Future Trends in Technology.. Educational response
Contents

- Majors Transformations Led to Structural Changes in Labor Market:
  - Continuing Disappearance and Creations of Jobs
  - New Skills Needed to Adapt to Significant Changes in Labor Market

- Technology Megatrends: The Tipping Points

- Response of Educational Institutions

- HCT Version 2: An Integrated Plan that Ties with UAE’s 2021
USE OF MANUAL LABOUR

19th century
\[
\eta_i(t) \approx \sum_{j=1}^{m} \gamma_j(t) \xi_j(t) + \sum_{j,k=1}^{m} \beta_{jk}(t; t - \lambda) \xi_j(t) \xi_k(t - \lambda) + \sum_{j=1}^{m} \int_{t-\lambda}^{t} \gamma_j(\tau) \xi_j(\tau) d\tau + \\
+ \sum_{j,k=1}^{m} \xi_j(t - \lambda) \int_{t-\lambda}^{t} \frac{\partial \beta_{jk}(\tau; t - \lambda)}{\partial \tau} \xi_j(\tau) d\tau + \sum_{j,k=1}^{m} \xi_j(t) \int_{t-\lambda}^{t} \frac{\partial \beta_{jk}(t - \theta)}{\partial \theta} \xi_k(\theta) d\theta + \\
+ \sum_{j,k=1}^{m} \int_{t-\lambda}^{t} d\tau \int_{t-\lambda}^{t} \frac{\partial^2 \beta_{jk}(\tau; \theta)}{\partial \theta \partial \tau} \xi_j(\tau) \xi_k(\theta) d\theta \quad i = 1, 2, \ldots, n. \quad (2.23)
\]
The Future!

Jobs of the Future

21st Century smart work
Rapid, global digital transformation across all industries
Jobs That Does Not Yet Exist!

• Technological advances are rapidly automating many activities that currently require human work.
• A 2013 Oxford Martin School study estimated that 47% of US jobs could be replaced by automated processes within two decades.
• While always removing the need for some types of jobs, technology creates new ones and new tools for increasing the efficiency of labor inputs.
• Yes, the Industrial Revolution destroyed some jobs but created many more.
• The picture looks worse than it actually is. Nine of the 10 most in-demand jobs in 2012 did not exist in 2003!
New set of skills in order to adapt to these changes

A recent WEF report indicates students require 16 skills for the 21st Century

'Competencies' and 'character qualities' are essential future skills

Competencies: ability to critically evaluate and convey knowledge, as well as work well with a team

Critical thinking: ability to identify, analyze and evaluate situations, ideas and information in order to formulate responses to problems

Character qualities: ability to tackle a changing environment

Persistence/grit: Ability to sustain interest and effort and to persevere to accomplish a task or goal

1. Programme for the International Assessment of Adult Competencies (PIAAC)
Source: UNEVCO report 2013; Deep Shift Technology Tipping Points and Societal Impact , WEF 2015;
New Vision for Education Unlocking the Potential of Technology, WEF 2015;
Technology Tipping Points and Societal Impact
The Survey

• A snapshot of expectations from a community of over 800 executives and experts from the information and communications technology sector.

• The survey asked respondents for their perception of when these tipping points would occur, offering date ranges from “it has already happened” to “20+ years”.

Source: UNEVCO report 2013; Deep Shift Technology Tipping Points and Societal Impact, WEF 2015;
<table>
<thead>
<tr>
<th>People and the internet</th>
<th>1</th>
<th>Wearable and implantable technologies will enhance people's &quot;digital presence&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing, communications and storage</td>
<td>2</td>
<td>Everyone has access to a supercomputer in their pocket, with nearly unlimited storage capacity</td>
</tr>
<tr>
<td>The Internet of Things</td>
<td>3</td>
<td>Smaller, cheaper and smarter sensors are being introduced—in homes, clothes and accessories, cities, transport and energy networks etc.....</td>
</tr>
<tr>
<td>Artificial Intelligence (AI) and big data</td>
<td>4</td>
<td>Rise of big data for decision-making, and the influence that AI and robotics are starting to have on decision-making and jobs</td>
</tr>
<tr>
<td>The sharing economy and distributed trust</td>
<td>5</td>
<td>The internet is driving a shift towards networks and platform-based social and economic</td>
</tr>
<tr>
<td>The digitalization of matter</td>
<td>6</td>
<td>Physical objects are &quot;printed&quot; from raw materials via additive, or 3D, printing</td>
</tr>
</tbody>
</table>

Source: Deep Shift Technology Tipping Points and Societal Impact, WEF 2015;
...with technology disruptions causing 'tipping points'

Note: The timeline represents average time each tipping point is expected to occur based on WEF survey and analysis
Source: Deep Shift Technology Tipping Points and Societal Impact, WEF 2015
Educational institutions are preparing themselves and their students for technology innovation

How is this being done?

Fostering student interest in technology innovation

• Conferences, workshops, competitions and curricula designed to engage students on exciting technology innovation across a variety of fields

Immersing students in technology innovation

• Encourage the use of innovative tech tools for classroom activities and collaborative work among students

Leverage technology innovation to drive productivity

• Streamline academic processes (i.e. computer-based examinations, online courses and meetings)
• Reduce material costs (i.e. e-books)

Educators and Tech providers are innovating methods

<table>
<thead>
<tr>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personalized and adaptive content/curricula</td>
<td>dreambox, KHAN, SMART SPARROW, BETTERLESSON, Pearson OLE, OLE create, HMH Player, Knewton, CurrikiGeometry</td>
</tr>
<tr>
<td>Deliver differentiated learning, dynamically assess gaps and track outcomes</td>
<td></td>
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<tr>
<td>Open educational resources</td>
<td>LearnZillion, netTrekker, Google for Education, GLASSLAB, ST MATH, Explolearn</td>
</tr>
<tr>
<td>Provide free repositories of vast amounts of open-source content and curricula</td>
<td></td>
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<tr>
<td>Communication and collaboration tools</td>
<td></td>
</tr>
<tr>
<td>Facilitating group work, peer-to-peer learning and peer feedback</td>
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<tr>
<td>Interactive simulations and games</td>
<td></td>
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<tr>
<td>Allow a focus on multiple skills and interaction with instructional content</td>
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</table>

Institutional tools help develop teachers

**Digital professional development resources for teachers**

Add more instructional strategies to a teacher’s repertoire and improve their ability to execute on these strategies through online resources and support

**Student information and learning management systems**

Generate data on student performance and facilitate the development of 21st century skills through enabling greater student collaboration and communication

**Source:** Institution websites; BCG analysis
HCT to prepare and equip ourselves for the future

- Students well equipped with 21st century skills
- Innovative partnerships with external stakeholders
- Highly engaged and high-performing staff and faculty
- Technology and innovation leveraged in learning environment and beyond
- Efficiently allocated funds to strategic priorities
HCT Version 2.0
to become a role model for UAE's Vision 2021

UAE's Vision 2021 with focus on first-rate education system … … and emphasis on 5 key elements in the new strategic model

7-star services
• Bring government service on par with private sector

Government innovation
• Adopt a culture of innovation and make it a part of working routine

Prepare for the future
• Utilize analytics to predict future trends and challenges

Focus on Results
• Maximize benefits and focus on activities that lead to concrete results

Financial Efficiency
• Optimize resources to ensure best value for money
H H Sheikh Mohamed Bin Zayed
FRIENDS,
Let’s
RETHINK
Learning,
SERIOUSLY!