

The 4th IR and AI Skills required for business, industry and daily life via Education

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Introduction:

The Fourth Industrial Revolution will create more employment or result in the loss of work opportunities. Optimistic predictions, based on trends already measured, suggest that the next 3 years will see about a million more jobs created than those lost. So, universities and post-schools should contribute to the advance of AI and its applications and how curricula and learning will need to change.

As the global economy moves towards the widespread adoption of AI solutions, competition will grow for employees who have the scarce skills required to implement, manage and work alongside the 4IR technologies. Developing these skills is therefore vital for any young person wishing to remain relevant in an increasingly automated workplace.

As this skilled workforce supports the AI industry, the demand for even more highly trained professionals will grow accordingly. Workplaces will require adaptable people whose jobs are reimaged, enriched or facilitated by the technology they work alongside.

This view might, however, prove to be overly pessimistic. For example, the Economist reported recently that computers can help to diagnose diseases,

excelling at abstract, cognitive tasks and at completing repetitive manual tasks, navigating randomly cluttered rooms or assembling pre-made furniture.

The implications that arise for institutions of education are at least twofold. Firstly, researchers in relevant disciplines face the challenge

of making AI increasingly more sophisticated and useful, not just in manufacturing or planning but also in the direct service of society. The

work of scientists, policymakers, social workers, educationists and many others whose duty of care it is to aim for the achievement of the

Sustainable Development Goals can all benefit from sophisticated AI applications. Whether the goal is quality education, decent work,

climate action, affordable and clean energy or sustainable cities, there are already AI options of value and importance, yet more can and

should be developed. But there are also other ways in which research (perhaps of a different nature) is important. In the realms of voice and

facial recognition. AI needs to be revolutionised and deracialised – and this requires research and interventions from scholars and scientists, a new activism, that goes beyond the creation

of new algorithms.

The second implication has to do with curricula, teaching and learning – rather than about robotic tutors. To succeed as a member of society,

and as an employee, in the era of the Fourth Industrial Revolution, numeracy, literacy and an understanding of how the world operates are

all essential. Students studying the basic and applied sciences need also to understand the political and social natures of the world in which

they live. For the same reasons, students who study the humanities and social sciences need to understand at least the foundations on which

AI is based and operates. This is a different kind of decolonization of curricula – even requiring, perhaps, some of the elements of the kind of education provided by liberal arts colleges.

The second implication has further requirements: people must have the skills required to implement, manage and work with the 4IR technologies. And, not least, to be problem solvers, to be adaptable, and to be able to express themselves in both the written and spoken word – and to make the kinds of ethical and moral decisions that

are not ever likely to become successful elements of AI. This challenge is one to which educators will have to rise.

Any effective 4IR education strategy must include in equal measure a deep consideration of the human condition, the ways in which new technologies and shifting economic power impact people of all socio-economic levels, and the threats that exist within a world that is increasingly interconnected, in a way that fosters deep intercultural understanding and an abiding respect for freedom and human rights. Such approaches

favor an interdisciplinary and global curriculum in a residential context, such as is found in many liberal arts institutions. These approaches maximize the development of intercultural and interpersonal skills, which will be a hallmark of the future 4IR workplace.

1. Environmental trends influencing a 'campus master plan' strategy and design

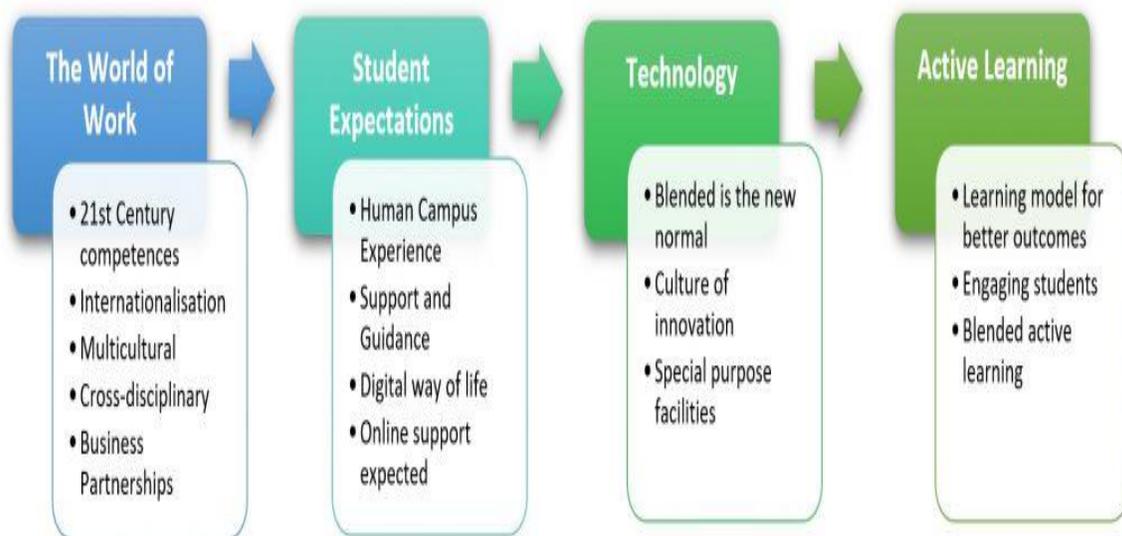


Figure1, : Environmental trends influencing a 'campus master plan' strategy and design

Technology is changing the face of society, the workplace and education, yet few higher education institutions are offering the high quality digitally supported course experiences and related services to full-time campus-based, part-time or distance students that are possible. Innovation in pedagogy, learning spaces and in the application of technology is essential to provide high quality offerings, flexibility for different needs, and a more dynamic education system.

New technologies are constantly pushing boundaries enabling active and instrumented learning spaces, new maker spaces, blended synchronous learning, augmented and virtual reality environments, design labs and fabrication facilities. These are bringing new thrilling and flexible dimensions to the learning and exploration process, yet supported innovation in these advanced approaches is not yet entering the main-stream process. In the medium-term these approaches will create new opportunities and advances but lack of support for innovation will put institutions at risk of competition from more innovative and agile institutions or learning services. Institutions need to create a strong university platform on which faculties can innovate and develop a stronger set of services.

A progressive and future-proof campus framework designed for 21st Century students, academics and administrators helps define and design active learning spaces and a high quality on-campus experience, together with a consistent high-quality digital environment, and a virtual campus experience which carries the strong institutional identity of a leading university across campus, campus and to distance learners globally.

2. Seven categories of recommendations to future-proof higher education

All of these aspects have an important relationship with the technology strategy of the institution, the quality of technology and learning spaces offered, and the quality of digital, online and virtual experiences offered. Cohesive and coherent learning models across all learning environments are key to the success of a hybrid learning model. The physical and virtual learning space design should be complementary. In our research and analysis we developed seven categories of

recommendations to help future-proof higher education institutions for the 21st Century (Figure 2).

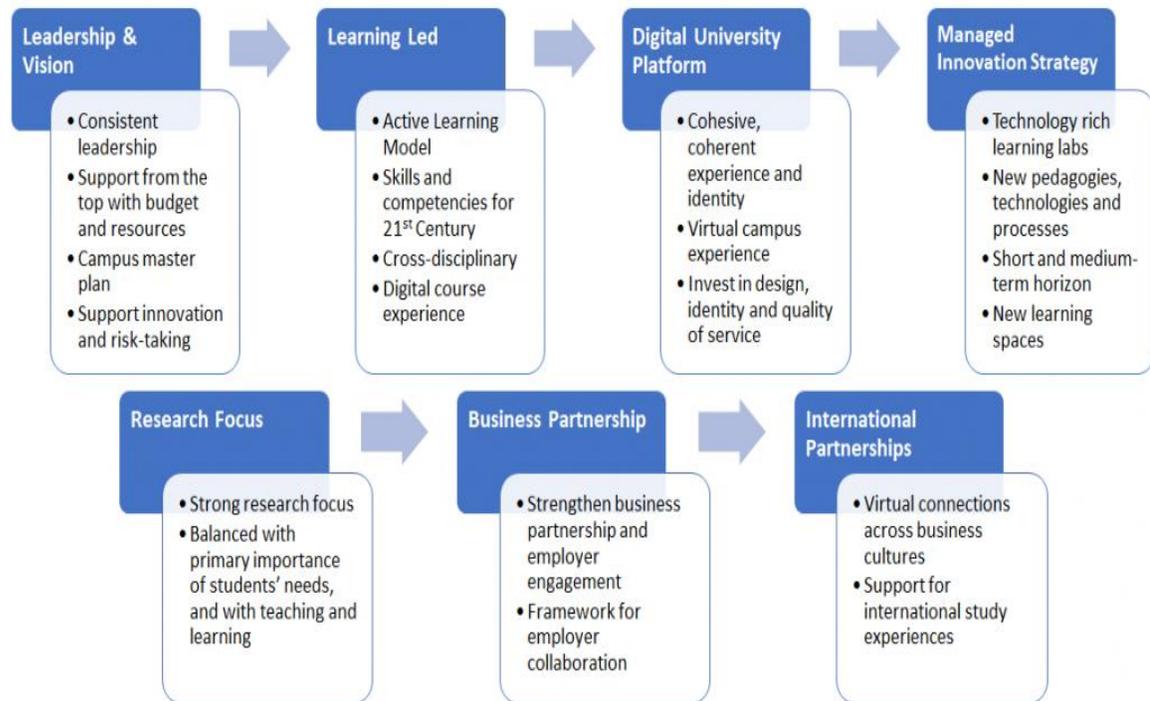


Figure 2: Seven categories of recommendations to future-proof higher education

In the leading institutions interviewed and visited for this research, blended learning is the new normal. The recommendations apply equally to campus-based and virtual digital higher education. The most competitive institutions are offering students a rich mixture of campus based, digital and distance experiences.

3. Case study: Virtual University for AI Education (VUA)

Education and job skills are the keys in determining a nation's wealth and influence. The aim is to achieve "education and healthcare for all," anywhere, anytime and at any pace. VUA helps higher educational and healthcare institutions in remote/rural areas of developing countries to deploy broadband Internet in order for them to close the digital divide. These institutions act as the knowledge center of their community for the eradication of poverty and isolation through the use of advanced Information and Communications Technologies (ICT). Learners will be able to take their courses from member institutions around the world to receive a VUA degree, thus freeing them from being confined to one academic culture of a single university or country. Learners and their professors from participating institutions will also form a global forum for exchange of ideas and information and for conducting collaborative research and development with the use of emerging GRID networking technology.

VUA has group activities in the major regions of the globe in partnership with higher learning and healthcare institutions. They foster the establishment of VUA in their respective regions, with the use of an advanced global broadband Internet virtual private network. These will then connect the universities with secondary and elementary schools, libraries, hospitals, local government offices and NGOs, etc., by broadband wireless Internet at drastically discounted rates (Figure 3).

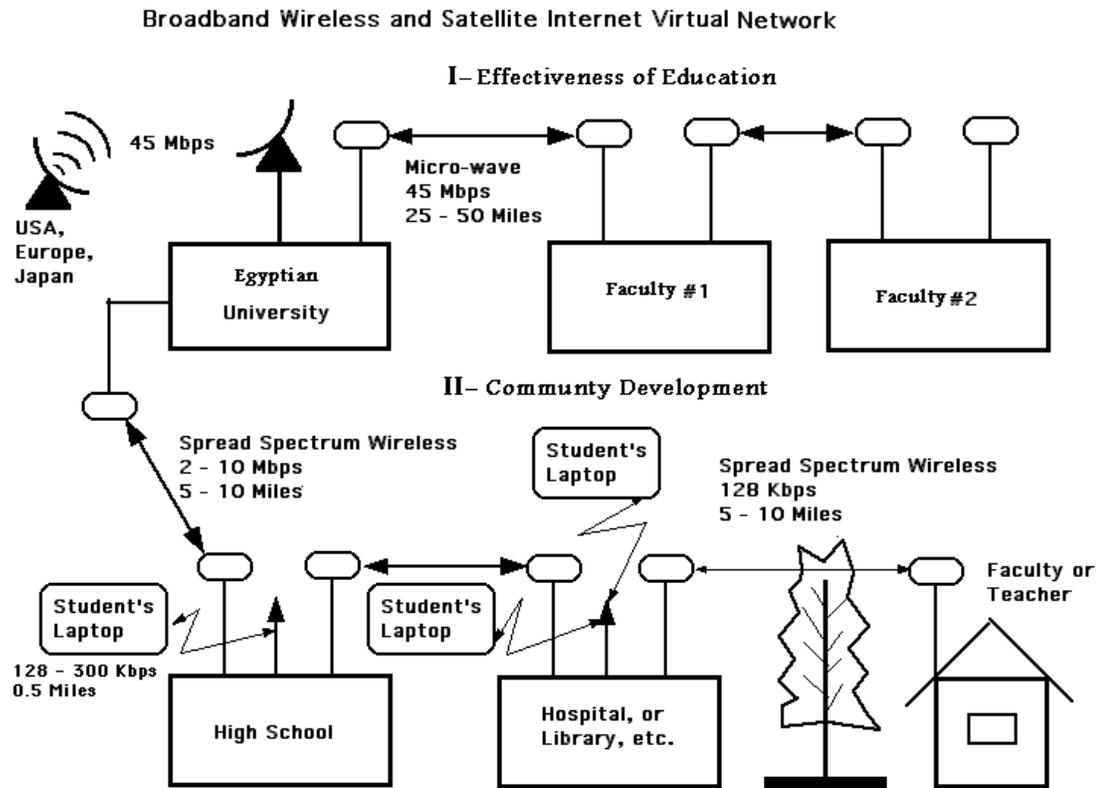


Figure 3. Broadband wireless and satellite Internet virtual network

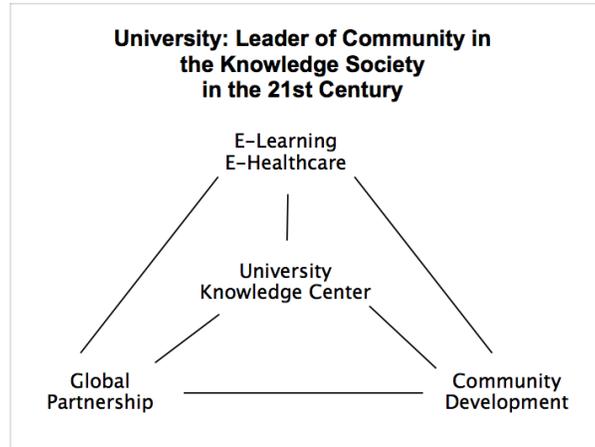


Figure 4: University as Leader of Community

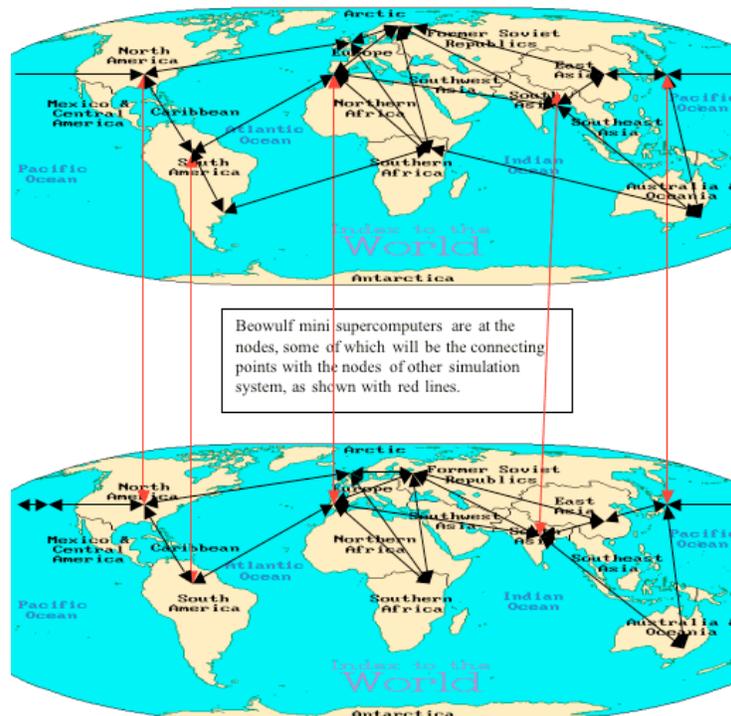


Figure 5: Globally Collaborative Environmental Peace Gaming

This Model will then demonstrate integrated and synergistic approach among grassroots, government, university, stakeholder, etc. Use of graphic info modeling/mapping and potential "gaming" on key issues and solutions will assist each group's ability for standardized data gathering and situational analyses, projecting out possible outcomes for more informed decision making and activities. It brings together most sophisticated university-based mathematical modeling techniques and experts and regular people who can then more easily see--at a glance--how issues and outcomes can impact and interact each other.

Conclusions

conclusion

The impacts of the emerging 4IR technology in economic and environmental terms alone will require a drastic reconsideration of the curriculum within higher education to enable students both to comprehend the individual technologies in detail and to be able to thoughtfully analyze and predict the evolution of networked systems of technology, the environment and sociopolitical systems. The dynamic responses with networked systems and exponential feedback effects will amplify the pace of change, as has already been seen in the context of global climate change and in many other physical and biological contexts. The 4IR curriculum will need to focus on emerging technologies—robotics, AI, IoT, nanomaterials, genomics and biotech—to provide a workforce not only capable of developing new applications and products, but also capable of interpreting the effects of these technologies on society and using their training to provide

sustainable and ethical uses of science and technology. More than any particular content area, curriculum needs to help students develop the capacity for ethical reasoning, for awareness of societal and human impacts and to be able to comprehend the impacts of 4IR technologies on people, so they are trained to not only increase our material prosperity but also to improve our social and cultural fabric.

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