live well amidst the biodiversity characterizing our common home. To refuse to allow education to be a space in which the hegemony of a single worldview is advanced, then, an integral approach to technology in education must take up the stance of fraternity through solidarity by working according to the principles of subsidiarity and synodality.

**Subsidiarity** names the principle whereby we judge the distribution of roles, responsibilities, and contributions of each member of a community to that community's common goal. Simply put, subsidiarity requires that decisions about fundamental matters be handled by the appropriate, proximate authority. As Pope Pius XI notes in *Quadragesimo Anno*, it is a

[53] See Francis, *Laudato Si'*, §107.

"disturbance of right order to assign to a greater and higher association what lesser and subordinate organizations can do."[54] In this way, subsidiarity ensures both that the least powerful in society do not have decisions made regarding their wellbeing that do not match their legitimate understanding of that wellbeing, and that political bodies can intervene when local action is not sufficient.

School systems and classrooms are not exempt from this principle. Within the context of schooling, subsidiarity means providing teachers, families, and students (as they mature into full adulthood) latitude to make decisions. Teachers have a complex sphere of influence that is very close to the raw materials of education (students, curriculum, infrastructure, etc.). Their influence also ranges across practices, including effective communication of content, assessment of learning, and care for multiple students' physical, emotional, mental, and social wellbeing. Because of the interpersonal nature of teaching and the talents required to manage a classroom and execute a lesson plan, the mission of the teacher should be respected as an integral good. If teachers possess the responsibility to encounter each student personally as an end in himself or herself, they should be afforded the space and time to engage well in their proper task. This requires a prudent balance between administrative support and pedagogical freedom. Thus, the principle of subsidiarity demands that we empower teachers and families by trusting and respecting their personal judgment within their sphere of influence. This trust and respect empower all members to become protagonists in the mission of the community. Teachers who know they are protagonists in such a mission teach well. Their students and their families benefit, and so does the school system as a whole.

Subsidiarity is a key ingredient in the common good insofar as it is itself guided by the preferential option for the poor. This option is taken up when the experience and knowledge expressed by the most exploited and vulnerable are intentionally adverted to, trusted, and made central to

[54] Pius XI, *Quadragesimo Anno,* §79.

community discernment. In other words, subsidiarity in a context of injustice involves respecting the most exploited and vulnerable as authorities who lead the way in the struggle for justice. For to know what most cultivates justice, a community must be particularly attentive to the concerns and lived experience of those who most suffer injustice even as they remain resilient in the face of it.[55] As St. Oscar Romero insists, "The world of the poor teaches us that liberation will arrive only when the poor are not simply on the receiving end of handouts from governments or from the church, but when they themselves are the masters of, and protagonists in, their own struggle and liberation."[56] Subsidiarity, then, requires that the Church's primordial stance be in preference of the poor when striving for peace through the pursuit of justice.

When discerning the role of AI technologies in education, this means privileging the perspective of those who have historically most suffered the inequities that have been perpetuated and have become structurally entrenched by the failures of mass education. First and foremost, this involves seeking to learn how AI technologies might exacerbate such

[55] In *Evangelii Gaudium*, §240, Francis asserts that subsidiarity requires both that political bodies take up their proper responsibility to address global issues and that this must involve a commitment to dialogue. In §205 of the same Apostolic Exhortation, Francis affirms that this dialogue must be oriented to healing the deepest roots of evil in the world. Because of this, Francis goes on to say, politicians must place the lives of the poor at the center of their work if they are to make progress toward justice. Indeed, this activity must be rooted in *friendship* (§200). Furthermore, in *Querida Amazonia*, §27, Francis maintains that dialogue "must not only favor the preferential option on behalf of the poor, the marginalized and the excluded, but also respect them as having a leading role to play." Thus, taking all this together, the dialogue that is the heart of subsidiarity promotes the common good only when defined by the preferential option for the poor. This means both that governing bodies have a responsibility to address large scale issues and that they should do so only through a dialogue in which the most vulnerable and exploited are given a primary place. See also Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church,* §§182, 351, and 449.

[56] Oscar Romero, "The Political Dimension of the Faith from the Perspective of the Option for the Poor," *Voice of the Voiceless: The Four Pastoral Letters and Other Statements*, trans. Michael J. Walsh (Orbis Books, 1985), 184.

inequities. AI technologies operate according to techniques of surveillance, classification, and standardization. By not only collecting and analyzing data but also through nudging and other behavior modification techniques, AI technologies surveil humans toward algorithmically defined ends. Furthermore, surveillance has been deployed in education in a way that disproportionately affects minority communities in a negative fashion.[57] Many unsupervised machine learning techniques group data into statistically normative categories, thus classifying reality into discrete, quantitatively delimited buckets. Classification in education has, under the influence of the ideology of meritocracy, reflected and perpetuated broader socioeconomic inequities.[58] AI standardization stems from the basic nature of its underlying statistical algorithms. Standardization in education has played a role in universalizing the cultural norms of particular communities to the detriment of other communities, thus wrongly naturalizing the idea that some communities are intrinsically superior to others.[59]

The preferential option for the poor as a guiding principle therefore presses us to ask: Who has historically suffered most through surveillance of students, the classification and stratification of students, and the standardization of curricula in schools? How might AI technologies worsen this suffering by decreasing the probability of the most exploited and vulnerable being offered the right of personal encounter and attentive listening within education? Will AI technologies further displace the voices of the marginalized and the exploited in conversations regarding the nature and goals of education—voices that ought, from the perspective of

[57] Odis Johnson and Jason Jabbari, "Infrastructure of Social Control: A Multi-Level Counterfactual Analysis of Surveillance and Black Education," *Journal of Criminal Justice* 83 (2022): doi.org/10.1016/j.jcrimjus.2022.101983.

[58] See Jeannie Oakes, *Keeping Track: How Schools Structure Inequality* (Yale University Press, 2005).

[59] See Radhika Viruru, "Postcolonial Technologies of Power: Standardized Testing and Representing Diverse Young Children," *International Journal of Educational Policy, Research, and Practice: Reconceptualizing Childhood Studies* 7, no. 1 (2006): 49–70.

Catholic social teaching, to be central?

If subsidiarity is organized by the preferential option for the poor, then it will be thoroughly **synodal**. For Catholics, synodality refers to the process of collaborative discernment of the will of the Triune Lord.[60] Catholics ought to view this as more than a management strategy. Rather, we are encouraged to view it as a way of life for Christian communities. As such, schools ought to adopt the practice of synodality as a way of enacting subsidiary discernment. If anything will require an ongoing habit of subsidiary discernment, it will be the continual, rapid, and unpredictable development of AI technologies.

There is simply no way to know ahead of time what AI will become, what new things it will make possible, and what things it will suddenly make obsolete. Because of this fundamental uncertainty, synodality seems to us to be a sound practice both for the sake of supporting teachers and students and for the sake of creating strong Catholic educational communities. Schools that adopt the practice of synodality will create regular mechanisms whereby all stakeholders—but especially those most vulnerable to the risks of AI: students and teachers—will be able to collaborate and discern issues related to the use of AI technologies in the classroom. Indeed, such collaboration must take the shape of dialogue-in-fraternity, a reciprocity that, following Francis, will break down barriers so that each participant may be open to the beautiful mystery of the other and the ongoing but joyful struggle to know one another in a way that better approximates how we are known by God. We must remember that we are all children of God called to participate in the inner-Trinitarian communication of Love for which we were made and to which we are called by grace.

[60] For an exploration of synodality in fuller form, see Synod of Bishops, "For a Synodal Church: Communion, Participation, Mission," September 2021, synod.va/content/dam/synod/news/2024-10-26_final-document/ENG---Documento-finale.pdf.

## *Reality and the World in an Integral Approach to Technology and Education*

**"Reality"** and "**the World**" as terms in the title of this section are purposely capacious. Following the ancient and medieval traditions, we will take "reality" to have not only one meaning, but many analogous meanings. Here we will focus on three of those meanings: the reality of the natural world, reality as a gift, and all reality as oriented to the transcendent.

These three meanings of reality coincide. In a consumerist and throw-away culture, nonhuman—that is, natural—realities are not respected as gifts whose beauty glorifies God the Transcendent in each their own ways. A culture of relativism emerges when instrumental reasoning reigns supreme, wherein everything is understood to be relative to one's immediate interests.[61] Significantly, it is precisely these interests that technocracy would commandeer for its own purposes—a populace concerned mostly with immediate interests will be a populace exceedingly susceptible to algorithmic behavior modification and unlikely to raise questions regarding structural sin and ultimate meaning. If one lacks a sense that there are objectively identifiable goods, then liberal consumerism easily convinces one that the good life is a matter of satisfying one's prevailing immediate desires so long as those desires do not lead to harm for others. This volume has already noted how surveillance capitalism produces modified human behavior through the application of machine learning algorithms. These algorithms are oriented to optimizing predictions of human choice based on a set of digital influences. The logic of surveillance capitalism might make its way into education through presenting a curriculum that is incentivized through extrinsic rewards, such as in gamification. Habituating students to extrinsic rewards is a matter of inculcating in them the patterns of instrumental reasoning: to get the reward, one must use education as an instrument.

[61] Francis, *Laudato Si'*, §§122–123.

Instrumental reasoning is, however, contrary to Francis's understanding of ecological education. An ecological education would eschew self-centeredness and the individualism at the root of relativistic instrumental reasoning. Thus, education that is truly ecological invites students to outward experiences; that is, experiences that draw them beyond themselves, that allow them to lose themselves in the beauty of learning that puts them into contact with the beauty of reality. As teachers know, students learn best when immersed in wonder to such an extent that they have forgotten, if only for a moment, the self-consciousness that at times keeps them from classroom participation. This is especially notable when wonder as a driver of learning gives students the momentum to accomplish necessary rote tasks that might not themselves stoke their wonder. For example, a learning environment of this sort refuses to allow technology to be a medium of distance that frustrates this immersive experience. While reality cannot but be a gift insofar as it is created by and for Love, we learn sensitivity to—perhaps even a "taste" for—the giftedness of reality in part through the loving invitation of teachers and mentors to take up the journey of discovering its beauty. Importantly, to learn this sensitivity is also to learn that we have the responsibility to respond with reciprocity. If everything is interconnected, then integral ecology is dialogical. An ecological education is essentially an invitation to be true to this dialogue. For we thrive insofar as we recognize and participate in the fact that we humans are not separate from the natural world, that human and nonhuman communities cannot but be in relationship.[62]

The technocratic paradigm would have us forget that these reciprocal relationships are indispensable. AI technologies thus have the propensity to increase the sense in students that their education is transactional rather than dialogical. Technocracy promises to rid the educational experience of toil. But one wonders where the toil ends and the purportedly "real" learning begins. It seems that "toil" in this sense is whatever nudges the student to move outside themself toward a reciprocal sensitivity to reality.

[62] Francis, *Laudato Si'*, §139.

In an integral approach to technology in education, no technology or use of technology can be permitted that hinders immersion in and reciprocity with the gift of reality that is essential to the learning process. Whatever technologies and uses of technology that habituate students to forgetting the gift nature of reality and so to treating reality as a mere instrument are, therefore, to be eschewed. Put another way, whatever technologies and uses of technology obscure the call of every reality to move further and further into the mystery of the Transcendent must be excluded from the learning environment precisely because such obfuscation can only be accomplished through stymieing wonder, our desire for ultimate meaning and value. Christ the Transcendent One who became incarnate to lead us to the Transcendent must, therefore, shape the very heart of education. A Catholic education, then, follows Christ in descending to the depths of reality so as to ascend to the Source of reality. Nothing is left out because all is contained in the one Lord.

## Conclusion: Six Necessary Elements for an Integral Approach to Education and AI

### 1. *Respect the Dignity of Every Person*

An education that is ordered to integral human development must be founded on a respect for the dignity of every person. This means promoting the recognition that persons can never be instrumentalized as means to a further end precisely because each person is oriented to a transcendent end of ultimate significance. Education for integral human development will, therefore, address the multiple components of being human—the biological, emotional, intellectual, social, cultural, and spiritual—as a unified whole. The proper development of any of these components necessarily entails the development of the others. Just as a gardener must care for plants by caring for the soil and all the creatures within the soil that have a symbiotic relationship with plants, the educator must never take a reductive perspective on education—everything is

interrelated. In turn, respect for the dignity of every person involves recognition of the fact that humans are not isolated individuals who are born as blank slates. Human persons are irreducibly relational, coming into themselves only through encounter and dialogue. In this way, to respect human dignity is to respect the integrity and fundamental value of human culture in all its diversity. Finally, holistic education will prioritize the human need to grow in spiritual maturity through the cultivation of a capacity for contemplation and discernment.

### 2. *Take an Interdisciplinary and Holistic Approach*

An education that is ordered to integral human development will take an interdisciplinary and holistic approach to the cultivation of knowledge and wisdom. Because the Catholic intellectual tradition, which places emphasis on the unity of knowledge, calls us to consider our understanding of the world from an interdisciplinary perspective, Catholic colleges and universities are well-suited to this approach. Insofar as education is not a mechanical process, this also means that no discipline should arrogate to itself the superior position of logically ordering all other views. This is especially important given the fact that the technocratic paradigm prioritizes the natural sciences since it views them as most amenable to its promotion of merely instrumental reasoning.

Holism is at the heart of the vocation of the gardener. All forms of reductivism are destructive to flourishing. Education must prepare persons for prudent participation in integral ecology. This requires that students be given the space in which to build the habit of attending to the dynamic complexity of reality. In this way, students must learn to resist any levelling framework. If they adopt a flattened perspective on reality, they do not see themselves in their entirety. True learning is rooted in an openness to oneself and other creatures as wholes; indeed, to all reality as a whole. The way of the gardener is dialogical, and dialogue is fundamentally non-reductive. To dialogue with reality is to be open to reality's full self-revelation and so not to reduce reality to some partial aspect through constrictive anticipations.

### 3. *Promote the Common Good and All the Diversity It Entails*

An education that is ordered to integral human development will promote the common good and all the diversity it entails. The promotion of the common good must resist the levelling effect of the one-dimensional technocratic paradigm. Thus, an education that is ordered to integral human development will safeguard cultural goods and the diverse, legitimate understandings of wellbeing found within the human community. Genuine education will, therefore, promote intergenerational justice and so resist deskilling and the loss of identity that occurs in a context defined by the hegemony of a single human culture.

Furthermore, genuine education will promote rootedness and will value diversity as enabling humans to live well amidst the particularities of their various homeplaces. As humans develop a shared way of living grounded in shared values, habits and skills are developed by which individuals enter into and realize the common good with others. Such habits and skills are not accidental to cultural identity and belonging. Nor are such habits and skills determined by one's circumstances or time. Instead, they are beautiful expressions of the basic human capacity for intelligent and responsible creativity in relationship with others. As such, they are to be guarded as basic goods, just as one's personal character is to be given intrinsic value as a beautiful addition to the human community. Of course, this guarding ought not to be a matter of creating insular communities. Any static notion of culture is a misunderstanding of the historicity of human existence. However, the loss of cultural diversity is a genuine loss as the human community as a whole yearns for full flourishing.

This means that genuine education is not to be shaped by technological progressivism and its tendency toward rapidification. Grounded in the ideal of efficiency, the rapidification that results from technological progressivism renders it difficult if not impossible to continue intergenerational traditions of skill that do not promote doing more in the same or less amount of time. Thus, technological progressivism leads to a

levelling of cultures. If the problems of today are many and multifarious, then we humans need every wisdom tradition available if we are to develop holistically effective solutions to the social ills that plague our ongoing history. While diverse legitimate understandings of wellbeing are to be valued in themselves, they also ought to be valued as providing insights into the way forward as we strive to promote flourishing for all. Authentic education will, therefore, resist any impulse towards homogenization for the sake of efficiency.

### 4. *Be Rooted in the Preferential Option for the Poor*

An education that is ordered to integral human development will be rooted in the preferential option for the poor. If the above three objectives are to be accomplished, then the perspectives of the exploited and excluded must be made central in decisions regarding education. Additionally, the exploited and excluded must be given a leading role in determining the shape of education and the structure of educational institutions. Thus, genuine education will be shaped by critical inquiry into who benefits and who suffers in any given understanding of education, what are the structures of educational institutions, and how any given decision regarding the implementation of technology is made. Genuine education must, therefore, invite persons to solidarity with the exploited and excluded and encourage the development of structures of subsidiarity that make space for the proper exercise of freedom and decision-making at the various levels of governance.

### 5. *Reject the Mechanistic Interpretation of Education*

An education that is ordered to integral human development must reject the mechanistic interpretation of education and any technologies that operate according to it. Students must be invited to know themselves as wonderers, as reaching toward the transcendent in their sensitivity to the beauty of truth and reality. Education must, therefore, invite students to participate *actively* in the outward movement defining their minds. True

learning is neither passive nor automatic. It rather occurs over time. It is an active, arduous process in which the mind must be engaged and the soul must be moved. It is a conscious and knowing process, not an automatic, unconscious one.

Any implementation of technology in education that habituates students to a mechanistic interpretation of education and thus treats them as empty slates to be filled or machines that merely operate automatically according to fixed rules is to be refused. This will ensure that students are called to question the liquid world with its immediate incentives and reductive vision of the good and the human person. Students will thus be exposed to education and learning as intrinsic goods, not processes that are worthwhile only for extrinsic rewards. This also requires refusing to use technology that would distract students from the call to explore their own interior life. In this way, education will become more than the place where facts are accumulated; instead, it will be the place where students encounter the possibility of discerning their uniquely gifted life and its meaning as created by God.

### 6. *Be Attentive to the Heart*

An education that is ordered to integral human development must be an education of what Francis calls "the heart." Education must invite students to grow in familiarity with their own interior life, both in its affective and its intellectual dimensions (which are not really two but one and should be treated as such). To learn, students must be invited to take possession of their own intellectual agency—to grow in affective sensitivity to the beauty of the intelligible and the virtues that render them properly responsive to it. The life of the mind is not a disinterested one; on the contrary, it is irreducibly invested in—that is, passionate about—the truth in all its multifaceted beauty. In other words, intellectual agency is essentially an aesthetic sensitivity that can be formed to delight in all things in truth.

The education of the heart resists the liquid world. A liquid world is a world without roots, an anonymous and individualistic world defined by

instrumental reasoning and the satisfaction of immediate interests. The liquid world is, therefore, a world of consumerism, throwaway culture, meritocracy, rapidification, and relativism. Education for integral human development allows humans to recognize themselves as more than consumers and to grow into a *feeling* for and awareness of objective values. This will entail allowing students to experience a sense of time other than that suggested by technological progressivism; that is, a sense of time other than as a constant rush into a future of so-called progress that is forgetful of tradition, roots, and the presence of others as sacraments of eternity.

Educating the heart involves making space for human wonder and personal agency and, therefore, inviting students to a personal commitment to truth. Thus, students must be given the space to cultivate their own sensitivity to the call of the beauty of reality and to grow in familiarity with themselves as learners who are conscious of and active in their own learning. As stated above, this will involve helping students to understand that learning is not mechanistic, not a mere response to stimuli (as behaviorists would have it), but an active and engaging dialogue with reality that invites one to be true to one's own desire for truth through discovering the meaning and value inherent in the things of creation. Unlike mechanistic processes, raising questions and recognizing when such questions have been adequately answered are not rule-following cognitive activities. Instead, one must build the *habit* of understanding when evidence suffices for a question to be answered. Education at its best will invite students to be at home in their own cognitive lives so that they might actively and purposely cultivate such a habit.

# Chapter 7

# Practicing Integral Education in the Age of AI

This chapter shows how the way of the gardener articulated in the previous chapters can orient discernment as to whether or how AI applications can serve education for integral human development. As we argued at the outset, this insistence upon the reader's own personal discernment flows directly from a commitment to education for integral flourishing that draws the hearts of all parties into a joint search for truth and the common good. More than anything, this volume has sought to clarify for readers what it would mean to inhabit an integral approach to education as an entire way of seeing, feeling, reaching and executing decisions, and interacting with others. There is no substitute for embracing personally the call to discern how to best help our students into such flourishing.

At the end of chapter 1, we articulated five questions to help us to better understand and respond to the motivations and misgivings surrounding educational AI development:

1. What is education? What is its purpose and value?
2. How does education actually happen? What processes bring it about?
3. What does our social and relational nature mean for education?
4. What is it for education to serve justice and the common good?

5. What is a good tool? How do we properly discern and evaluate whether the tools we employ in education are good?

Let us now take stock of how the various answers we have given to these questions fit together. To begin with, the introduction to this volume suggested a guiding theme: the vocation of the gardener. The inspiration for this theme is taken from the second creation narrative of Genesis. God creates a garden and places humans in that garden "to till and to keep it" (Genesis 2:15). To be a gardener is to strive to participate as much as one can in the divine wisdom by which the garden was created. It is to recognize a reality not of one's own making—one whose intelligibility one must discover and respect as possessing an integral value of its own. This means that one ought not to strive to overbearingly control the garden, forcing it to conform to one's selfish ends. Instead, one ought to work so that each of the creatures within the garden attains the ends set for them by God and which are intrinsic to the way they exist. Just as a tree in an orchard must be given the freedom to sway in the wind and so learn to bend but not break, a proper education provides students with the opportunity to develop into the full realization of their own intellectual agency and the virtues that that agency entails. This also means that the purpose of education is to know and to live according to the love of the Wisdom of God, ultimately through union with God but also in accordance with that Wisdom as it is expressed in all creation. Indeed, as we have seen, Aquinas understood education in terms of growth in this life of wisdom. And Augustine understood this wisdom to be Christ, the true Teacher who is more intimate to us than we are to ourselves.[1] Consequently, educating for the life of wisdom means inviting students to know themselves as wonderers whose orientation to the Truth is actualized best when they appropriate the meaning of their own intelligence.

From the theme of the vocation of the gardener, we derived some corollaries that elaborate the meaning of integral development. First,

[1] St. Augustine, *Confessions*, 3.6.11.

learning is *dialogical*. Learning is not a unilateral process by which teachers simply provide students with information. To know reality is to engage with it both by raising questions about it and by allowing it to question oneself and one's understanding. Second, therefore, education is a matter of *encounter*. One comes to know oneself through encounter with another. Indeed, we are who we are most fundamentally because of an encounter with God in the depths of our heart. Genuine education must then allow for encounter through dialogue. Third, this encounter ought to be structured according to a *hope* that does not compromise with the evil perpetrated in this world in the name of pragmatism or material security. The Christian hope is an Easter hope; that is, a hope that all things are raised in Christ and that God is all in all. Though our efforts may appear futile, given the way that evil is entrenched in our hearts and in our history, we hope in a God who has already taken action to make all things new. Such a hope frees us for a dialogical encounter by liberating us from the need to wrest control over the world in order to force our goals to fruition. Lastly, then, education as a hopeful dialogue of encounter *cannot be reduced to mechanistic procedures*. Understanding is not the result of following some technique or recipe by rote. Instead, understanding results from the creative and responsible actualization of our intellectual and affective capacities through a process by which any set of formalized procedures can be questioned and revised and which, therefore, cannot itself be constituted by rules. The human mind and its capacity for learning are fundamentally non-mechanistic.

All of this must, of course, be interpreted through the lens of the preferential option for the poor if it is to lead to justice in an unjust world. Who suffers most from rapidification making its way into education and so is afforded less of an opportunity to give expression to their wonder? Who suffers most from the anonymity of education technology and so is not afforded much of an opportunity for personal encounter? The common good cannot be served through education if education involves structural injustice that entails easy and broad development of the

capacities of some but obstructed and narrow development of the capacities of others. Hope must impel us to undo any such structures in our work to cooperate with God in the making of God's kingdom. To teach in a way that is inspired by and flows from the love of Jesus Christ is to prioritize the least among us in the provision of an integral education. Teachers who embrace the preferential option cannot rest content with offering marginalized students a thinner education aimed solely at their material security. They must teach in a way that witnesses to the *full* humanity of those whom our societies have most dehumanized.

In what follows, we show how the way of the gardener makes a concrete difference as to what goals will be prioritized or what options will receive serious consideration in an integral education. We do think that certain uses of AI technology in education are simply not reconcilable with students' dignity and the cultivation of their integral flourishing. In other cases, putting AI technologies in true service to that flourishing requires carefully prepared conditions. But we do not pretend to consider every contextual instance or to anticipate every potential use. It remains for educators and their supporting administrators to make wise judgments on the ground about how to best seek their students' good in the face of limited resources and time. Hence, we remind readers that this book proposes not a set of rules so much as a way of seeing and working one's way wisely through concrete problems. If readers disagree with the practical conclusions below, we invite them to consider how different conclusions might remain deeply grounded in the approach proposed in this book. In other words, we urge them to disagree as fellow gardeners, discerning and laboring with us in service to our students' infinite dignity as creatures oriented to the free and holistic pursuit of truth and goodness.

The topics chosen are meant to represent a balanced sampling of tasks or questions faced by educators across a range of age groups and settings. Readers will find that later discussions sometimes repeat considerations broached in earlier ones. This is intentional: we want to help readers practice such thinking, as well as to make clear in each instance the link

between the gardener's commitment to integral human development and specific practical conclusions.

## Plagiarism

Perhaps the most immediate concern that educators have regarding student use of AI is plagiarism. Large language models can generate content that mimics the human capacity to analyze literature, answer reading reflection questions, solve math problems, write essays, write code, and more. Many educators are therefore at a loss regarding how to evaluate student learning in a world where various generative and agentic AI applications can produce so much for students. In turn, AI's capabilities have created the possibility for an atmosphere of distrust in teacher-student relationships. If education is to continue to call humans to integral development, then it is this distrust that educators must work against most of all.

It is important to note from the beginning that techniques for the detection of AI-generated content will forever be in an arms race with techniques for evading such detection. This does not mean that there is no role for detection techniques. If used prudently in some circumstances and alongside other measures to mitigate plagiarism, AI detection can be a helpful tool to assist teachers in recognizing work that is not produced by students. However, other strategies that invite students into conversation, promote personal responsibility, and minimize unilateral surveillance as a structuring feature of education are to be preferred and prioritized. For instance, if students are invited to defend a written argument in the context of an oral examination, then not only is it possible to discern whether writing is their own but also the student is invited to a personal encounter to communicate the fruits of their labor. A coordinated assessment of this type can help to give students confidence in their ability to learn and teach them how to be personally responsible for their work. They can experience a model of the joys of learning, and they can learn that they and their development matter in an ultimate way. Of course, not

every teacher will have the time to implement this kind of assignment. Nevertheless, this example is meant to illustrate that every effort should be made to move away from a *surveillance* model of plagiarism detection toward a *conversational* model that incites in students a sense of personal agency and responsibility for their own learning. Correlatively, AI techniques for detecting plagiarism should never be used as the ultimate determiner of whether a student plagiarized or violated academic integrity.

Plagiarism will continue to be incentivized to the extent to which students are habituated to understanding education as a matter of producing work that is extrinsic to their own personal development in a transactional process defined by grades as abstract "rewards." Thus, the best strategy for disincentivizing plagiarism is to structure education according to the metacognitive process by which one appropriates and actualizes one's own capacity for intelligence and affectivity. Just as one's own intelligence cannot be automated, so, too, is it impossible to automate the process by which one grows in familiarity with (and a sense of ownership over) the cognitive activities by which one learns. This growth in familiarity with one's own intelligence as an activity for which one can be personally responsible requires an education that is fundamentally relational and conversational. To best approximate this ideal, each student ought to be afforded the chance to develop their own questions and interests in a context that makes it evident to them that those questions and interests are not inconsequential to their education. This can then help open students up to the possibility of developing new interests and richer questions when exposed to new ideas or subject matter. Examples of such metacognitive activities include inviting students to voice what questions arise for them based on material, to narrate how they found the solution to a problem or answer to a question, and to explicitly name connections between what they already know and what they are currently learning. While this may seem like a lofty goal, it must serve as a guiding principle when considering strategies for reducing plagiarism. An anonymous, unilateral, and surveilled education alienates students from their

intelligence and their work, thus removing all personal significance from that work. Students recognize the personal significance of their own work when they feel that they are not only collaborators but the central agents of their education.

This, of course, will require more from teachers. Anonymity, unilateralism, and surveillance are all techniques of efficiency. While such techniques are enticing given the amount of pressure educators face from multiple directions and at all levels, we ought to be stubborn in embracing only what makes for the integral development of students—even if it is slower and involves more work. But this is also why our school communities should involve mutual aid and invest in human teachers and teacher aides. Education is a communal activity, not something that occurs only in the buildings we name schools. Integral development is best realized when communities as a whole take responsibility for education. Of course, this will also require that we do all we can do to undo structural injustice. For the more that a community suffers from structural injustice, the more difficult it will be for its members to resist techniques of efficiency.

This is not to say that surveillance has no role to play in minimizing plagiarism. There are, for instance, programs that will track what students write as they write it. Indeed, programs can even implement certain AI applications to provide students with live feedback that prompts their active wonder and engagement on the basis of the assignment's goals or rubric. Of course, without careful restraint in service to calling forth the student's *active* wonder, such feedback could easily become a form of friendly surveillance that simply keeps students on track toward extrinsic success without asking them to take ownership of their own education. In turn, if these programs are used in such a way that student questions and interests are not engaged, this will likely exacerbate students' feeling that education is transactional. In the case of the automation of education, the idea that education is a matter of "just giving teachers what they want" will be replaced with the idea of "just giving the machine what it wants." For

this reason, we have been emphasizing that education must be conversational rather than transactional. This is just as much true for the detection of and consequences for plagiarism as it is for the mitigation of plagiarism. An adversarial relationship between educators and students must be avoided to the greatest extent possible. Every attempt must be made to invite students to an understanding of education as a personal journey in which they are the primary agents.

## Curriculum

Curriculum design in the age of AI presents both challenges and opportunities. Among the most pressing challenges is the task of preparing students for a labor market with potentially fewer entry level positions and/or a rapidly changing landscape of skill requirements. Among the greatest opportunities is the possibility of renewing a vision of education as something that cannot be automated, that is rooted in personal encounter, and that invites students to know themselves in their cognitive and emotional capacities. As the section on "personalization" within this chapter makes evident, the age of AI should not be treated as a chance to steer curriculum toward "personalized" education if such personalization is really individualization and entails an increased standardization that does not promote integral development.

Because AI technologies can automate the tasks of many current entry level jobs, the labor market has become increasingly difficult to enter for recent college graduates. Two responses to this challenge ought to be avoided in curriculum design. First, one might be inclined to respond by putting a greater emphasis on skills that cannot be easily automated. Thus has there been in recent times a push to funnel more students toward training for blue collar work. To be sure, if accompanied by a living wage and just hours and benefits, blue collar work is fundamentally valuable and meaningful work without which the common good would deteriorate. But such an emphasis should not be to the detriment of an education that promotes integral development. That is, training for blue collar work

should not be to the detriment of the development of students' capacities for moral reasoning or aesthetic reflection or the appreciation of and participation in their cultural traditions. It must be affirmed that education in skilled trades forms persons in habits that have implications beyond any given trade and so ought to be understood alongside the liberal arts as playing an essential role in forming persons for integral human development. However, in a world where work, especially for the poorest, tends to be dissociated from a holistic vision of human flourishing, we should resist any attempt to reduce education to job training. In other words, every student should be given an education that invites them to develop some grasp of themselves and reality as a whole. An education for integral development is never a siloed education that neglects the multi-faceted nature of being human.

Second, one might be inclined to rapidly integrate AI systems into curriculum design so as to prepare students for a world in which AI technologies are ubiquitous. However, education should not only prepare students for the world as it is; rather, it should also prepare students to understand and to build the world as it should be. In other words, we ought not only to ask, "How can my students survive financially in an AI-influenced world?" but also, "What will such a world need from my students?" If used imprudently, AI systems will result in human deskilling and cognitive offloading. In turn, this will result in dependence upon AI systems in arenas of human life for which such systems are not necessary. For instance, if, early in their intellectual and emotional development, students are asked to write letters and emails with AI assistance, then perhaps they will not feel confident writing letters and emails independently later in life. What a tragedy it would be if humans were to lose their ability to express solidarity, love, companionship, and mutual grief in writing to one another. Such expressions are not accidental to the maintenance of the common good. Moreover, we ought not to implement AI education technologies in ways that rid students of the chance to develop their ability to make and execute long-term plans. If, for instance, AI technologies tell

students how to schedule their time and which tasks to accomplish first, then students will not develop prudence in such matters for themselves. In general, shortcuts are deleterious to long-term agency development. The love of truth as a habit we can develop leads us to care not for immediate results when those results are not adequate to the task of taking the full measure of the real. While formation for a transactional or passive use of AI technologies will prioritize ease and efficiency, formation for a creative and active use of AI technologies will prioritize delaying ease and efficiency so that students might approach AI not as a source of convenience but as a tool by which the intelligibility of the world might be more fully discovered. Thus, curriculum designers ought to prudently consider at what ages and for which tasks AI technologies ought to be implemented in order to invite students into creative engagement with the technology, rather than a merely transactional use leading to deskilling and cognitive offloading.

Finally, as curricula are designed with space for adjustment to accommodate diverse student needs, AI technologies should not replace prudent judgments or caring relationships. It is true that AI technologies allow the collection and analysis of data to be streamlined in ways that may enable curriculum benchmarks to be efficiently adjusted according to individual student needs. Students are, however, never to be reduced to the results of the analysis of quantitative data. AI technologies might cause the contemporary standardized and benchmark-heavy nature of curriculum to become even more impersonal. From the perspective of the exigencies of integral development, the age of AI should be met as an invitation to make education more personal and conversational rather than more impersonal and transactional. A curriculum designed to automate as much as possible within education is a curriculum that will thoroughly disadvantage the most vulnerable humans who most of all require personal encounter to flourish. For if the execution of curriculum is increasingly automated, then only privileged students from communities that have the means to "add" concrete, embodied relationality to the curriculum will

receive an education rooted in conversation and the summons to know oneself as an intellectual and affective creature. To ensure, then, that all receive an education whose real end is integral development, we ought not to be too hasty when integrating AI systems or applications into our curricula. By doing so, we may be exacerbating the negative aspects of the age of AI and so render it more difficult to actualize the positive aspects of these technologies.

Of course, besides curriculum content, curriculum design itself ought not to be offloaded to AI systems. If we worry that our students do not use AI technologies well by checking the veracity of their outputs, then how much more ought we to be wary of an AI-designed curriculum? We have already discussed in this volume the fact that AI technologies can produce various injustices. To use AI technologies to produce a curriculum is to risk allowing such injustices to define what our students are exposed to both in terms of educational structures and educational content. And, of course, if AI technologies can invite students to cognitive offloading and deskilling, then the same is certainly true of educators. Let us be responsible and live the full actualization of our intellectual agency so as to serve as good models for our students.

## Planning and Executing Lessons

What, then, might it look like to instantiate a curriculum promoting integral human development in individual courses and daily classroom practice? Much of the discourse and advertising surrounding AI technologies for teachers asserts that AI can *do* and can *rapidly* do all the toilsome tasks and labor for teachers, so that teachers can focus on "just teaching" and "interacting with students." Traditional AI systems *promise* to mine student data for actionable patterns that an instructor can use to quickly identify areas in which the class as a whole or individuals in particular need further instruction. They also promise early diagnostics for learning disabilities and safeguards against truancy and dropout rates. Generative AI systems promise to develop effective lesson plans "instantly"

and create engaging media, practice sets, and activities that bring lesson plans to life and enable students to achieve learning outcomes with enjoyment and facility. They also promise to offer "infinite" help through AI chatbots and adaptive learning platforms which are available to learners and can provide practice sets or feedback at any time of day. Agentic AI systems promise to execute many of the aforementioned tasks with minimal prompting, effort, or oversight required by the instructor.

Part of the difficulty with these types of advertisements and the promises they make about what AI applications will do for teachers is that they often fail to recognize that the work of "just teaching" or "interacting with students" necessarily includes the work of lesson planning, course design, teaching lessons, developing activities and practice sets, providing feedback, clearly communicating with students or guardians, and rendering evaluations. Such work is not separate from or ancillary to the work of teaching, much the way that a fair bit of memorization is not separate from or ancillary to learning and the work of cultivating rigorous understanding or advanced knowledge.

The work of planning *what* to teach, in what *sequence,* at what *pace*, and *how* to teach what one has chosen to teach *to* particular students *in* particular communities and contexts is intrinsic to the art of teaching. The work of teaching lessons and lesson planning broadly construed is indispensable to the *activity* of *teaching* itself and inseparable from the vocation of the teacher and the mandate of communities of learning. While it is beyond the scope of this section to evaluate any one design model for building lesson plans, designing courses, or teaching particular lessons, it is true that no matter the model a given instructor, educational institution, or school system employs, any AI technologies it adopts must be oriented toward helping the unfolding and flourishing of learners as persons in community, the ends of integral human development, the cultivation of right relationship with reality.

Claims about various AI technologies reducing toil require that teachers and learning communities be able to rightly discern between *toil*

and *demanding* but *necessary work* that is intrinsic to the activity of teaching. Work that is demanding but necessary and intrinsic to the art of teaching cannot be offloaded to a machine without acting against the goods of teaching and thereby learning itself. The teacher needs to be able to rightly discern between what uses of AI technologies act as helpful educational tools that aid teaching and what uses cause technologies to usurp the activity of teaching from teachers in ways that are ultimately inappropriate and harmful to the goods of teaching and learning.

These kinds of prudential discernments are no small feat. As we mentioned at the start of this book, the systemic cross-pressures that many educators and under-resourced learning communities experience make prudential discernment about the adoption and implementation of AI technologies incredibly difficult. For many educators nowadays there are not enough hours in the day to accomplish the demands being made on them. With diminished funding, resources, staffing, and personnel at all levels of contemporary education, those working in education are often overloaded with too many courses and service responsibilities or given large class sizes without enough teaching aides, assistants, or support. From this vantage point, any technology that could enable teachers to meet such demands would seem to be a helpful tool and a benefit to the practice of teaching. But this vantage point can be distortive because it is ultimately oriented towards efficiency instead of the goods of teaching and learning. This distinction matters because from the vantage point of efficiency it is difficult to differentiate uses of AI technologies that save time or accomplish tasks by perpetuating already existing injustices and failings of the education system versus those that do so by helping to facilitate the teaching and learning process with more acuity and care.

When morally discerning about whether a use or implementation of a given AI technology is beneficial to lesson planning, teachers need to consider and evaluate the goods and ills not only for their own planning but also for the acts of teaching and learning. Teachers and administrators are responsible for the technology they use and implement for their

courses, classrooms, and schools. If and when a teacher implements or an administrator impels the implementation of a given AI technology or an "AI-powered" application, it is that person's responsibility to research and understand the documented risks and potential points of failure of that technology. For instance, teachers or administrators considering the use of predictive or analytical AI tools need to consider the privacy and bias risks such systems pose to students, risks to which students and their families might rightly object (and from which they may desire to opt out). They need to consider the quality of the data and how much testing a specific application has undergone for the express purpose for which it will be used or if it is simply being recommended for a use for which it was neither expressly developed nor tested. They need to consider the limits of data analytics and predictive analysis as well as their tendency towards behaviorism and surveillance when those limits are not respected. The human person is not reducible to statistical analysis, and the actions of a human person are not reducible to predictive analysis by virtue of the person's nature as free.

Perhaps the most enticing type of AI technology for streamlining the planning and execution of lessons is generative AI. For one skilled in prompt engineering, generative AI can make suggestions, create dynamic and multimodal lessons, and even roll out lessons for individual students depending on what they have accomplished in the course. Of course, the possible danger lies in the fact that technologies structured to produce streamlined workflows tend to result in anonymity and so mitigate the chance for true personalized attention. Nothing should replace the virtue of patiently listening to students and acting as a personal model for students of how to learn and grow integrally. Learning occurs best when we feel that others are lovingly present in our lives and witness to the kinds of persons we want to be. Students achieve best when they know deeply that their development is valued because they are valued. A person cannot feel valued when their development is approached as a series of activities to be streamlined. While generative AI can produce custom activities or

practice sets tailored to specific students' interests, no machine-produced content ought to stand in for the invitation to pursue truth alongside another person. Moreover, to build on a point made in another part of this chapter, generative AI ought not to entice educators into the wholesale gamification of education. For then students will grow accustomed to a relatively anonymous stream of rewards that do not habituate them to the dialogue with other persons and reality as a whole that makes one a true learner. And, of course, teachers have a duty to protect their students from harmful biases that might be present in the structure of and content created by generative AI technologies. This requires serious attention and a commitment to implementing only those technologies that one has discerned will not expose students to what will impede their feeling safe and whole in school.

## Personalized Learning and Individualized Education

No education and no aspect of education is neutral. It always either impoverishes or enriches, to quote Pope Francis.[2] Of all the sectors of education, personalized learning is the sector in which some of the greatest harm can be done and the deepest needs can be met because of the very way in which it seeks to address the singular human person and promises to attend to her and her needs uniquely. As a result of this, the ways in which personalized learning impoverishes or enriches can cut to the very core of the individual and lead to the cultivation or diminishment of her flourishing.

More and more frequently, diverse types of AI technologies are claiming to "personalize" learning. Because of the profound power of personalized learning, good moral discernment about the use and implementation of AI technologies for the purpose of aiding personalized learning must keep the meaning of what it is to be a person and the fact

[2] Francis, "Address of Pope Francis to Students and Teachers from Schools Across Italy," vatican.va/content/francesco/en/speeches/2014/may/documents/papa-francesco_20140510_mondo-della-scuola.html.

that technology does not "solely advance in a positive direction" at the front of mind.[3] Earlier in the book we mentioned that simply because an AI technology is being advertised as an "educational" technology does not mean that it has been developed or sufficiently tested for appropriate or beneficial use in education. In the midst of a landscape with such intense pressures and targeted rhetoric, we think it is important and necessary to constantly remind ourselves that simply because an application or educational technology is advertised as "personalized," that in no way means and certainly does not guarantee that it *is*, let alone that it *aids*, personalized learning.

The very notion of personalized learning or personalization in education is derived from the ideal of a one-on-one personal encounter between parent and child, teacher and student, mentor and mentee, friend and friend, wherein one person meets with, recognizes, and responds to another person according to the fullness of who she is, the depths of who she is called to become, and the nuances of her circumstance. Properly speaking, personalized learning can only happen between persons; machines and thus AI applications are incapable of personalization in its strict sense and true meaning. Therefore, when evaluating an AI technology advertised as "personalized," it is necessary to determine what feature or ability is actually being advertised. One needs to discern whether "personalized" refers to an AI technology as customizable, individualizable, automated, anthropomorphized, predictive, or some combination of these. Individualized learning is not inherently bad—there are some excellent use cases—but it should also raise important questions not only about misleading marketing of AI applications but also about the role of human beings in education.

As previously mentioned in the first chapter of this book, the AI technologies typically advertised as "personalized" are adaptive learning platforms, image or word generation systems, chatbots, AI assistive technologies, AI diagnostic tools, and data analytics features. In line with

[3] AI Research Group, *Reclaiming Human Agency in the Age of Artificial Intelligence,* 148.

*Reclaiming Human Agency in the Age of Artificial Intelligence*, we have already suggested that programmers and AI developers "should resist attempts to anthropomorphize the machine" or models with which one is interacting.[4] To that end, parents, educators, and administrators who adopt and implement AI technologies, especially AI chatbots or systems with chatbot interfaces, should avoid applications that anthropomorphize the chatbot or system.

Education is a foundationally interpersonal activity. While education does *include* information acquisition, education is not reducible to information acquisition nor is the cultivation of knowledge and wisdom equivalent to it. In the extreme, we might think of a teacher using AI to create an assignment fully, students using AI to complete the assignment fully, and the teacher using AI to grade the assignment fully. In this example, we must ask ourselves exactly what teaching or learning has taken place.

## Teacher Aides and AI Teaching Aids

Teacher aides are essential to providing differentiated education, especially for students with disabilities or students in need of remediation. In a world of mass education and large classes, teacher aides are indispensable in emergency situations and when in-class activities require personal attention. Because education today is not immune to patterns of rapidification, the task of building substantive relationships among administration, teachers, and students is a challenge. Thus, teacher aides make building such relationships much more probable, allowing for more one-on-one time between instructors and students. In this way, teacher aides promote a conversational rather than a transactional vision of education.

Given the advancement of AI technologies today, we must face the possibility (really, the danger) that the work of teacher aides will be

[4] AI Research Group, *Reclaiming Human Agency in the Age of Artificial Intelligence*, 183.

automated. After all, generative and agentic AI systems can be used to develop tests to evaluate a student's proficiency in a given domain of learning, can be used to develop lesson plans that are particularized for a given student, and can be used to provide in-depth feedback regarding the pace of a student's work and their achievement of learning benchmarks. Generative and agentic AI systems can even be used to provide teachers with suggestions for what interventions are best suited to the needs of an individual student. Consequently, AI systems will be an enticing cost-cutting measure available to schools and school districts if one system can accomplish all the above and so replace a large number of teacher aides.

First, of course, we should always indulge in a healthy skepticism regarding cost-cutting measures in education. Learning and the development of educational tools and techniques are both slow processes that require immense amounts of effort and ingenuity. Second, and more to the point, the abovementioned cost-cutting measures would increase the anonymization of education and decrease the personal relationships within education. Students learn best in environments in which they have personalized attention and personal encounters with mentors and models who approach them with an unconditionally positive regard, encouraging in them personal wonder and a confidence that they can achieve success.

As regards the substitution of the work of teacher aides by AI systems, our considerations ought to focus on individualized education programs (IEPs) and behavior intervention plans (BIPs). IEPs and BIPs are more than personalized education. Successful IEPs and BIPs are constituted by networks of supportive social relationships within which a student is most likely to thrive according to their talents, disposition, and abilities. An often essential component of that network of supportive relationships is the relationship between a teacher aide and a student. Students often feel embarrassed by being singled out by such plans. In turn, students can develop adversarial relationships with those implementing such plans or grow in apathy toward their education if such plans are merely a matter of the application of standardized guidelines to their particular case. In both

cases, teacher aides are crucial for opening the possibility that students approach their plan as a possibility for personal growth and a space in which to grow in confidence through meaningful relationships.[5]

Teacher aides can develop a sensitivity not only to a student's intellectual needs but also to their emotional profile. Moreover, the relationship between a teacher aide and a student can provide the student with the sense that they are understood and valued in truth. Developing this sense requires a personal encounter. This personal encounter ought never be replaced by an impersonal machine. The preferential option for the poor demands that students with IEPs and BIPs be treated in such a way that they come to consider their uniqueness not as a burden but as an intrinsically valuable addition to the beautiful diversity of the human community. This is no mere sentimentalism. If students do not develop a sense of just pride in themselves, then they will not feel the invitation to actualize their capacities. By rendering differentiated education relatively more anonymous, the automation of the work of teacher aides would rid the most vulnerable students of the opportunity to be known. It is the personal attentiveness of a teacher aide that can read an emotion on a student's face or hear joy and pain in what goes unsaid amidst their conversations with students.

Many teachers have had the experience of coaxing a student to persist after they have put their head on the desk during an exam. This sort of coaxing is effective only when couched within a personal relationship. Personal relationships are difficult to develop in large classes. Teacher aides alleviate such problems. In this way, the impersonal nature of a machine cannot substitute for the personal relationships that teacher aides build with their students. Without these personal relationships, many of the most vulnerable students would not achieve the realization of their capacities. Thus, to automate the work of teacher aides is to consign the

[5] See Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §79.

most vulnerable students to an impersonal education.[6] A key question here is whether our service to the least among us is a matter of the best we have to offer or merely what we can get by with. We must not let considerations of economic efficiency deprive our students of the possibility of learning to affirm their own self-worth in all their uniqueness through a personal relationship with someone who ideally strives to know them in truth.

## Writing, Foundational Skills, and Education as a Synthesis of Knowledge

Catholic education has a fundamental commitment to an ever deeper embrace of "the whole truth about nature, [the human person], and God."[7] Christians are encouraged to know ever more about the world in all its aspects as a way of honoring God the Creator and encountering God's goodness in all things. This task of contemplation of the world about us is unending, since the depths of any creature are beyond our knowledge. While our world has advanced in knowledge, advances in which the Church rejoices, too often this knowledge is fragmented in specialized fields, which "makes it difficult to see the larger picture."[8] Even less apparent is a grasp of the larger meaning behind these developments that would "guarantee that the new discoveries be used for the authentic good of individuals and of human society as a whole."[9] To remedy these gaps, Catholic education tries to synthesize knowledge through inter-disciplinary efforts,[10] but especially by forming students in the ability to

[6] See Francis, *Evangelii Gaudium*, §53: "We have created a 'throw away' culture which is now spreading. It is no longer simply about exploitation and oppression, but something new. Exclusion ultimately has to do with what it means to be a part of the society in which we live; those excluded are no longer society's underside or its fringes or its disenfranchised—they are no longer even a part of it. The excluded are not the 'exploited' but the outcast, the 'leftovers.'"

[7] John Paul II, *Ex Corde Ecclesiae*, §4, vatican.va/content/john-paul-ii/en/apostconstitutions/documents/hfjp-iiapc15081990ex-corde-ecclesiae.html.

[8] Francis, *Laudato Si'*, §110.

[9] John Paul II, *Ex Corde Ecclesiae*, §7.

[10] Francis, *Laudato Si'*, §135.

integrate different fields within a broader grasp of the ultimate end of human life. These higher level efforts at integration depend, however, on skills like reading and writing developed throughout students' educational path.

When emphasizing synthetic and integrative goals, there can be a temptation, given the power of AI systems to do simple and seemingly creative tasks like writing, data analysis, text summary, and programming, to argue that schools, especially in higher education, should skip over the teaching of these more basic skills. Why learn programming when an AI system can generate code? Why have students write papers when an AI system can generate them so quickly with a quality better than that of high school graduates? Why perform a messy dissection, when you can have an AI-generated visualization? Why read when an AI system can summarize? In response, some commentators instead suggest that we focus on more abstract and seemingly higher level skills like curating AI-generated art, editing AI-generated writing, criticizing AI products, or simply focus on more advanced aspects of a discipline. These higher level skills seem more closely related to the goods of synthesis, interpretation, and wisdom. While surely correct at some level (for example, perhaps sociologists do not have to become expert coders to analyze their data), these arguments miss at least four important roles of these foundational skills.

Merely at a pragmatic level, a user needs expertise to judge AI outputs. A common rule for using AI is that you should only have it perform tasks that you already know how to do. Otherwise, you will not be able to evaluate its products to know if it is producing drastically wrong results due to hallucinations or problems in its training data or code. That expertise requires learning basic skills. One must know the principles of coding to judge whether code will work. A person must read a lot and write well to recognize good prose. A student must know how to read and interpret the argument of a book to check whether an AI-generated summary is correct. For example, society is facing major problems of scientific reproducibility and medical reversal caused in part by a lack of

statistical sophistication among practitioners.[11] Because they cannot do statistics, researchers trust outputs from statistics programs and lack the skill to design or evaluate research analyses themselves. AI technologies could cause such problems to spread to other fields. Without the skills for judgment, students will be reduced to blind faith in AI technologies rather than the wise use of them as tools.

Second, many of these tasks have important formative effects in regard to developing wisdom. Take writing, perhaps the skill in the humanities curriculum that is under the most threat from generative AI technologies. Writing is not merely a mode of communication but can have important effects on the student's own thought development. When writing, a certain distance is opened between oneself and one's ideas that invites a patient reflectiveness. In this way, writing facilitates the possibility of becoming one's own interlocutor. With text as a visible aid, one can break down complex argumentation for analysis in terms of coherence, order, and validity. Writing can, therefore, be an instrument by which one adopts a certain habit of mind, a facility with the process of reflecting on the logical cogency, due order, and sufficiency of evidence in one's own argumentation. If imagination is essential as a cognitive prelude to understanding, then writing provides a visual schematic that enables one to rearrange and break apart an argument with ease. This is especially important as students learn to develop arguments with multiple interlocking premises and multiple sources of evidence. Writing an argument in a paper invites one to shape it into a logical form. Rhetorical and written forms of argument are radically different, with the latter taking on modes of logic, objectivity, and universality frequently lacking in oral modes of argumentation.[12] Learning objectivity is important, especially in

[11] Paul Scherz, *Science and Christian Ethics* (Cambridge University Press, 2019); Vinayak K. Prasad and Adam Cifu, *Ending Medical Reversal: Improving Outcomes, Saving Lives* (Johns Hopkins University Press, 2019).

[12] Marshall McLuhan, *The Gutenberg Galaxy: The Making of Typographic Man* (University of Toronto Press, 1962); Walter J. Ong, *Orality and Literacy: The Technologizing of the Word* (Routledge, 1982).

a world threatened with post-truth forms of discourse. Moreover, it is frequently only through writing an idea down, seeing and evaluating it on the page, that a person develops a good thought in an area. Writing forces one to clarify one's ideas and explore their deeper implications, or, alternatively, realize that they are in fact incorrect. Thus, writing is not merely a technical skill. It is deeply formative, necessary for developing the synthetic wisdom at which Catholic education aims.

Excellence in writing and other basic skills also only develop through a long process of formation. Much of university research, be it humanistic writing or scientific discovery, is undertaken under the craft model of apprenticeship.[13] Performing an experiment for the first time often requires hands-on guidance by an expert, just as writing requires mentorship by the teacher in order to develop proper style. The honing of a skill begins with easier tasks; through experience, one improves one's skill.[14] That means that the early work of most students will be of poor quality and will be on projects that, to the seasoned expert, would not seem worthwhile (for example, five-page summaries of a reading's argument). AI products will indeed be superior to most of those human efforts, but without that foundation of gradually improving mediocre work, no human will get to a level of excellence that exceeds AI. Moreover, since AI models are trained on human inputs, they will also cease to improve. It is only through a long apprenticeship that one can become a master. Researchers will not get to research insights that are truly new if they have not initially wrestled with basic tasks. They will not even be competent to criticize research products without knowing basic techniques. Developing the patience to face the blank page or struggle with an experimental design until inspiration comes—rather than asking an AI system for suggestions

[13] Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (University of Chicago Press, 1962); John Flett, "Alasdair MacIntyre's Tradition-Constituted Enquiry in Polanyian Perspective," *Tradition and Discovery: The Polanyi Society Periodical* 26, no. 2 (2009): 6–20.

[14] Alasdair MacIntyre, *After Virtue: A Study in Moral Theory*, 2nd ed. (University of Notre Dame Press, 1984).

that canalize work down paths trodden by whatever appears in the training data—will be necessary for the development of truly creative work. Thus, tedious, basic assignments prepare the ground for creativity and the deeper engagement with reality sought by Catholic universities and necessary for an increasingly complex world.

This illuminates a final concern. It is frequently in the basic tasks where encounter with reality and truth occurs. A push toward curation and higher processes is a push toward abstraction and intellectualization and a turn away from the messiness of concrete reality. It is frequently in the concrete details that we encounter truth. For example, computer or in vitro models of biology serve many good uses, but they cannot replace the encounter with the messiness of the living organism. Or it is frequently the details or offhand comments in a text that inspire insight rather than the high-altitude, frequently banal, summary. This is where art like poetry and the appreciation of beauty are so important. Art forces students to deal with the particularity of a concrete being or experience and through that particularity gain insight into deeper reality. Humans as rational, embodied beings can only find truth through the concrete messiness of reality. Truth is incarnate. That encounter occurs through many of the basic skills thought to be replaceable by AI systems.

It thus would be a tragedy to allow AI technologies to replace students' efforts at mastering difficult texts or writing research papers. Students would lose the skill to evaluate AI outputs and the apprenticeship that would eventually lead to a mastery surpassing AI ability. In turn, AI development itself would suffer with less original content to engage. Moreover, students would lose the formative effects of having to organize and evaluate their arguments in an objective way. Finally, students would be without an important avenue for encountering the world and others or at least for reflecting on their experiences of encounter. Thus, these kinds of basic skills are very important to teach in Catholic schools.

## Gamification

To gamify learning is to incentivize it by means of extrinsic feedback, including punishments but, most frequently, rewards. These rewards can involve points or badges in a game designed to train students towards learning objectives. However, such rewards can include anything that motivates students that is not intrinsic to those learning objectives—for example, the feeling of victory within a game narrative, the achievement of a certain status within the game or the classroom, or exciting celebration graphics triggered by reaching degrees of mastery. Even the acquisition of good grades (and the careful calibration of effort to an assignment's importance towards a course grade) can become a highly motivating game for students. Since the point of these games is to motivate learning objectives, such games need not (and are unlikely to) have much of their own internal goods and complexity. AI technologies can augment gamification by empowering teachers to create games that are digitally immersive or bespoke to their particular course or classroom, or by individualizing the gamified learning experience to each student's strengths and weaknesses.

Gamification, however, is at odds with integral learning in a number of important ways. The reasons for this are closely connected with the legacy of behaviorism in modern education. First, gamification habituates students to focus substantively on extrinsic rewards and thus to instrumentalize their learning as a means to achieve those rewards. This creates profound obstacles to a non-mechanistic education that is attentive to the heart. Such an education, we have argued, aims to cultivate an intrinsic love and appreciation for the truth. It also seeks to aid students in discovering and embracing themselves as creatures that are fundamentally oriented to the truth through their innate wonder and capacity for freely raising and answering questions. This "coming home to ourselves" frees us to take increasingly active and personal responsibility for cultivating the habits that empower us to undertake this journey successfully. Similarly, education should lead to the free pursuit of character through a conscious

understanding of the good, not simply the acquisition of conditioned habits.

Second, since gamification is primarily effective with the serial learning of discrete actions or chunks of information, reliance on gamification introduces a tilted floor toward learning environments or experiences that are not hospitable to the fuller and more complex process of learning. As we have explained above, not all learning happens through the serial mastery of chunks. A lot of learning—especially the kind we embrace through a free and personal journey—happens through insights and judgments that occur through iterative processes that combine various modes of thinking. Some of these modes involve active focus upon an immediate task. Others thrive in reflective distance from that task. Often we must integrate numerous bits of data by hitting upon (and then verifying) a concept or principle that we cannot arrive at simply by aggregating that data. This process cannot be fully planned in advance because it is driven and unified through an engagement involving the student's prior experiences and active questioning. Pedagogies that fail to make enough room for such learning also fail to provide rich soil for students' need to fit what they learn into an increasingly comprehensive, interdisciplinary, and profound understanding of the world and of their place in that world. When we fail to provide amply for this formation in wisdom, we fall short of honoring students' dignity as creatures called to the integration of their various capacities for spiritual maturity in contemplating the whole and acting in service to that whole. Rather, we train them to remain distracted from that whole by staying focused on the next immediate reward and only seeking truth and goodness when such rewards keep coming.

Such habituation also leaves students pliable to manipulation by anyone who can connect extrinsically rewarding experiences to actions that do not necessarily line up with their flourishing. It also prevents them from learning when and how to embrace deeply challenging and even burdensome actions that only make sense with reference to a more

integrative perspective. In other words, to the degree that learning relies substantively on extrinsic rewards, it is systematically hobbled in its ability to foster not only a taste for truth but also the virtue of fortitude. Of course, scaling back substantive reliance on gamification often requires a greater investment from teachers of their time and attention. However, the considerations above also help us to see how an educator's embracing of these greater sacrifices allows them to become important models of fortitude (as well as patience, generosity, and personal attention) for their students. In a world where digital technology is everywhere amplifying the presence of extrinsic immediate rewards, students are all the more in need of important models of perseverance in service to deep and nourishing formation and a free gift of self in search of the truth.

One might reasonably ask how AI-powered gamification is any different from the kind of games teachers have long used in their classrooms to keep learning fun and interesting. Indeed, unless the game rewards and the learning objectives are intrinsically connected somehow, *any* reliance on games to motivate learning is to some degree susceptible to the problems just mentioned. However, AI-powered gamification runs into an additional problem. We saw in Chapter 4 that behaviorism's narrow focus on the individual's mastery of discrete tasks pits individual and communal learning against each other: ideally, behaviorist learning should be easily automated and done alone, without the complications that relationships can introduce into the conditioning of each student's serial mastery of tasks. Behaviorist learning, then, is problematically self-focused in two mutually reinforcing ways: it focuses on the rewards extracted from learning that the individual seeks as a mere instrument, and it tends toward the isolation of learners by construing their relationships with others as either accidental or an obstacle to learning. And AI's main proposed contribution to gamification is precisely that it can greatly increase teachers' ability to individualize each student's learning experience.

We have argued, however, that integral learning embraces our encounter with others and the world as an intrinsic aspect of education. Teachers and

students share a dialogical journey by which they freely adjust to one another's engaged questioning and answering in a mutual pursuit of a deeper grasp of reality and of the common good's demands. While behaviorist learning encourages us to curve in upon rewarding psychological experiences that have no inherent connection to the world and other people, integral learning is ecstatic and ecological, embracing our reciprocity with the world and other people as necessary for the process of holistic and deeply human formation. If AI technologies are used to power educational gamification, then we risk exacerbating the isolating tendencies already inherent in extrinsic reward systems. Earlier education games, by contrast, tend to be in-class activities that foster social interaction and thus heighten the possibility of a mutual eliciting of wonder.[15]

There is, indeed, a spectrum of defensible views here. Not a few members of this research group agree that some extrinsic rewards and punishments are frequently worth the tradeoffs within educational ecologies that are otherwise strongly oriented to integral learning. Moreover, some of us can see the value of educational games—perhaps even AI-driven ones—for reviewing knowledge, helping with memor-ization, or acquiring languages. The key is to cultivate the wisdom and honesty to

[15] Some may ask: are not group projects a notoriously burdensome aspect of traditional education that snuffs out the best students' wonder and motivation while keeping everyone shackled to the lowest common denominator? We propose that what makes such collaborations burdensome in an educationally negative way results not from a mismatch in members' skills or prior learning, but rather from some members' inability or unwillingness to lose themselves in the shared journey of wonder, which then interrupts other members' attempts to do so. For the same reason, a teacher and student may resonate fruitfully with one another as mutual learners despite a wide variance in prior learning, provided that both are open to the journey of wonder. To the degree that this is true, then, fostering environments in service to integral learning is not simply a fruit of collaborative learning, but is also frequently a condition for it. If learning is irreducibly dialogical and, therefore, collaborative, then group projects succeed only under the condition that they are situated in a context in which the mutual expression of wonder is promoted. For the mutual expression of wonder requires a self-transcending compassion and joy in the other's learning that allows one to be sensitive to the questions that reality asks of the learner in the journey of learning.

discern when extrinsic rewards have shifted the balance away from (or are actively preventing) integral learning driven primarily by the love of truth.

However, we also urge readers to continue engaging with voices or ideas that might recalibrate such discernment, especially at a time when so much educational technology development remains focused on extrinsic rewards. To give just one example, important voices in the world of education argue that the mere *presence* of extrinsic rewards can lessen students' taste for (and their ability to be motivated by) the intrinsic goods of learning.[16] Catholic theologians have more recently taken up this question in direct engagement with many of the same considerations driving this book.[17] We invite readers to lend their voice to this conversation, which bears on far more than the place of AI technologies in our classrooms.

## Assessment and Grading

AI-powered tools can notice relevant patterns in student work and make predictions about how those patterns match up with feedback messages for the student or with an assignment's learning goals and rubric. Hence, it is no surprise that AI technologies have been suggested as an aid to grading and assessment. In chapter 5, we discussed grading as a form of labor, and thus, too, as a way by which teachers model for students specific attitudes about the nature and value of work. Grades also appeared as a learning incentive in our discussion of gamification just above. We must now consider uses of AI tools for assessment with regard to two other purposes: (a) as a way to determine and certify how much students have learned, and (b) as an instrument for teachers (and sometimes students) to track progress toward learning goals and to identify appropriate interventions (for example, constructive feedback, remediation needs, a change in study habits, etc.). These two purposes link well with a

[16] See especially Alfie Kohn, *Punished by Rewards: The Trouble with Gold Stars, Incentive Plans, and Other Bribes* (Houghton Mifflin Harcourt, 1993).

[17] Jason A. Heron and Alessandro Rovati, "From Coercion to Fascination: Grades, Vulnerability, and Responsibility," *Journal of Moral Theology* 15, no. 1 (2026): 105–128.

distinction often drawn between summative and formative assessments.[18] However, that distinction often refers to different types of *assignments*. For the purposes of what follows, the key distinction is between the *purposes* of assessment, regardless of the assignment in view. Since the following speaks to these two uses in general, readers should think further about how judgments about AI use in assessment should be shaped by the particular discipline, type of knowledge, or degree of precision at which students are being assessed.

While both purposes for assessment share important overlap as to the key questions at stake, the purpose of determining and certifying how much students have learned brings us most decisively to the central question regarding AI-enhanced grading: the role of personal responsibility in AI-driven automation. At stake here is both what teachers owe students as creatures oriented to the truth and what it means for teachers to model for students virtues that AI technologies render all the more significant.

Teachers owe their students a just and truthful assessment of their work. Such assessments have consequences for students' futures. Moreover, the learning environment, as a shared pursuit of truth, can only be built upon a fundamental commitment to truthfulness. Finally, students deserve equal access to that environment and to a fair assessment of their work. Hence, determinations about how much students have learned must be executed under the active and responsible judgment of a human educator. One reason for this is that AI systems are more biased and less objective than we think, primarily because they are trained on cultural objects

[18] Summative assessments refer to end-of-term exams or papers that are more comprehensive in scope. They are usually weighted more substantially and intend to provide a larger view of student learning across a quarter or semester of instruction. Formative assessments, by contrast, are narrower in scope, providing a brief snapshot of student learning along a trajectory towards summative goals. They are called formative because they are designed to shape and direct student learning in process, encouraging habits that support student learning along the way. They represent an iterative process, whereby students make an attempt, receive corrective feedback, and then try again so as to make progress.

produced by humans. And unlike considered human judgments, the processes leading to AI predictions are often opaque to scrutiny.

However, there is a deeper reason for the central importance of human judgment in grading: only humans can desire and seek truth through wonder. When a person is able to give full expression to their wonder in their living, they spontaneously ask questions and spontaneously do not accept answers that are insufficient because they are not substantiated by adequate supporting evidence. But to notice what amounts to adequate supporting evidence is a subtle skill that one must form by both being taught by a person with experience and engaging in the intellectual life for oneself. When one attends to what occurs in one's inner life as one pursues truth, one is able to grasp that there is no set of rules that can fully capture the activity of noticing the adequacy of supporting evidence. In turn, neither is there a single way to express what one has understood when one understands. Rather, there is a flexible spectrum of possible avenues that one might take both on the way toward grasping an explanation or affirming a truth and in the expression of what one has understood or affirmed.

Consequently, there is no set of rules that can fully capture the activity of evaluating a student's expression of what they have understood and how they came to understand it. It is in this sense that grading must be a dialogue whose ideal is personal encounter. Of course, there are some assignments that can be graded quite easily—those assignments meant only to incite rote learning in students. Far be it from us to denigrate the importance of assessments that incentivize rote learning in specific cases. However, learning in the fullest sense cannot be reduced to memorization. So, when one is evaluating for understanding and judgment, one must develop a sense of how particular students express their insights. Machines should never replace the process by which teachers develop this sense. Any such replacement would have two related nefarious consequences. First, students would likely get the sense that teachers do not take the time to know the intellectual journeys of their students. This would lead them to

believe that their intellectual journeys are not valued. Second, students would likely get the sense that, if their teachers do not take the time to know their intellectual journey, then perhaps that journey itself, oriented as it is toward truth, is not intrinsically worthwhile. In other words, the automation of grading incentivizes the reduction of education to some arbitrary set of extrinsic rewards. For if we all wonder, then we all can appreciate what behaviors result from wondering. If students do not see habits of wonder in their teachers, then they will follow suit in not developing those habits.

Consequently, direct human assessment is a chance to model a key habit for students. Grading involves making sense of data and coming to a judgment about it. One is pursuing the truth with regard to a topic bearing on another's good. Integral teaching takes responsibility for eliciting from students their direct personal responsibility in searching for the truth and for themselves as truth-seekers. Accordingly, remaining personally and directly involved in the work of assessment is a key opportunity to model exactly the kind of habits we wish to cultivate in students. Relinquishing direct involvement in that process sends a very different message, namely, that truth is an instrument (really, a commodity) to manage in the way that most efficiently satisfies the expectations of a supervisor or customer so as to secure our private interest. This is millimeters away from the cynicism by which many students cease to think of grades as growth-oriented feedback given in love, and instead as an adversarial metric to be maximized by treating learning like a game.

For similar reasons, renouncing personal responsibility for grading also erodes education construed as a dialogical encounter that elicits students' wonder, hope, and increasingly active and skilled truth-seeking. When the process that generates grades is opaque even to the teacher, why should students feel encouraged to join those teachers in a sincere search for knowledge?[19]

[19] Of course, education involves training students to make wise choices about when and how to trust reliable authorities to access expert knowledge they cannot verify on their own.

Not only should teachers refuse to hand over the final judgment to a bot, but they also owe it to their students to remain actively involved in, and responsibly aware of, *the process leading to* that judgment. If teachers are not in sufficiently direct contact with students' work, they cannot make their own reliable judgments as to the accuracy of AI predictions regarding the grade (or other assessment response) this work deserves. They also deprive themselves of an important means of maintaining a close and precise sense of how students are engaging or struggling with the course material (or whether they are struggling with non-academic issues that call for support). Finally, lack of awareness of these details will likely compound over time. Assessing student work is a muscle that needs to be trained and perpetually kept in good shape. Teachers learn this quickly from experience: not accounting for fatigue, longer time gaps between grading sessions mean that more effort is needed to begin those sessions and to reactivate one's capacity to assess work at one's full potential. Hence, giving up direct involvement in the process leading to an assessment judgment will often create a cycle of increasing dependence and passivity.

For this reason, we caution strongly against using the language of "human in the loop" to talk about the proper role of human educators in grading.[20] "Human in the loop" tends to mean an insistence upon direct (rather than merely supervisory) involvement.[21] A human in the loop does not just intervene in an otherwise automated system when problems arise (that is, a "human *on* the loop" approach); the human must make the

However, this too can be done in more and less personally responsible ways. Not all uses of AI technologies to access information inculcate this habit, much less provide reliable access to human expert knowledge. We will return to this in the discussion of research below.

[20] "Human in the loop" is commonly abbreviated "HIL" but for the sake of clarity we decided to use the full term each time we refer to it.

[21] For a helpful introduction to terms like "human in the loop" and "human on the loop," as well as to the limitations of such categories for making sense of human-machine interaction, see Xinyue Hao, Emrah Demir, and Daniel Eyers, "Beyond Human-in-the-Loop: Sensemaking Between Artificial Intelligence and Human Intelligence Collaboration," *Sustainable Futures* 10 (2025): doi.org/10.1016/j.sftr.2025.101152.

choice each time. This *could* refer to the kind of responsibility over assessment that we are describing. The problem is that "making the choice" can refer either to the final judgment about a work's grade, or to the prior acts of interpretation of various aspects of that work that lead up to that final judgment. We have found that, in the concrete practice of institutional deliberation about the role of AI technologies and their use in education, "Human in the loop" often means that the human is simply the final arbiter over a process they need not remain robustly aware of (and thus cannot adjudicate adequately).[22] In the interest of clarifying that humans should remain actively and responsibly aware through the process *leading to* a final assessment judgment, we consider more helpful terms often used with regard to human-machine interaction; for example: "human in command," "AI-assisted," or "AI in the loop." These would help better construe and so practice assessment as a fundamentally human process into which AI technologies figure in a carefully articulated and delimited way—rather than to set up the human educator as a governor over an otherwise machine-led process.

These last remarks suggest that some forms of AI use in assessment could be consistent with an integral education. This *may* be the case if the application does not stand in for the teacher's judgment or impede the teacher's awareness of the student's work, or if the assessment aims primarily at the purpose of tracking progress and identifying appropriate interventions. Perhaps it is possible, at least in some disciplines, to use AI technologies as a delimited aid in identifying where students are on track or struggling, to provide them with prompt feedback or clear visualizations of their long-term progress toward a specific learning goal, or to help teachers notice when assignments are not working properly (for example, by promptly generating and displaying statistical analyses that help identify test questions that were missed by so many students that the topic

[22] For similar conclusions about how "human in the loop" functions in healthcare settings, see Rawan Abulibdeh et al., "Who's Really in the Loop? Rethinking Oversight in AI-Assisted Health Care," *Lancet* 407, no. 10545 (2026): 2340–2344, doi.org/10.1016/S0140-6736(26)00204-7.

deserves reteaching and/or the question must be dropped and rephrased in the future). We offer the following questions and considerations in service to prudent discernment of these instances:

- How is my reliance on AI-assisted assessment tools causing long term shifts in my personal and dialogical engagement with students and their learning journeys? Or in my active and responsible awareness of their work as I move towards my assigning of grades? Or in my ability to assess their work at my full potential? Or my ability to cultivate a truth-seeking and inquiry-friendly class environment?
- Teachers owe their students transparency about how AI figures into their assessment processes. This ensures the integrity of the teacher-student relationship as a joint search for the truth. It also models for students what it means to take ultimate responsibility for the choices by which we delegate power to AI technologies.[23]
- AI-assisted feedback should be designed to prompt students to engage in active reflection about why they made a mistake and how they can correct course. It should not make it easy for students to try again indefinitely or thoughtlessly until they happen to get the answer right.
- Although AI-powered displays of aggregate student data might be helpful with regard to highly specific measures, more comprehensive analyses carry an increasing risk of making it harder to distinguish between measurable outcomes and integral growth. Percentage grades for specific assignments are harder to mistake as a full measure of growth (and are less exciting to look at) than a fancy display of one's improvement over the semester.
- Even with topics that lend themselves easily to quantification (for example, math), students' test answers do not provide all the data

[23] Dicastery for the Doctrine of the Faith and Dicastery for Culture and Education, *Antiqua et Nova*, §46.

> relevant to their learning. An actively and responsibly aware teacher can spot when a student may have blamelessly misunderstood a question, provided an insightfully wrong answer, or taken risks that deserve encouraging redirection. This is one of the best (of multiple) reasons why teachers who run highly "objective" assessments (for example, multiple choice tests processed in Scantron sheets) often still ask students to show their work. But these are highly complex and situated interpretive judgments about cause and effect (for example, "I see why this student got lost, but insightfully so, in question 4!"), and it remains to be seen how much the statistical predictions of AI applications can help here. In any case, here, too, the question of teachers staying sharp and actively aware of their students' learning process remains important.

It may be, then, that some kinds of AI assistance in assessment (for the purposes of tracking progress and identifying adequate interventions) are consistent with integral learning. We invite readers who want to explore such applications to reflect deeply and honestly upon how this is working over time with regard to the goods at stake in the work of grading. Like good gardeners, let us not simply explore creative experiments but contemplate with patience when and how these experiments are building up our garden and our own ability to do good work.

## Research and AI

Catholic education, especially at the college and university level, goes beyond forming students in virtue and a broad level of practical wisdom. It also teaches students to pursue scholarly inquiry "in such a way that an ever deeper understanding in these fields may be obtained and that, as questions that are new and current are raised . . . there may be a deeper realization of the harmony of faith and science."[24] Higher institutes of

[24] Second Vatican Council, *Gravissimum Educationis*, §10.

Catholic education generate new understandings of reality and inspire creative modes of addressing contemporary problems. AI introduces larger opportunities and challenges to the research mission of Catholic education, especially higher education, beyond just its effects on basic skills.

Many fields, like genomics and astrophysics, have long relied on the data analytic capacity of computers. Some of the first computers were designed to assist nuclear physicists. Machine learning has complemented these classical techniques, and generative AI has brought completely new abilities to bear on research questions. Take, for example, AlphaFold, whose designers won the Nobel Prize in Chemistry in 2024.[25] This program, trained on protein databases, can predict the shape of proteins merely from their amino acid sequences and even suggest the sequence for a particular shape of a protein. These tasks are challenging for researchers because of the complexity of protein folding, which has generally relied on empirical exploration. AlphaFold has greatly accelerated biological research and drug discovery in a way that complements human skill. Thus, developments in AI hold tremendous promise for scientific research, and many students will need to learn how to make the best use of AI in their research.

Yet, the growth of AI in science and even in the humanities leads to temptations and dangers for the research enterprise. Most obviously, there is the danger of fraud. Generative AI technologies can create images, text, and data in ways that are hard to detect. Researchers could create whole research papers that have no basis in reality. One might suggest that science is self-correcting, since experiments can be replicated. However, we are already almost fifteen years into a reproducibility or replication crisis in science during which many fields have discovered that a large number of research findings cannot be replicated, a problem driven by the

[25] "Press Release: The Nobel Prize in Chemistry 2024," *The Nobel Prize*, October 9, 2024, nobelprize.org/prizes/chemistry/2024/press-release.

publication and grant demands of the academic career.[26] Since few of the millions of papers published each year are actively replicated or retracted, these erroneous findings build up in the literature. Though some of this irreproducible research is fraudulent, most is not. It results from the genuine complexity of experiments, carelessness, statistical cherry-picking, or from poorly designed studies. Generative AI technologies raise risks of further exacerbating these problems. Already, researchers are seeing an increase in low quality papers.[27] For example, generative AI can easily take the data from some of the large surveys comparing nutrition with health outcomes and come up with a correlation between a food and a particular disease. The problem is that most of these correlations will be spurious. People are using AI technologies to find these likely spurious correlations in many databases, leading to a growth in useless literature. The number of problematic papers already in the literature also raises questions about the value of generative AI's ability to summarize the field. If many of the papers going into its analysis are garbage, an AI system will produce garbage, leading to many false tracks for researchers.

A subtler problem than poor quality papers is the danger that AI tools will alter and narrow the focus of fields.[28] Given the popularity of AI technologies right now, there is a danger that studies that use AI will be given priority. Moreover, studies that are easy to do with AI tools may come to predominate because they will be much faster. The problem with such outcomes is that AI technologies usually require a preestablished dataset to analyze. The ease with which AI can come to potential findings out of such datasets may discourage researchers from doing experiments in

[26] See discussion in Scherz, *Science and Christian Ethics*, chapters 1 and 2.

[27] Tulsi Suchak et al., "Explosion of Formulaic Research Articles, Including Inappropriate Study Designs and False Discoveries, Based on the NHANES US National Health Database," *PLOS Biology* 23, no. 5 (2025), doi.org/10.1371/journal.pbio.3003152.

[28] This paragraph draws on Lisa Messeri and M. J. Crockett, "Artificial Intelligence and Illusions of Understanding in Scientific Research," *Nature* 627, no. 8002 (2024): 49–58; Paul Scherz, "The Displacement of Human Judgment in Science: The Problems of Biomedical Research in an Age of Big Data," *Social Research* 86, no. 4 (2019): 957–976.

the real world or developing ground truth datasets. It is, after all, easier just to use AI on an observational study based on already-existing hospital records than to run a large clinical trial. Further, AI technologies can shift the kind of knowledge sought. AI tools are much better at producing statistical correlations, patterns, and predictions than at developing causal explanations. If studies easy to do with AI are prioritized, then we might find that we have less actual, causal knowledge.

There is therefore a need for Catholic institutions to encourage actual experimentation engaging with the real world rather than merely sifting data with AI tools. They must prioritize long-term creative projects that involve data collection or deep engagement with sources. These kinds of projects will not generally be encouraged by the structures of an AI-dominant research landscape. Moreover, students need to be explicitly formed in a commitment to scientific truth. The general formation in virtue that one receives in Catholic education should help with this, but there is an additional need to mold this general formation to the vocation of science. Finally, students have to be given the basic skills of reading, writing, and data analysis to use AI tools properly and appropriately. Only in these ways can the research aspect of Catholic higher education be protected.

## Teaching Age-Appropriate AI Ethics and AI Literacy

Since education aims at increasing "our personal ability to think critically; evaluate whether our sources are trustworthy and the possible interests behind selecting the information we have access to," it is becoming increasingly necessary within our contemporary context "to introduce media, information and AI literacy into education systems at all levels, as already promoted by some civil institutions."[29] Leo XIV goes so far as to say that "just as the industrial revolution called for basic literacy to enable people to respond to new developments, so too does the digital revolution

[29] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

require" AI and digital literacy.[30] These AI literacy efforts should, however, not only be directed to children and adolescents but should also include and "be integrated into broader lifelong learning initiatives, reaching out to older adults and marginalized members of society, who often feel excluded and powerless in the face of rapid technological change."[31] Moreover, "as Catholics, we can and must contribute to this effort, so that individuals—especially young people—can acquire critical thinking skills and grow in freedom of spirit," which means AI literacy and AI ethics efforts cannot fall solely on educational institutions. Parishes and families also have an important role to play in serving the common good in this way.[32]

What is AI literacy and what does teaching AI literacy entail? In what ways, if any, does AI literacy differ from AI ethics?[33] This very book is a

[30] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

[31] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

[32] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

[33] Other related terms that one might see in "AI literacy" discourse are "AI competency" and "AI safety." These are frequently used interchangeably, despite each having its own specific meaning. The term "AI competency" tends to be used in conjunction with "AI literacy" when "AI literacy" is primarily defined as learning to use AI technologies that might be relevant to the job market. "AI safety" tends to refer to the management and mitigation of risks that AI and machine learning technologies might pose to human persons, human communities, or human goods. The theoretical framework for AI safety is fairly similar to that of automobile safety manufacturing insofar as the concern is about making sure that the technology functions as intended by both the manufacturer and the user, so that it will not malfunction and thereby cause harm akin to a car not responding to its brakes or suddenly overheating and bursting into flames. Sometimes AI safety rhetoric and even AI literacy and AI competency rhetoric are used to avoid dealing with some of the profound and pressing ethical problems concerning the development, deployment, and use of AI technologies. See Tim G. J. Rudner and Helen Toner, "Key Concepts in AI Safety: An Overview," *Center for Security and Emerging Technology*, March 2021, doi.org/10.51593/20190040; Dario Amodei, Chris Olah, Jacob Steinhardt, Paul Christiano, John Schulman, and Dan Mané, "Concrete Problems in AI Safety," *arXiv*, July 26, 2016, doi.org/10.48550/arXiv.1606.06565.

book of AI ethics. But we aim for anyone who reads it to have increased AI literacy as well as a better understanding of AI ethics. While there is no single agreed upon definition of AI literacy, true AI literacy "cannot condone naïve enthusiasms, nor fuel unfounded fears."[34] We must educate ourselves and others about how to use AI intentionally. AI literacy *should not* be misunderstood to refer simply to knowing how to use particular AI technologies and applications. Since AI technologies shape those who use them, "educating people about the use of AI, then, involves teaching them to decide when and for what purpose it ought *not* to be used."[35] In a context where many educators feel pressured to unreflectively adopt AI technologies, especially generative AI, it must be remembered that teachers and "schools are not called to follow the pace of the digital world, but to offer that which the digital sphere by itself cannot provide, namely a shared time for learning and developing trustworthy relationships."[36]

In addition to understanding that AI literacy requires that we know when *not* to use AI technologies, AI literacy also requires that we "understand how algorithms shape our perception of reality, how AI biases work, what mechanisms determine the presence of certain content in our feeds, what the economic principles and models of the AI economy are and how they might change."[37] AI literacy requires the teaching of discernment, and there must be standards for that discernment. These standards must incorporate "the dignity of the human person, the universal destination of goods, the preferential option for the poor, care for our common home and peace," so that discernment and those standards for discernment can be translated "into practices such as responsible planning, the assessment of human and social impact, the inclusion of the most vulnerable, the promotion of digital literacy and

[34] Leo XIV, *Magnifica Humanitas*, §14.
[35] Leo XIV, *Magnifica Humanitas*, §140.
[36] Leo XIV, *Magnifica Humanitas*, §147.
[37] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

guiding research and industry toward justice and peace."[38] AI literacy is thus inseparable from AI ethics and the integral development of the human person. No AI literacy program is sufficient unless it is grounded in an AI ethic and rightly situated within the horizon of integral human development and the common good. Because of this, discernment should also include assessing (or learning how to assess), according to the areas for vigilance outlined at the end of chapter 3, the specific ways in which the design, deployment, or use of a particular AI application might do harm. Again, we must teach "how to exercise restraint in the use of AI and to protect our young people from the promise of the perfect machine, from that subtle temptation which renders human thought seemingly superfluous precisely when it is most needed."[39]

A key aspect of teaching AI literacy and AI ethics is the cultivation of prudential reasoning about the extent to which a given AI technology is developed, built, deployed, and/or used. Discerning prudently about AI technologies cannot be done in the abstract since AI is not just one thing. Evaluating AI technologies requires specificity and concrete reflection on the exact AI technology or application in question, *how* that exact technology is built, *who* builds that technology, *what* the proposed use(s) of that specific application are, *what* the desired outcome is, and *what* the known risks or areas of vigilance are for that specific AI technology or application. As noted in the introduction, prudence is a virtuous sensitivity to the concrete good in all its dynamism and complexity. Thus, prudence as an activity is not equivalent to following a book of rules. For prudence is the intelligent activity that applies rules to diverse circumstances.

A major contemporary problem with the majority of the easily and publicly available existing AI literacy material and literature is that AI is more often than not described anthropomorphically. Any resources claiming to promote AI literacy that anthropomorphize AI models or AI technologies to describe what they are and how they work are not good

[38] Leo XIV, *Magnifica Humanitas*, §14.
[39] Leo XIV, *Magnifica Humanitas*, §140.

resources because they are distorting what AI models are, how they work, and how they are used in various new and emerging technologies. *Magnifica Humanitas* reaffirms that truth is a common good that the family, schools, and educational institutions have a duty to protect. As such, many descriptions of what "AI" is and how "it" works (as if it were a singular entity, which it is not!) can be deceptive because they use entirely anthropomorphized language and biological analogies to describe the technical phenomena. These accounts avoid using technical language and often avoid fully describing how the systems function. As Leo XIV notes, "Media, information and AI literacy will help individuals avoid conforming to the anthropomorphizing tendencies of AI systems, and enable them to treat these systems as tools and always employ external validation of the sources provided by AI systems—which could be inaccurate or incorrect."[40]

## Conclusion

Given the number of judgments in this chapter that argue for a fairly restrictive approach, readers may wonder whether there are any areas of education where AI technologies are especially worth exploring or likely fit well with integral learning. With some important exceptions (especially related to disability-related uses), the most promising areas of such exploration have less to do with using AI tools to attain educational objectives and more with helping students towards the kinds of AI uses that genuinely advance knowledge and the common good. In other words, we suggest that normally the question of good AI use in education is a matter of "education for AI use" rather than "education through AI use." What do we mean by this?

We want to stress the difference between this approach and frequently voiced proposals for sacrificing substantive components from an integral education (especially from the humanities) in order to train students to use AI in economically profitable ways right after graduation. This does not

[40] Leo XIV, "Message of His Holiness Pope Leo XIV for the 60th World Day of Social Communications."

just invert the value system this entire book has been proposing. It also fails students at an economic/material level because it focuses too much on giving students a short-term edge, often in competition for a first-mover advantage in the AI gold rush. Business leaders, however, remind us that they actually prefer to have liberal arts students for the long haul. The random success stories of high school dropouts who became Silicon Valley entrepreneurs should not distract us from what is generally true: even for long-term economic security, integral learning is a better bet than a narrowly focused preparation for surface-level AI-readiness.

To prepare students well for a world influenced, or even dominated, by AI is not simply to acclimate students to the use of AI as early and as often as possible. Correlatively, to engage technology with an orientation to integral human development and, therefore, human flourishing, students must be invited to a certain critical distance from technology.[41] Here the term "critical" does not refer to criticism, as if we were arguing that students must learn to view technology negatively. Rather, it denotes thoroughgoing analysis. Just as metacognition interrupts the flow of immersion in one's lived experience, so does critical distance from technology allow one to reflect on both the various affordances opened by a given technology and the multiple implications of those affordances in a given context. In other words, students should be given the opportunity to interrogate the world that results from a predominant interpretation of the use of a technology in a given context and so to creatively imagine other possible worlds entailed by other uses of that technology. Indeed, such interrogation is crucial especially in a context defined by injustice. Genuine integral development cannot be achieved by some to the exclusion and at the expense of others. Because uses of technology have systemic implications, orienting education to the formation of just persons requires that students be invited to the aforementioned critical distance. This is what is meant by educating for AI use.

[41] Leo XIV, *Magnifica Humanitas*, §140.

Second, we have argued that wise and creative AI uses depend on the prior acquisition of a solid foundation of skills that require direct, persistent, and personally engaged experience. Wise and creative AI use depends on an education committed strongly (though perhaps not completely) to AI askesis—the initial restriction of use for the sake of acquiring the habit of good use.[42] Here the term "askesis" alludes to a component of the wisdom of the Christian monastic tradition. However, we apply it in a novel way to AI so as to evoke the habits by which one might become the sort of person who can and will use AI well. The default uses most easily adopted by both students and teachers may, by contrast, prevent students from growing into the sorts of people who can make the best of the true gifts AI technologies can give humanity and creation. Hence, in general, we think that good uses of AI will be found in secondary- and college-level learning, where students will be more ready to explore creative uses without cutting corners on their own formation. This is not to advocate for an education that is constituted early on only by rote activities or drudgery. We have highlighted the importance of wonder in education throughout this volume. However, complex skills are built from the conjunction of simpler activities. So, to develop excellence in the complex requires that one first develop excellence in the simple. Often, the simple is a matter of memorization, repetition, and what does not so easily pique the student's interest. And it is through the acquisition of simple skills that one gains the habitual framework from which intelligent creativity emerges with relative ease. Thus, if AI technologies incentivize various forms of cognitive offloading, then introducing students to such technologies early in their education will stymie their attainment of excellence in complex skills. Significantly, this will lead to the inability to approach AI technologies creatively. So, in seemingly paradoxical fashion, early immersion in the use of AI technologies renders one less sensitive to negative uses of AI technologies in the long run.

[42] The word "askesis," also spelled "ascesis," is related to the word "asceticism."

But discernment of the prudential integration of AI technologies in education should not consist only of reflection on the impact of AI technology use on the development of individual students. Education is a thoroughly social affair. Decisions regarding the shape of education should, therefore, be the fruit of broad consultation and of a preferential option for the perspective of the most vulnerable and marginalized among us. Furthermore, education must foster bonds of solidarity not only between the persons in the classroom but also between the persons in the classroom and the many other societies to which they are connected. Given the reservations about bias, inequality, and isolation that we have expressed throughout this book, placing a premium on solidarity can work as a stay against the negative consequences of using AI technologies.

Still, an education for integral human development cannot stop at identifying with bonds of solidarity. It must also do its part to prepare students and teachers to work for the common good of the persons and groups involved in those webs of solidarity. So, the curriculum should expose and encourage cooperation toward goods that can only be held in common: justice, transparency, accountability, love, truth, etc. As we have seen throughout this work, the use of AI will not lead inevitably toward greater cooperation. It is a tool that will have to be bent in that direction. The largest context in which these creative protagonists participate in education is the created order of a good and loving God. So, whenever it is possible, and with due deference to the integrity of each academic discipline, the curriculum and its lessons should foster transcendence: a lived experience that everything we are doing matters in the greater story that God is writing throughout history.

As we have demonstrated throughout this work, the use of AI technology has a lot to do with our relationships with others. It has the potential to foster social bonds when it is used well. But we have good reason to be concerned that some uses of AI technology could be antisocial if we are not vigilant. It will be up to all stakeholders to judge whether a

given use of AI technology is promoting or obstructing the loving reciprocity at the heart of any thriving community.

However, educating for this social reality is not something that can be limited to any particular place and time, such as within the walls of schools during school hours. Our social nature implicates each of us across the planet and throughout time. So, an education for integral human development must be mindful of traditions that stretch far back and roots that sink down deep. And since no given tradition has mastered the art of being human, this curriculum must do what it can to safeguard cultural goods and the diverse legitimate understandings of "wellbeing" found within the human community. Whether the use of AI could prove useful in protecting these goods is very much the question. But it seems to us that the use of AI technologies could be bent in this direction. It will be up to all stakeholders to ensure that this happens.

Education for integral human development recognizes the place of teachers and students in the many deep traditions that make life possible and meaningful. At the personal level, educators share with parents the responsibility for handing on to students their culture's vision of how to become trustworthy people. As noted in Chapter Two, "We are relational beings and our vocation, as such, is to the communion of persons;"[43] "we exist *with* others and *for* others."[44] This community is both contemporary and historical. Individual trustworthiness within such a community nurtures the fraternity and solidarity that the Catholic social teaching tradition identifies as key indicators of healthy social relations.

This trustworthiness can serve as the basis of an alliance formed for the sake of resisting AI products rooted in "business models that monetize attention and time."[45] According to Leo XIV, this alliance should be fundamentally communal, a matter of cooperation among families,

[43] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §3.
[44] Pontifical Council for Justice and Peace, *Compendium of the Social Doctrine of the Church*, §165.
[45] Leo XIV, *Magnifica Humanitas*, §142.

educators, policy-makers and more. If we are irreducibly social, and if we cannot promote true integral development without promoting the common good, then social trends that isolate us detract from human flourishing in a fundamental way. The goods of education and the conditions of integral development should be safeguarded by multiple, cooperating actors and agencies. Parents alone cannot face the challenges to their child's integral development presented by technocracy. Systems, institutions, dialogue, and mutual aid together form the necessary basis for addressing the challenges of our time, the so-called age of AI.

Finally, it must be reiterated that this volume has been an invitation to dialogue to the end of facilitating prudential discernment in concrete contexts. This volume should not, therefore, be taken as a manual that tells educators what to do with regard to AI technology if they are to accomplish their tasks well. On the contrary, this volume has provided a set of considerations that should inform but not determine the decisions educators make as they face the various opportunities and challenges presented by AI technologies. Again, the point is not to burden educators with a further set of imperatives. Rather, this volume invites one to a consideration of the true end of education and to a reflection on the various implications of AI technologies for the attainment of that end. That true end is an orientation to God that includes the flourishing of everything. In this sense, what has been provided is a non-reductive vision, a way of seeing that entails certain ways of acting that respect the fundamental dignity of the human being as imaging God and so not being exhausted by any finite purpose.

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