

The Real Shortage isn't Jobs - It is Problem Solvers: Reimagining Higher Education and Employability in the Age of Artificial Intelligence

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Abstract

The global labour market is undergoing substantial transformation as a result of artificial intelligence (AI), automation, digitalisation, economic uncertainty and changing patterns of employment. Although higher education continues to provide essential disciplinary knowledge and academic credentials, possession of a degree alone may not adequately prepare graduates for complex and unfamiliar workplace situations. This conceptual paper examines the growing importance of problem-solving, analytical thinking, creativity, adaptability, collaboration, lifelong learning and responsible technological use in the emerging world of work. Drawing on recent evidence from the World Economic Forum, International Labour Organization, Organisation for Economic Co-operation and Development, UNESCO and World Bank, the paper argues that technological transformation is more accurately understood as a process of task and occupational transformation rather than simply job elimination. The paper further examines the implications of artificial intelligence for graduate employability and proposes a problem-solving-oriented educational framework integrating disciplinary knowledge, human competencies, AI literacy and experiential learning. Four conceptual models and four analytical tables are presented to demonstrate the relationship between education, technological change, human capabilities and employability. The paper concludes that higher education institutions should move beyond predominantly knowledge-transmission and examination-oriented approaches towards learning environments that cultivate inquiry, experimentation, interdisciplinary collaboration, ethical judgement and real-world problem-solving. Degrees may provide access to employment opportunities, but the ability to apply knowledge intelligently and responsibly is increasingly central to sustainable employability.

Keywords: Artificial Intelligence, Employability, Problem-Solving, Higher Education, Future Of Work, Critical Thinking, Lifelong Learning, Digital Skills, Human Capabilities, Skills Transformation.

CONTENT

- Introduction
- Route Map 1. From Degree-Centered Education to Problem-Solving-Centered Employability
- Conceptual Orientation and Methodology

- Beyond the Degree: From Qualification to Capability
- Table 1. Traditional Qualification Model and Emerging Capability Model
- Artificial Intelligence and the Transformation of Work
- Table 2. Human and AI Capabilities in the Emerging Workplace
- Route Map 2. Human-AI Complementarity Model
- The Changing Nature of Employability
- Table 3. Core Employability Competencies for an AI-Enabled Labour Market
- The Apollo 13 Lesson: Knowledge Under Pressure
- Route Map 3. The Problem-Solving Cycle
- Rethinking Higher Education
- From Examination Questions to Real-World Problems
- The Future of Work Requires Lifelong Learning
- Interdisciplinary Problem-Solving for Global Challenges
- Responsible Use of Artificial Intelligence
- Implications for Key Stakeholders
 - a) Educational Institutions
 - b) Faculty Members
 - c) Employers
 - d) Governments
 - e) Students
- Discussion
- Recommendations
 - a) Curriculum Recommendation
 - b) Assessment Recommendation
 - c) AI Education Recommendation
 - d) Industry Collaboration Recommendation
 - e) Faculty Development Recommendation
 - f) Lifelong Learning Recommendation
 - g) Equity Recommendation
- Conclusion

References

Introduction

For decades, a university degree has been widely regarded as an important pathway to professional employment and social mobility. Higher education provides disciplinary knowledge, intellectual development, professional preparation and recognised credentials. However, the relationship between academic qualifications and employment outcomes is becoming increasingly complex. Rapid technological change, artificial intelligence, automation, economic restructuring and changing employer expectations are reshaping the skills required in contemporary workplaces.

The central issue is therefore not simply whether sufficient jobs will exist in the future. A more significant question is whether graduates possess the capabilities required to perform effectively

when workplace problems are unfamiliar, ambiguous and constantly changing. The original argument underlying this paper is that the emerging labour market has a growing need for individuals who can interpret information, identify problems, generate alternatives, make judgements, collaborate with others and transform knowledge into meaningful action.

The World Economic Forum's Future of Jobs Report 2025 identifies analytical thinking as the most sought-after core skill among employers. It also reports that approximately 39% of workers' existing skill sets are expected to be transformed or become outdated during the 2025–2030 period. At the same time, resilience, flexibility, creative thinking, leadership, technological literacy and lifelong learning are expected to remain increasingly important.

The International Labour Organization (ILO) provides an important qualification to the popular narrative of widespread AI-driven unemployment. Its 2025 analysis estimates that approximately one in four workers globally are in occupations with some degree of generative AI exposure, while emphasising that transformation of jobs is more likely than complete replacement in most cases because human input remains necessary.

Consequently, the future of employability requires a shift from a qualification-centered model towards a capability-centered model. This does not mean that degrees are becoming irrelevant. Rather, degrees need to become foundations upon which graduates develop the capacity to apply knowledge in changing environments.

Route Map 1. From Degree-Centered Education to Problem-Solving-Centered Employability

TRADITIONAL EDUCATION

Knowledge Acquisition

Examination Performance

Degree / Qualification

Employment Expectation

TECHNOLOGICAL & LABOUR-MARKET CHANGE

EMERGING EDUCATION MODEL

Knowledge + Critical Thinking

Problem Identification

Creative Solution Generation

Collaboration + AI Literacy

Judgement + Responsible Action

Sustainable Employability

Conceptual Orientation and Methodology

This paper adopts a conceptual and narrative-review approach. It reframes the supplied manuscript through current international literature and institutional reports on employment, skills transformation, AI, education and human capabilities.

The conceptual discussion is informed by selected publications from the World Economic Forum, ILO, OECD, UNESCO and World Bank. These sources were selected because they provide internationally recognised evidence concerning labour-market transformation, skills development, technology and education.

The paper does not claim to present primary survey data, experimental findings or original econometric analysis. Instead, it synthesises existing evidence to develop a conceptual argument: problem-solving capability should become a central objective of higher education and graduate employability development.

This approach is consistent with the OECD Learning Compass 2030, which emphasises student agency and the ability of learners to navigate unfamiliar contexts rather than merely receive fixed instructions.

Beyond the Degree: From Qualification to Capability

A university degree continues to have significant value. It provides structured knowledge, disciplinary foundations, intellectual habits and an initial signal of academic achievement. However, knowledge becomes economically and socially valuable when individuals can apply it effectively.

Workplace problems rarely resemble examination questions. They may contain incomplete information, conflicting priorities, limited resources, uncertain outcomes and multiple possible solutions. Employees therefore require more than the ability to reproduce information.

Problem-solving involves a sequence of cognitive and practical processes:

1. recognising and defining a problem;
2. collecting and evaluating relevant information;
3. analysing causes and relationships;
4. generating possible solutions;
5. evaluating alternatives;
6. implementing an appropriate response; and
7. reviewing the outcome and learning from it.

The World Bank's World Development Report 2019 similarly observes that technological change is reshaping the demand for skills and highlights complex problem-solving, teamwork and adaptability as increasingly important capabilities.

Table 1. Traditional Qualification Model and Emerging Capability Model

Dimension	Traditional Orientation	Emerging Orientation
Primary emphasis	Qualification	Capability
Learning focus	Knowledge acquisition	Knowledge application
Assessment	Examination and recall	Performance and problem-solving
Workplace preparation	Discipline-specific	Interdisciplinary
Technology	Supporting tool	Collaborative and analytical tool
Student role	Knowledge receiver	Active problem solver
Teacher role	Knowledge transmitter	Facilitator and learning designer
Career development	Qualification completion	Continuous learning
Success indicator	Academic achievement	Value creation and adaptability

The distinction should not be interpreted as a rejection of academic knowledge. Rather, knowledge and problem-solving are complementary. Problem-solving without knowledge can become superficial; knowledge without application can remain disconnected from real-world needs.

Artificial Intelligence and the Transformation of Work

Artificial intelligence is changing the relationship between humans, information and work. AI systems can increasingly perform tasks involving information processing, content generation, pattern recognition, summarisation and data analysis. The key issue, therefore, is not simply whether AI will eliminate employment. The more important question concerns which tasks will be automated, which will be augmented, and which will continue to require distinctly human capabilities. The ILO's 2025 research suggests that generative AI exposure is widespread, but that transformation rather than full replacement is the more likely outcome for most occupations.

The OECD likewise reports that human capabilities such as problem-solving, creativity and innovation remain important alongside technological and data-related competencies.

Table 2. Human and AI Capabilities in the Emerging Workplace

Capability	AI Strength	Human Contribution
Information processing	Very high	Interpretation and contextual understanding
Pattern recognition	Very high	Critical evaluation of significance
Content generation	High	Purpose, originality and ethical judgement
Data analysis	High	Question formulation and decision context
Routine automation	Very high	Monitoring and responsible oversight
Problem definition	Limited by given objectives	Human judgement
Ethical decision-making	Context-dependent	Values and accountability
Empathy and interpersonal interaction	Limited	Human relationships
Strategic judgement	Supportive	Responsibility and long-term vision
Creative direction	Generative assistance	Meaning, purpose and innovation

The UNESCO AI Competency Framework for Students similarly emphasises a human-centered mindset, AI ethics, AI techniques and applications, and AI system design, with learners progressing from understanding to applying and creating.

Route Map 2. Human–AI Complementarity Model

ARTIFICIAL INTELLIGENCE

Data Analysis

Pattern Finding

Content Generation

HUMAN EVALUATION

Context

Ethics

Judgement

DECISION MAKING

RESPONSIBLE ACTION

The emerging workplace should therefore not be understood as a simple competition between human workers and machines. A more productive perspective is one of human–AI complementarity, in which technology extends human capability while humans provide direction, context, judgement and responsibility.

The Changing Nature of Employability

Employability is increasingly multidimensional. Technical knowledge remains important, but employers also value transferable capabilities that allow individuals to function effectively in uncertain environments. The World Economic Forum's 2025 report identifies analytical thinking as the leading core skill, followed by resilience, flexibility and agility, leadership and social influence. Creative thinking, curiosity and lifelong learning and technological literacy are also among the capabilities expected to remain significant.

Table 3. Core Employability Competencies for an AI-Enabled Labour Market

Competency	Meaning	Workplace Application
Analytical thinking	Examining information systematically	Diagnosing organisational problems
Problem-solving	Developing and evaluating solutions	Responding to unexpected challenges
Critical thinking	Questioning assumptions and evidence	Evaluating AI-generated information
Creativity	Producing novel possibilities	Innovation and product development
Adaptability	Responding effectively to change	Managing technological transitions
Collaboration	Working productively with others	Interdisciplinary projects
Communication	Expressing ideas clearly	Teamwork and stakeholder engagement
AI literacy	Understanding appropriate AI use	Human–AI collaboration
Ethical judgement	Considering consequences and values	Responsible decision-making
Lifelong learning	Continuously developing capabilities	Reskilling and career mobility

These competencies are interconnected. A graduate may possess strong technical knowledge but struggle to apply it if they cannot communicate, collaborate or adapt. Conversely, transferable skills become more valuable when they are grounded in substantial disciplinary knowledge.

The Apollo 13 Lesson: Knowledge Under Pressure

The Apollo 13 mission provides a powerful historical illustration of applied problem-solving. In April 1970, an oxygen-tank explosion damaged the spacecraft and forced the mission team to abandon its planned lunar landing. The challenge became the safe return of the astronauts. The situation required engineers and astronauts to work within severe constraints. A problem emerged concerning carbon-dioxide accumulation in the lunar module, and the available filtration resources were insufficient for the required period. The ground team therefore developed an improvised solution using materials already available aboard the spacecraft.

The significance of the example is not simply technological achievement. It demonstrates the relationship between knowledge, constraints, creativity, collaboration and action. The lesson is transferable to contemporary workplaces. Engineers may face unexpected system failures; teachers may encounter unfamiliar learning needs; entrepreneurs may respond to market disruption; public officials may manage emergencies; and professionals may have to make decisions when information is incomplete. The supplied manuscript captures this principle by distinguishing between the knowledge required to build the spacecraft and the problem-solving capability required to respond to an unforeseen crisis.

Route Map 3. The Problem-Solving Cycle

IDENTIFY THE PROBLEM

↓
UNDERSTAND THE CONTEXT

↓
COLLECT & EVALUATE DATA

↓
GENERATE ALTERNATIVES

↓
EVALUATE POSSIBLE SOLUTIONS

↓
TAKE ACTION

↓
ASSESS THE OUTCOME

↓
LEARN & ADAPT

↓
NEW PROBLEM

This cycle demonstrates why education should expose students to situations where there is no predetermined answer.

Rethinking Higher Education

Higher education needs to respond to the changing relationship between knowledge, technology and employment. The objective should not be to reduce education to employability training. Universities have broader intellectual, cultural and social responsibilities. Nevertheless, employability must form an important part of contemporary educational design.

The OECD Learning Compass 2030 advocates an educational vision that develops student agency and enables learners to navigate unfamiliar circumstances. It also identifies transformative competencies including creating new value, reconciling tensions and dilemmas, and taking responsibility.

Similarly, UNESCO's 2023 Global Education Monitoring Report argues that technology should support human-centered education rather than simply substitute human interaction.

Higher education institutions can therefore strengthen problem-solving through:

- project-based learning;
- case-based learning;
- interdisciplinary assignments;
- simulations;
- research-based learning;
- community engagement;
- entrepreneurship activities;
- design challenges;
- industry-linked projects;
- reflective learning;
- AI-assisted learning with critical evaluation; and
- authentic performance assessment.

From Examination Questions to Real-World Problems

One of the most important changes required in education concerns assessment. Traditional examinations often reward students who can remember, reproduce and organise information within a specified format. These abilities remain useful, but they do not necessarily demonstrate the capacity to respond to unfamiliar problems.

Assessment should increasingly ask students to:

- analyse authentic situations;
- interpret evidence;
- identify competing perspectives;
- develop alternative solutions;
- justify decisions;
- use digital and AI tools responsibly;
- collaborate with peers;
- communicate findings; and
- reflect on outcomes.

Such assessment would better represent the demands of professional environments.

The shift is particularly important because AI can increasingly assist with routine writing, information retrieval and content production. The educational objective should therefore move towards assessing what students can do with information, rather than merely whether they can reproduce it.

The Future of Work Requires Lifelong Learning

The idea that education ends when a student receives a degree is increasingly difficult to sustain. Technological change continuously modifies occupational requirements.

The World Economic Forum estimates substantial skill disruption between 2025 and 2030, while also reporting that employers increasingly value curiosity and lifelong learning.

Lifelong learning should therefore be understood not merely as participation in additional courses. It includes the capacity to:

- recognise knowledge gaps;
- locate reliable information;
- learn unfamiliar tools;
- evaluate new evidence;
- revise existing assumptions;
- apply new knowledge; and
- continue adapting throughout one's career.

Interdisciplinary Problem-Solving for Global Challenges

The major problems confronting contemporary societies rarely fit neatly within a single academic discipline. Climate change, public health, cybersecurity, sustainable development, energy transitions and technological governance require multiple forms of expertise.

For example, climate-related challenges involve scientific evidence, engineering, economics, public policy, communication, community participation and ethical considerations. No single discipline can independently resolve such complex problems. The ability to work across disciplinary boundaries is therefore becoming increasingly important. Students should be encouraged to recognise relationships among disciplines and understand how different perspectives can contribute to a common solution. The OECD's framework similarly emphasises the capacity to reconcile tensions and dilemmas, deal with complexity and ambiguity, and develop creative and problem-solving capabilities.

Responsible Use of Artificial Intelligence

AI literacy should not mean merely knowing how to operate an AI application. It should include the ability to understand its limitations, assess its outputs and use it responsibly.

Students should learn to ask:

- Is the information accurate?
- What evidence supports the answer?
- What assumptions are involved?
- Could the output contain bias?
- What contextual information is missing?
- Is AI appropriate for this task?
- What human judgement is required?
- Who is responsible for the final decision?

UNESCO's AI Competency Framework for Students emphasises responsible and creative participation in the AI era and includes human-centered thinking, AI ethics, AI techniques and AI system design.

Therefore, AI should be positioned as a tool for learning and problem-solving, not as a substitute for intellectual responsibility.

Implications for Key Stakeholders

a) Educational Institutions

Universities should redesign curricula to integrate disciplinary knowledge with problem-solving, communication, creativity, digital literacy and interdisciplinary learning.

b) Faculty Members

Teachers need opportunities to become learning designers, facilitators, mentors and responsible users of emerging technologies. The OECD's 2025 Teaching Compass similarly highlights the importance of teacher agency and teachers as co-designers of curriculum change.

c) Employers

Employers should move beyond excessive dependence on academic credentials and develop more effective ways of identifying demonstrated competencies.

d) Governments

Governments should support education, digital infrastructure, lifelong learning, reskilling and equitable access to emerging technologies.

e) Students

Students should recognise that graduation represents a foundation rather than the end of learning. They need to develop curiosity, adaptability, ethical judgement and the ability to learn continuously.

Discussion

The evidence reviewed in this paper supports a shift from a narrow interpretation of employability towards a broader capability framework. The changing labour market does not necessarily indicate a simple decline in employment opportunities. Rather, technological change is redistributing tasks, transforming occupations and altering the relative value of different competencies.

The ILO's evidence is particularly important because it challenges deterministic claims that AI will simply eliminate large numbers of jobs. Its 2025 analysis indicates that transformation is more likely than complete replacement for most occupations.

Similarly, the World Economic Forum identifies analytical thinking, resilience, flexibility, creative thinking and technological literacy among the skills shaping the future labour market.

These findings suggest that the future worker is likely to require a hybrid capability profile: disciplinary knowledge + human skills + digital competence + AI literacy + ethical judgement + lifelong learning.

The implications for higher education are significant. Institutions that continue to measure educational success predominantly through examinations may risk preparing students for environments that no longer resemble contemporary workplaces. Conversely, institutions that integrate knowledge with authentic problem-solving can strengthen students' capacity to navigate uncertainty.

UNESCO's work on technology in education reinforces this argument by emphasising that technology should serve educational purposes and human interaction rather than simply replace them.

The central argument can therefore be expressed as follows:

The future of employability will depend less on what graduates know in isolation and more on how intelligently, creatively and responsibly they can use what they know.

Recommendations

Based on the conceptual analysis, the following recommendations are proposed:

a) Curriculum Recommendation

Higher education curricula should integrate problem-solving and employability competencies across disciplines rather than treating them as isolated add-on courses.

b) Assessment Recommendation

Universities should increase the use of authentic, project-based and scenario-based assessment.

c) AI Education Recommendation

AI literacy should include ethical judgement, verification, critical evaluation and responsible use rather than tool operation alone.

d) Industry Collaboration Recommendation

Universities should collaborate with employers to design authentic problems, projects and simulations that reflect contemporary workplace conditions.

e) Faculty Development Recommendation

Faculty members should receive continuous professional development in AI-enabled pedagogy, interdisciplinary teaching and experiential learning.

f) Lifelong Learning Recommendation

Institutions should provide pathways for continuous reskilling and upskilling beyond graduation.

g) Equity Recommendation

Access to digital technologies and AI-enabled learning opportunities should be designed with inclusion and equity in mind.

Conclusion

The central challenge facing graduates in the emerging world of work is not adequately explained by the simple question of whether there will be enough jobs. Technological change is transforming occupations, tasks and skill requirements. Artificial intelligence is accelerating this transformation, but available evidence suggests that human capabilities will continue to play a critical role.

The future therefore requires a reconsideration of what higher education is expected to accomplish. A degree remains valuable, but its value should extend beyond certification. Education should enable learners to understand problems, question assumptions, evaluate evidence, generate solutions, collaborate across disciplines, use technology responsibly and continue learning throughout their careers.

Problem-solving should consequently become a central organising principle of contemporary higher education. Students need opportunities to work with ambiguity, incomplete information and open-ended challenges. They need to experience experimentation, revision and constructive failure. They need to understand that AI can support human intelligence but cannot replace human responsibility.



The World Bank's analysis of the changing nature of work, the OECD's emphasis on transformative competencies, UNESCO's human-centered approach to educational technology, the ILO's evidence on AI-driven occupational transformation and the World Economic Forum's analysis of future skills collectively point towards a common conclusion: the most resilient form of employability is the capacity to learn, adapt, think critically and solve problems in changing circumstances.

The real educational objective, therefore, is not to produce graduates who merely possess answers. It is to develop graduates who can identify meaningful questions, evaluate possible answers and act responsibly when the answer is not already known.

Degrees may open doors, but problem solvers build the future.

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