HUMAN CENTRIC INTELLIGENCE IN INDUSTRY 5.0: WHAT SKILLS DO GRADUATES REALLY NEED?

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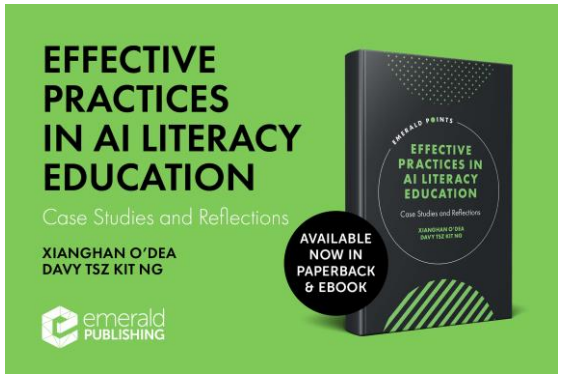
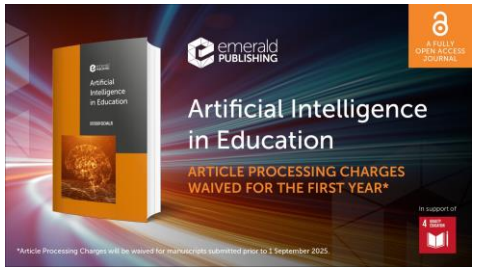
European University Alliance





AVAILABLE AT

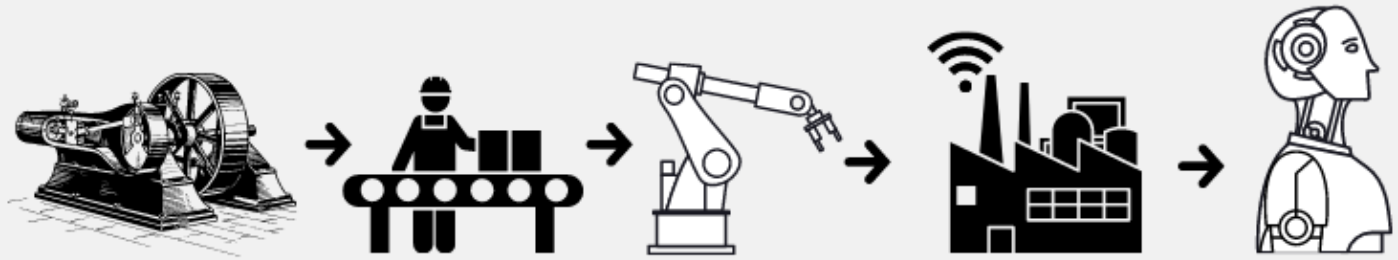
About Christine

- Senior Lecturer, Department of Public Services Management & Organisation (PSMO), King's Business School
- Research interests: GenAI literacy, GenAI in HE, digital transformation.
- Academic chair: Knowledge Hub on AI, Circle U (European University Alliance)
- Principal Investigator (PI) of a QAA project (24-25)
- Co Investigator (Co-I) of a QAA project (25-26)
- Co-Editor-in-Chief: Acritical Intelligence in Education (Emerald, open access)

KNOWHOW

Industrial

REVOLUTIONS



Industry 1.0	Industry 2.0	Industry 3.0	Industry 4.0	Industry 5.0
mechanization, water and steam powers	mass production, electric power, assembly line	computers, automated production, electronics	cyber-physical systems, IoT, networking, machine learning	human-robot collaboration, cognitive systems, customization
1800	1900	2000	2010	2020

Matuszak, J (2024)

JOB LEVELS IN THE WORKPLACE

primarily routine and consist mainly of manual and repetitive tasks, such as office clerks and housekeeping
low skills jobs are most likely to be substituted by AI

Low skilled

involving cognitive tasks, but not at the advanced level seen in higher-skilled positions. Roles like researchers and data analysts combine both cognitive and manual tasks

Middle skilled

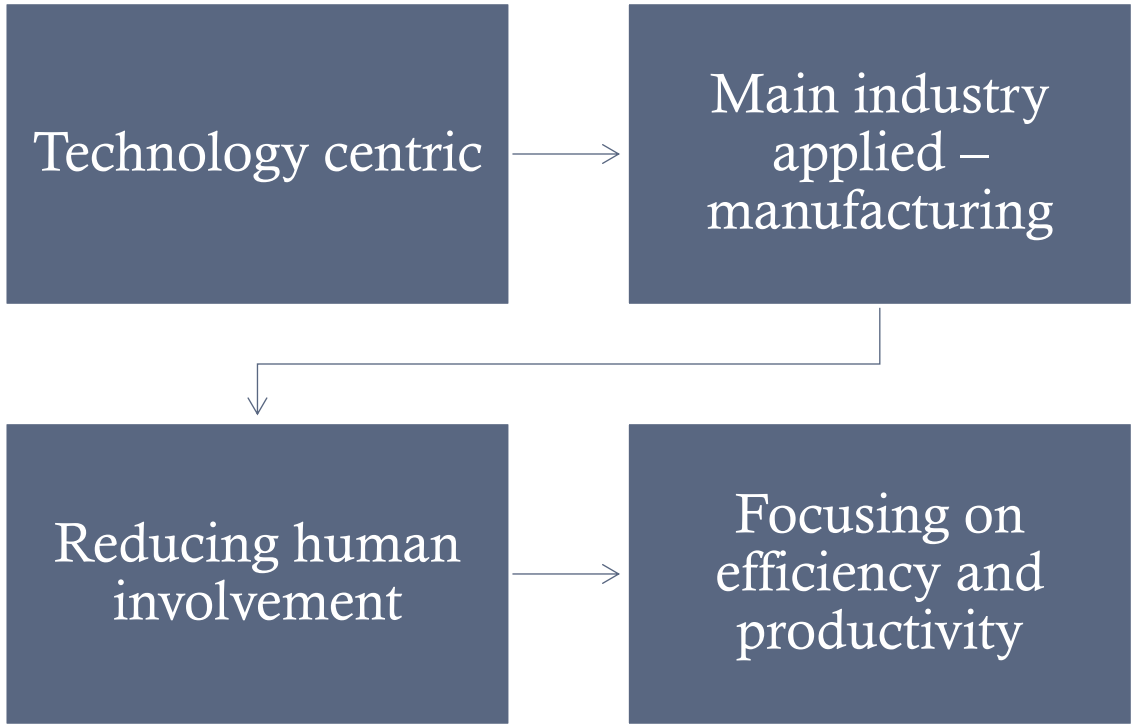
refer to managerial and professional jobs (e.g, senior managers, doctors). These roles typically require individuals to engage in cognitive, non-routine activities such as decision-making, problem-solving

High skilled

Brekelmans & Petropoulos, 2020

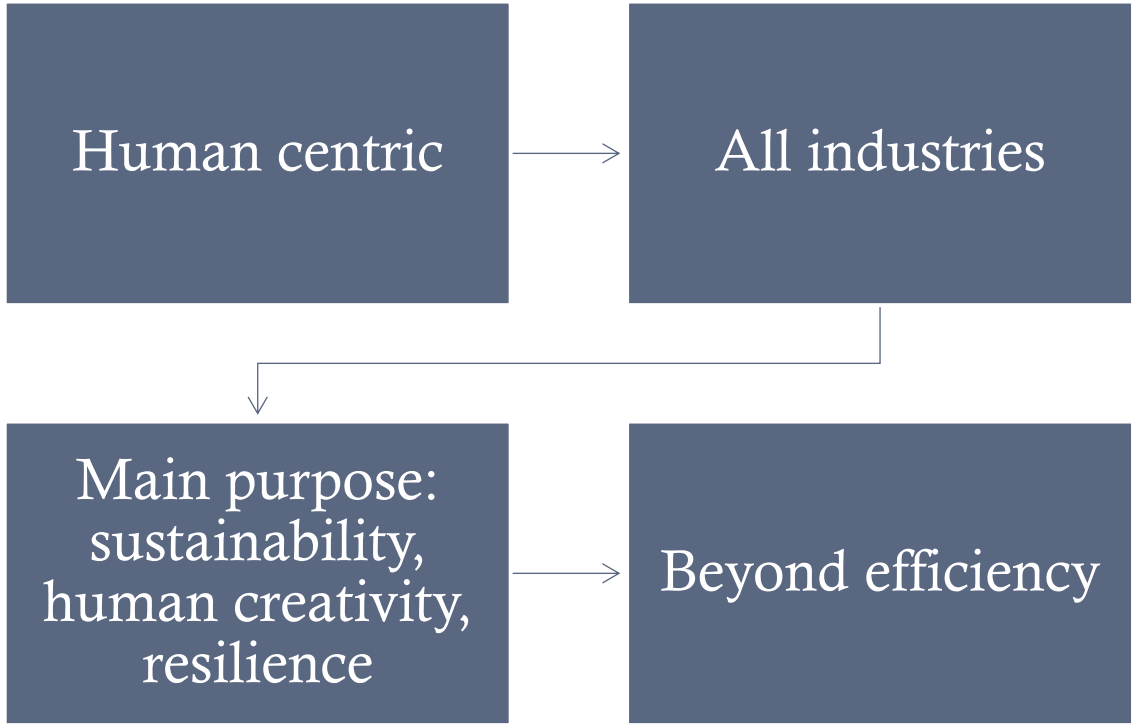
FROM INDUSTRY 4.0 TO 5.0: THE SHIFTING LANDSCAPE

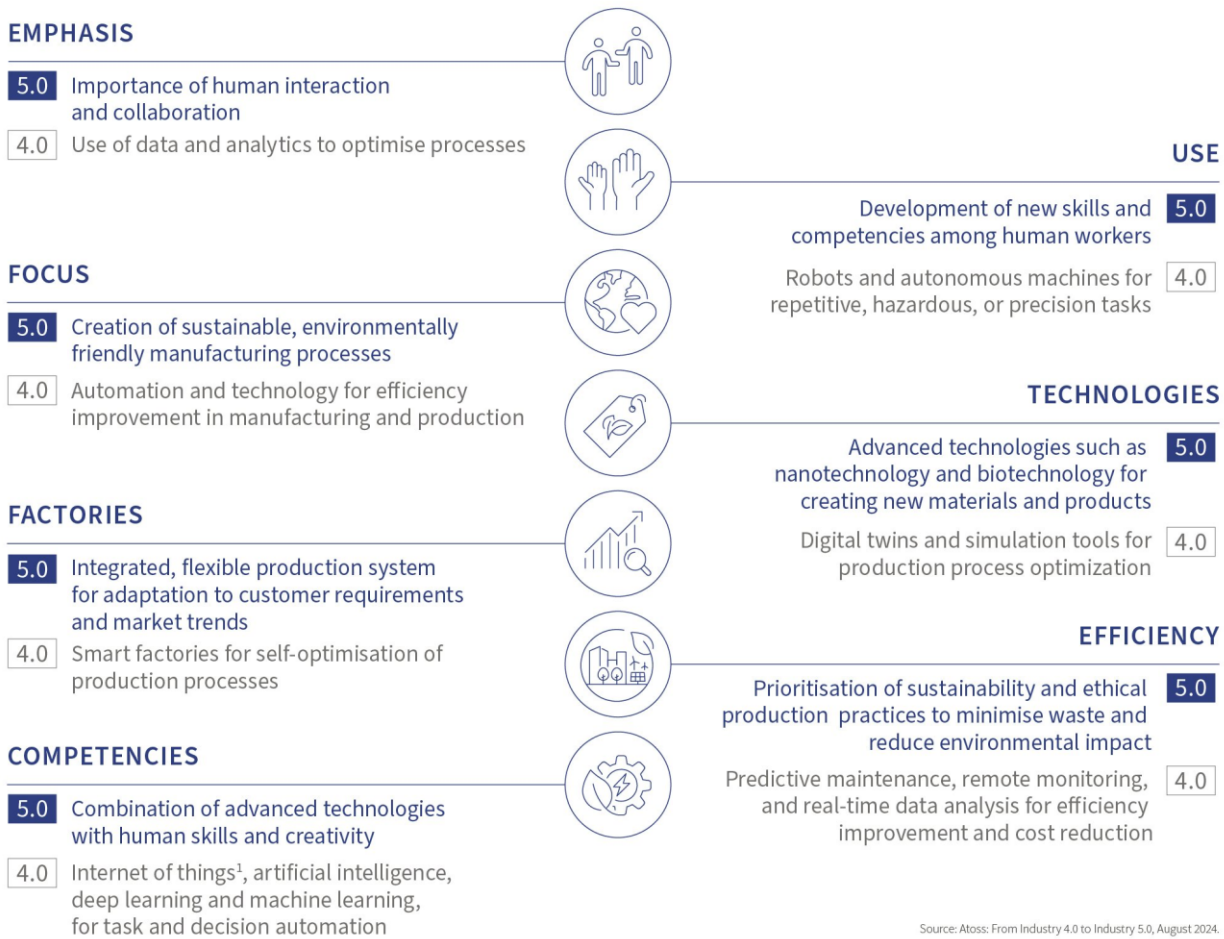
Industry 4.0, the fourth industrial revolution



FROM INDUSTRY 4.0 TO 5.0: THE SHIFTING LANDSCAPE

Industry 5.0, the fifth industrial revolution

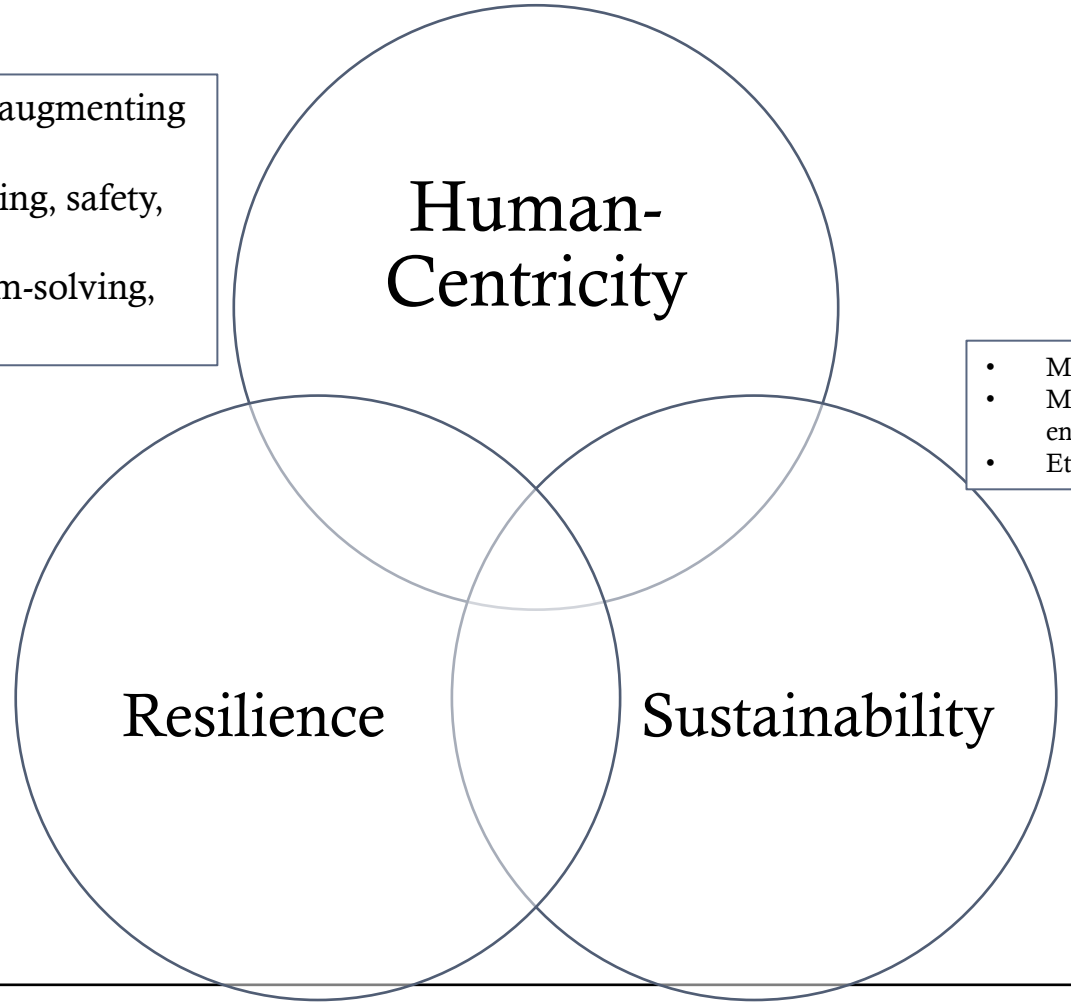




Harbeke & Kunlen, 2024

THE THREE PILLARS OF INDUSTRY 5.0

- Not replacing humans but augmenting human capabilities.
- Prioritizing human well-being, safety, and meaningful work.
- Focus on creativity, problem-solving, and critical thinking.



- Moving towards circular economy models.
- Minimizing environmental impact (waste, energy, emissions).
- Ethical and responsible production.

- Ability to withstand and adapt to disruptions (pandemics, supply chain shocks).
- Robust design and contingency planning.
- Agility and adaptability in manufacturing.

FROM INDUSTRY 4.0 TO 5.0: THE SHIFTING LANDSCAPE

Industry 4.0, the fourth industrial revolution

Industry 5.0, the fifth industrial revolution

From **human vs machine** to **human + machines**

Why this shift matters: societal expectations, environmental concerns, need for adaptability.

AI assists in decision-making, analyzes data, and predicts trends, but human creativity and critical thinking steer the direction

Current situation: a major concern on whether humans will be replaced by machines?

What does industry want? – **knowing what to do when you don't know what to do** (problem solving, solution oriented).

An important question to ask: **what does this mean for the future workforce, particularly for university graduates?**

ESSENTIAL COMPETENCES FOR INDUSTRY 5.0

Technology literacy

AI/GenAI literacy; awareness of new technologies

Innovation and creativity

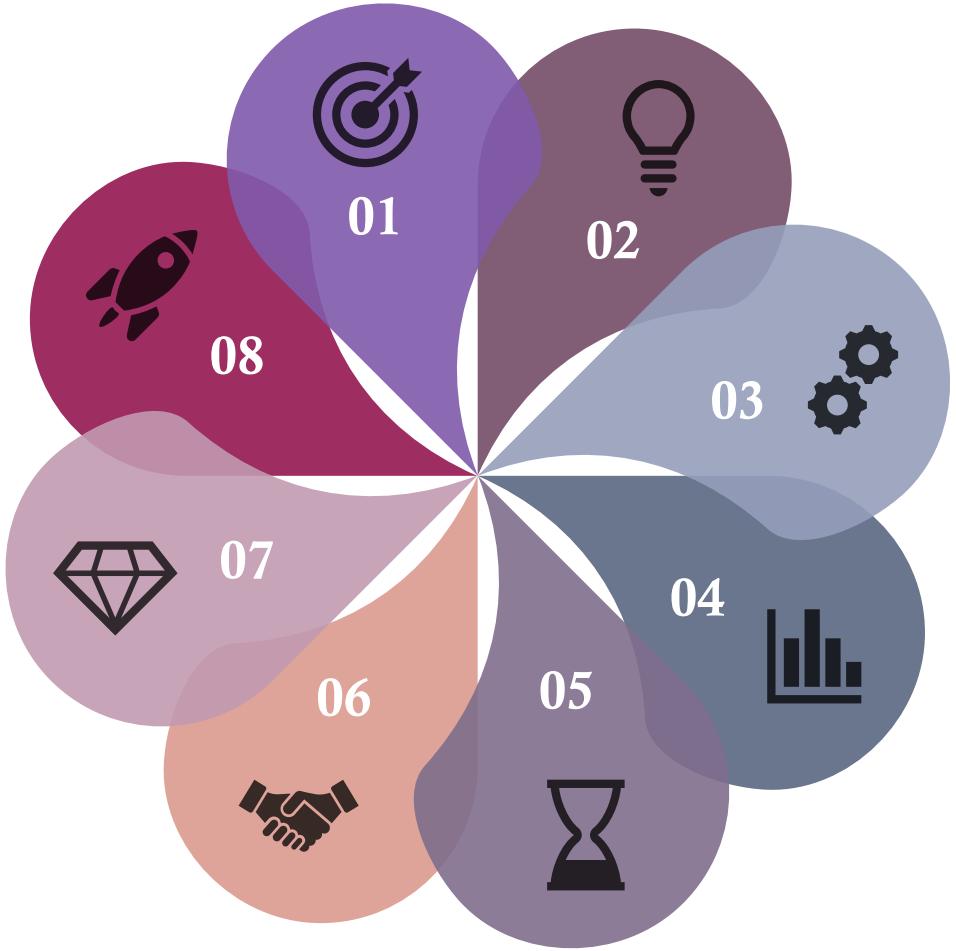
Human creativity and inventiveness – fresh ideas, being innovative

Complex problem solving

Analysing complex systems, spotbottlenecks, and come up with effective solutions.

Emotional intelligence

Recognising and effectively controlling theirown emotions as well as those of their co-workers and clients..



Adaptability and lifelong learning

Embracing adaptation and be receptive to ongoing learnin.

Data literacy

Ability to gather, understand, analyse, and extrapolate knowledge

Collabration and communication

Collaborating effectively in cross-disciplinary teams, share knowledge, and discuss ideas

Ethics and values

Be aware of the ethical ramifications of their actions, comprehend how they may af-fect society, and act in a way that upholds principles like justice, accountability, and transparency

Suganya et al., 2024

ESSENTIAL COMPETENCES FOR INDUSTRY 5.0

Benefits	Explanation
Increased flexibility and work-life balance	Remote work allows individuals to have more control over their schedules and work from environments that suit their needs, resulting in better work-life balance.
Access to a global talent pool	Remote work enables organizations to tap into diverse talent from around the world, accessing a broader range of skills and expertise.
Reduced commuting time and cost	By eliminating the need for daily commuting, remote work saves time and money spent on transportation, reducing stress and improving quality of life.
Improved productivity and focus	Remote work offers fewer distractions and interruptions, allowing individuals to focus on tasks and increase productivity.
Reduced environmental impact	By eliminating the need for daily commutes, remote work reduces carbon emissions, contributing to a more sustainable future.
Enhanced diversity and inclusion	Remote work breaks down geographical barriers, enabling individuals from diverse backgrounds to work together and fostering inclusivity.

INDUSTRY READINESS

- Businesses are still heavily engaged in Industry 4.0, or even earlier versions
- Barriers and challenges
  - Leadership resistance, policy transformation - McKinsey report
  - Skill gaps of employees
  - Infrastructure
  - Change of culture – calling for a change in mindset from one that prioritizes short-term gains to one that is more long-term, as well as a stronger openness to accept experimentation and innovation.

Miniotec, n.d.

ARE ORGANIZATIONS READY FOR INDUSTRY 5.0?

It depends

- Industry 5.0 is offering enormous opportunities.
- Demanding a large time, effort and financial investment.
- May need to instil increased efforts

> “In this new era of collaborative machine/human interaction, those that can successfully incorporate cutting-edge technologies while simultaneously taking into account the human, resilience and sustainability aspects mentioned above will be in the best positions to succeed.”

Miniotec, n.d.

GRADUATE EMPLOYABILITY AND ATTRIBUTES

- Different names in different country contexts
- Overarching qualities, skills, values that universities and tertiary institutions strive to develop in their graduates holistically
- Representing a wide set of transferable skills needed for diverse industries and dynamic societies

WHERE ARE THE GAPS?

What universities teach

- Fundamental and essential key skills
- Subject specialist knowledge and skills
- Theoretical knowledge
- The process in problem solving
- Application of knowledge to the real world to some extent
- Scaffolded, excellent pastoral support

What industries want

- Be ambidextrous
- A more holistic set of skills
- Interdisciplinary collaboration
- Think on the spot
- Think outside the box
- Responsive and adaptative to changes (ongoing and new)

What should universities do?

FUTURE-PROOF CURRICULUM

Identifying deficiencies in existing educational programs at Higher Education Institutions (HEIs) and to assess their ability to adapt to rapid industrial changes (Kocha et al., 2025).

Balancing breadth and depth
Potentially shortage of skilled educators

RAPID TECHNOLOGICAL ADVANCEMENT

Artificial intelligence, robotics, quantum computing, and biotechnology

LIFELONG LEARNING

Graduates must possess not only specific skills but also the ability to adapt, learn, and unlearn as technologies evolve

Gu Rankings, n.d.

Strategies

Agility & adaptability

The emphases should be on adaptable skills such as critical thinking, problem-solving, and creativity

Interdisciplinary learning

Fostering collaboration between diverse fields and encourage holistic problem-solving

Digital literacy & data fluency

Digital literacy skills and the ability to analyze and interpret data, ensuring they can navigate the information-rich landscape of Industry 5.0.

Soft skills & emotional intelligence

Develop soft skills like emotional intelligence, empathy, and effective communication to enhance collaboration and human-machine interaction

Industry partnership

facilitating hands-on experience, internships, and real-world projects that bridge the gap between academia and practice

Lifelong learning mindset

Integrating continuous skill development and self-directed learning into curricula

Gu Rankings, n.d.

INDUSTRY AND UNIVERSITY COLLABORATION

We are doing all the right things; however, the connection and collaboration need to be strengthened

- Scenario-based learning and problem solving (industry led challenges)
- Using agile methodologies for rapid prototyping and iterative development cycles
- Emphasis on Soft Skills and Emotional Intelligence in Applied Settings

Thank you!
Any questions?

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