Inovasi PEMBELAJARAN

Ainun Na’im
Sekretraris Jenderal Kemeristekdikti

Jogjakarta, 25 Januari 2019
The shrinking world

1500-1840
Best Average speed of horse-drawn coaches and sailing ships: 10mph

1850-1930
Steam locomotives: 65mph
Steam ships: 30 mph

1950s
Propeller Aircraft: 300-400mph

1960s
Jet Passenger Aircraft: 500-700mph

The world is changing
The shrinking world
### Drivers of change, industries overall
Share of respondents rating driver as top trend, %

<table>
<thead>
<tr>
<th>DEMOGRAPHIC AND SOCIO-ECONOMIC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing nature of work, flexible work</td>
<td>44%</td>
</tr>
<tr>
<td>Climate change, natural resources</td>
<td>23%</td>
</tr>
<tr>
<td>Middle class in emerging markets</td>
<td>23%</td>
</tr>
<tr>
<td>Geopolitical volatility</td>
<td>21%</td>
</tr>
<tr>
<td>Consumer ethics, privacy issues</td>
<td>16%</td>
</tr>
<tr>
<td>Longevity, ageing societies</td>
<td>14%</td>
</tr>
<tr>
<td>Young demographics in emerging markets</td>
<td>13%</td>
</tr>
<tr>
<td>Women’s economic power, aspirations</td>
<td>12%</td>
</tr>
<tr>
<td>Rapid urbanization</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TECHNOLOGICAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile internet, cloud technology</td>
<td>34%</td>
</tr>
<tr>
<td>Processing power, Big Data</td>
<td>26%</td>
</tr>
<tr>
<td>New energy supplies and technologies</td>
<td>22%</td>
</tr>
<tr>
<td>Internet of Things</td>
<td>14%</td>
</tr>
<tr>
<td>Sharing economy, crowdsourcing</td>
<td>12%</td>
</tr>
<tr>
<td>Robotics, autonomous transport</td>
<td>9%</td>
</tr>
<tr>
<td>Artificial intelligence</td>
<td>7%</td>
</tr>
<tr>
<td>Adv. materials, biotechnology</td>
<td>6%</td>
</tr>
<tr>
<td>Adv. manufacturing, 3D printing</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: Future of Jobs Survey, World Economic Forum
Change in demand for core work-related skills, 2015-2020, all industries
Share of jobs requiring skills family as part of their core skill set, %

<table>
<thead>
<tr>
<th>Skills Family</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Abilities</td>
<td>31%</td>
<td>28%</td>
</tr>
<tr>
<td>Content Skills</td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>Cognitive Abilities</td>
<td>52%</td>
<td>16%</td>
</tr>
<tr>
<td>Technical Skills</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>Resource Management Skills</td>
<td>36%</td>
<td>22%</td>
</tr>
<tr>
<td>Systems Skills</td>
<td>42%</td>
<td>18%</td>
</tr>
<tr>
<td>Process Skills</td>
<td>39%</td>
<td>22%</td>
</tr>
<tr>
<td>Social Skills</td>
<td>37%</td>
<td>24%</td>
</tr>
<tr>
<td>Complex Problem Solving Skills</td>
<td>40%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Source: Future of Jobs Survey, World Economic Forum
A New Economic Compass for the Fourth Industrial Revolution

The 12 Pillars of Competitiveness

- Institutions
- Infrastructure
- Macroeconomic environment
- Labour market efficiency
- Financial market development
- Technological readiness
- Higher education and training
- Goods market efficiency
- Market size
- Business sophistication
- Innovation
- Health
- Skills

Figure 1: The Global Competitiveness Index 4.0 2018

<table>
<thead>
<tr>
<th>Enabling Environment</th>
<th>Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pillar 1</strong> Institutions</td>
<td><strong>Pillar 7</strong> Product market</td>
</tr>
<tr>
<td><strong>Pillar 2</strong> Infrastructure</td>
<td><strong>Pillar 8</strong> Labour market</td>
</tr>
<tr>
<td><strong>Pillar 3</strong> ICT adoption</td>
<td><strong>Pillar 9</strong> Financial system</td>
</tr>
<tr>
<td><strong>Pillar 4</strong> Macroeconomic stability</td>
<td><strong>Pillar 10</strong> Market size</td>
</tr>
<tr>
<td><strong>Pillar 5</strong> Health</td>
<td></td>
</tr>
<tr>
<td><strong>Pillar 6</strong> Skills</td>
<td></td>
</tr>
<tr>
<td><strong>Pillar 11</strong> Business dynamism</td>
<td></td>
</tr>
<tr>
<td><strong>Pillar 12</strong> Innovation capability</td>
<td></td>
</tr>
</tbody>
</table>
Indonesia Competitiveness (2018)

45th/140

Rank in 2017 edition: 47th / 135


https://www.weforum.org/reports/the-global-competitiveness-report-2018
The future work is changing
The Lifecycle of the Industry

Source: KPMG, 2016
Ministry of Research, Technology and Higher Education’ Mission
Improve access, relevancy, and quality of higher education to produce qualified human resources

Population
>262 Million
Demography Bonus

ECONOMY
The 7th World in 2030
McKinsey Global Institute, 2012

ECONOMY
The 4th World in 2050
Pricewaterhouse Coopers (PwC), 2017
**Challenge HRD DEVELOPMENT Indonesia**

36th /137 C’s

3rd rank: Singapore
23rd rank: Malaysia
32nd rank: Thailand

Indonesian Competitiveness Index

8,8%/ 618 thousand

Unemployed Bachelors

Numbers of Open Unemployment
±7 millions people out of
±128 millions of workforce

“Employers complains that the employees do not have the appropriate skills”

**Percentage of Indonesian Manpower Education (BPS, 2017)**

- Rendah (≤ SMP)
- Menengah (SMA/SMK)
- Tinggi (≥ Diploma)

**Ranking in Program for International Student Assessment (PISA), 2015**

<table>
<thead>
<tr>
<th>Country</th>
<th>Science</th>
<th>Maths</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>62/70</td>
<td>64/70</td>
<td>63/70</td>
</tr>
<tr>
<td>Vietnam</td>
<td>30/70</td>
<td>8/70</td>
<td>22/70</td>
</tr>
<tr>
<td>Thailand</td>
<td>57/70</td>
<td>54/70</td>
<td>54/70</td>
</tr>
<tr>
<td>Singapore</td>
<td>1/70</td>
<td>1/70</td>
<td>1/70</td>
</tr>
</tbody>
</table>
Indonesia needs to improve the quality of workforce skills with digital technology (Parray, ILO, 2017)

Technology disruption era is the combination of physical, digital and biological domain (Schwab, 2017)

75–375 Million GLOBAL EMPLOYEES SHIFT PROFESSIONS

- Internet of Things
- Artificial Intelligence
- New Materials
- Big Data
- Robotics
- Augmented Reality
- Cloud Computing
- Additive Manufacturing 3D Printing
- Nanotech & Biotech
- Genetic Editing
The Development of Human resources in Indonesia
In the 4th Industrial Revolution era

Challenges

Indonesian Competitiveness Index

36th / 137 C’s

3rd rank: Singapore
23rd rank: Malaysia
32nd rank: Thailand

Unemployed university graduates

8.8% / 618 thousands

Employers complain that the employees do not have the appropriate skills

References:
Mourshed, Farrell, Barton (2012), Education to Employment: Designing a System that Works (survey 8,000 universities, and industries from 24 countries)

Education and work (job) should be adjusted into the development of Science and Technology, but still attention should be given to humanism aspects

Markets need the human resources with multiple skills, which is so different with the old system of higher education (Marmolejo, World Bank, 2017).
The needs

**New literacy**

In facing the 4th Industrial Revolution

In order to produce qualified graduates, curriculum needs a new orientation, due to the 4th Industrial Revolution. So it is not appropriate anymore using an old literacy (reading, writing and math), as the main asset if we would like to produce qualified human resources which could be performed in the society.

(Aoun, MIT, 2017)

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**Data Literation**

The ability to read, to analyze, to use information (**Big Data**) in the digital world.

**Technology Literation**

The ability to understand mechanical (system) work, to use the application of technology like (**Coding, Artificial Intelligence, & Engineering Principles**).

**Human Literation**

**Humanities**, Communication and Design
Universities should always find methods for developing the cognitive capacity of the students, through implementing higher order mental skills, critical and systemic thinking. It is important to keep survive in the 4th industrial revolution.

**Skills:**
1. Leadership
2. Teamwork

**Cultural Agility:**
Students with their various background, are able to work in different environment, both in national or international places.

**Entrepreneurship (including social entrepreneurship):**
This should be introduced again that entrepreneurs must have basic capacity which is owned by each student.

**Goal:**
Humans should be useful in their society, therefore they need to implement humanities approach, communication and design.

**How to teach in the 4th industrial revolution era?**
(Aoun, 2017)

- 1. Thematic study on various discipline, connecting it to the real world based on project based-learning.
- 2. Through General Education, Extracurricular

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**Internship/practices/co-op program (al. higher order skills, leadership, teamwork)** (Northeastern, 2014)
Human literacy is part of the General Education, which should be mastered by the students. Data and technological literacy could be selected from the extra curricular programs.
Lifelong learning should be facilitated by universities, as the education activity (because education will never stop though degree certificate was received before)

- Up to now, there have been many universities which facilitate the life-long learning.
- In USA: 12.8 Million students are facilitated by special units. These are provided for advanced students who would like to obtain more and or new knowledge/skills/competencies, which are suitable to dynamic technologies or jobs requirements.

Lifelong learning is becoming an economic imperative (Economist, 2017)
University 4.0: universities will be transformed to embrace know-how and ideas of University 4.0 by adapting their administrative paradigm and the investment in human resources and giving more priority to serve the objectives of society. Universities will serve as bases for developing technology and innovation reform and building cooperation with leading international universities in each specific field research.
HE 4.0 MISSIONS

1. Expansion of Traditional HEIs
2. Focus on lifelong and adult education
3. Long-distance Education
4. Corporate Universities
5. University-Industrial Partnership
6. Professional certification, validation & franchising
7. Cross-border Education

Traditional HE Missions:
- Research
- Teaching
- Social Engagement
- Cultural Preservation
One solution: Academic Learning 4.0

**BLENDED LEARNING**
It is facilitated by SPADA & IdREN through Video Conference, Online Learning, Resource Sharing

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**The solution**
- Optimally utilize ICT, in order to improve productivity of learning (effective and efficient), with continuously keep the quality.
- Harmonization and or developing the existing regulation.

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Tuition Fee is continuously increased

Source: Kompas R&D Center
15 Des '17

Ratio of Lecturers: Students

<table>
<thead>
<tr>
<th>Advanced Countries</th>
<th>INDONESIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>1:15</strong></td>
</tr>
<tr>
<td>State Uni</td>
<td>1:20</td>
</tr>
<tr>
<td>Others</td>
<td>1:30</td>
</tr>
<tr>
<td>Private Uni</td>
<td>1:30</td>
</tr>
<tr>
<td>Sciences</td>
<td>1:15</td>
</tr>
<tr>
<td>Others</td>
<td>1:40</td>
</tr>
</tbody>
</table>

(Times Higher Education, 2017)

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One lecturer (which is accompanied by tutor/assistant/mentor, could teach a big class.
On the other hand, a lecturer could teach certain program study in universities with lack of lecturers..
INOVASI PEMBELAJARAN DARING/DIGITAL

Merupakan pengembangan implementasi SPADA merespon kebutuhan dunia kerja di era industri 4.0, dengan mengintegrasikan sistem pembelajaran daring, soft skills mahasiswa dan penjaminan mutu yang didukung oleh backbone infrastruktur jaringan IdREN sebagai perekat kerjasama antar perguruan tinggi di Indonesia.
## SPADA Indonesia

Sistem Pembelajaran Daring Indonesia

### SPADA Online Courses

<table>
<thead>
<tr>
<th>Service</th>
<th>Open Content</th>
<th>Open Courses</th>
<th>Online Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>297</td>
<td>221</td>
<td>279</td>
</tr>
</tbody>
</table>

### PPG HYBRID

<table>
<thead>
<tr>
<th>Bidang Studi PPG Hybrid</th>
<th>MHS Batch I</th>
<th>Mahasiswa Batch II</th>
<th>MHS Batch II Tambahan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>53</td>
<td>6.775</td>
<td>10.596</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18.103</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lulus Daring</th>
<th>Tidak Lulus Daring</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.567</td>
<td>804</td>
</tr>
</tbody>
</table>

### PT Penyelenggara

- 54 PT Penyelenggara
- 201 PT Mitra
- 18.138 Mahasiswa

### Online Courses

- Online Courses 7in1: 102
- Online Courses Student Exchange: 29
KERANGKA PENGEMBANGAN

PENINGKATAN RELEVANSI, MUTU, DAN AKSES PENDIDIKAN TINGGI

INOVASI PEMBELAJARAN DARING/DIGITAL

INOVASI SISTEM PEMBELAJARAN DARING/DIGITAL

INOVASI MODUL DARING/DIGITAL (MICROLEARNING)

PENJAMINAN MUTU

SOFT SKILLS LITERASI BARU

IMPLEMENTASI idREN + TEIN

INFRASTRUKTUR JARINGAN

INITIATIVE INOVATIVE DIGITAL LEARNING AWARD (INIDIA)
Tujuan: mendorong penerapan inovasi pembelajaran modern (digital) secara terintegrasi dan holistik sesuai dengan SNDikti dan prinsip-prinsip pendidikan dan mengembangkan literasi baru lulusan perguruan tinggi.

<table>
<thead>
<tr>
<th>MELALUI KEGIATAN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENGEMBANGAN (piloting)</td>
</tr>
<tr>
<td>BANTUAN PENDANAAN/ INSENTIF</td>
</tr>
<tr>
<td>SOSIALISASI [diseminasi]</td>
</tr>
<tr>
<td>BIMBINGAN DAN PENDAMPINGAN</td>
</tr>
<tr>
<td>MONITORING, EVALUASI, DAN DAMPAK</td>
</tr>
</tbody>
</table>

| SISTEM PEMBELAJARAN DARING/DIGITAL DIDUKUNG OLEH IdREN |
| INOVASI MODUL DARING/DIGITAL (MICROLEARNING) |
| PENJAMINAN MUTU |
| SOFT SKILLS LITERASI BARU |
Tujuan: menerapkan pembelajaran jarak jauh (distance learning) dan jaringan penelitian lingkup nasional, regional dan internasional

MELALUI KEGIATAN:

- PENGEMBANGAN (piloting)
- BANTUAN BIAYA
- SOSIALISASI [diseminasi]
- BIMBINGAN TEKNIS
- MONITORING & EVALUASI
FASILITAS INFRASTRUKTUR JARINGAN

**Tujuan:** menyediakan layanan infrastruktur jaringan pendidikan dan penelitian perguruan tinggi yang memadai, stabil dan handal untuk seluruh pendidikan tinggi di Indonesia

<table>
<thead>
<tr>
<th>MELALUI KEGIATAN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>PENGADAAN</td>
</tr>
<tr>
<td>PENGEMBANGAN &amp; PEMUTAKHIRAN</td>
</tr>
<tr>
<td>DIGUNAKAN DAN DIPELIHARA BERSAMA BELMAWA DAN PT</td>
</tr>
</tbody>
</table>

Tujuan: menyediakan layanan infrastruktur jaringan pendidikan dan penelitian perguruan tinggi yang memadai, stabil dan handal untuk seluruh pendidikan tinggi di Indonesia
IdREN

- Jaringan tertutup (National Closed User) bagi pendidikan dan riset
- Antar PERGURUAN TINGGI, LEMBAGA RISET
- Terhubung ke REN Global
- 3S (Single Network, Sharing and Collaboration & Sustainable Platform)
KONSEP PEMANFAATAN IDREN DAN TEIN
Dikembangkan dari INHERENT DIKTI 2006

ASN 18007
PT/LEMBAGA DG/TANPA ASN

ITB-idREN GATE
IDREN AS 64302
ISP - 2
ISP - n

Gov idREN GATE
UB idREN GATE
ITS idREN GATE
UGM idREN GATE
UI idREN GATE

UB 46019
ITS 38331
PT
PT
PT
PT
PT

PT

TEIN
(Trans Eurasia Information Networks)
ASN 24490

ASN : Autonomous System Number
PETA SEBARAN NODE IDREN

Jaringan tertutup Terhubung ke REN global KAPASITAS LEBIH BESAR KUALITAS LEBIH BAIK
KAMPUS & INSTITUSI YANG TERHUBUNG

1. Universitas Brawijaya
2. Universitas Negeri Yogyakarta
3. Syiah Kuala University (Unsyiah)
4. Universitas Nusa Cendana
5. Universitas Islam Negeri Maulana Malik Ibrahim (UIN Maliki)
6. Universitas Islam Negeri Suska Riau
7. Institut Teknologi Sumatera
8. Universitas Negeri Padang
9. Universitas Negeri Semarang
10. Universitas Sebelas Maret
11. Universitas Pendidikan Indonesia
12. TELKOM UNIVERSITY
13. Universitas Jember
14. Universitas Negeri Gorontalo
15. Politeknik Manufaktur Negeri Bandung
16. Institut Seni Indonesia Yogyakarta
17. Direktorat Jenderal Pendidikan Tinggi (Pusdatin)
18. UNIVERSITAS SAM RATULANGI
19. Universitas Islam Negeri Raden Fatah Palembang
20. Institut Teknologi Sepuluh Nopember
21. Universitas Padjadjaran
22. University of Indonesia
23. PPTIK - UNIVERSITAS GADJAH MADA
24. ITB
25. Universitas Diponegoro
26. Universitas Sumatera Utara
27. Universitas Atma Jaya Yogyakarta
28. Lembaga Ilmu Pengetahuan Indonesia - LIPI
29. Universitas Tanjungpura
30. UIN Mataram
31. Univ. Mataram
32. UNM Makasar
33. UIN Alauddin Mks
34. UNRI
35. Universitas Islam Indonesia Yogyakarta
36. Universitas Cenderawasih
37. Universitas Malikusaleh
38. UIN Raden Intan Lampung
39. Univ Borneo Tarakan
40. PETRA Surabaya
41. POLITANI Kupang
42. Poltekkes Kupang
43. Universitas Komputer Indonesia Bandung
44. Universitas Hasanuddin
45. Universitas Muhammadiyah Yogyakarta
46. Universitas Negeri Surabaya
47. Universitas Ahmad Dahlan Yogyakarta
48. Universitas Andalas Padang
49. Universitas Negeri Jakarta
50. Universitas Jenderal Soedirman

IN PROGRESS CONNECTING

51. IPB
52. Universitas Tadulako
53. Politeknik Negeri Bandung
54. PENS Surabaya
55. PPNS Surabaya
56. Politeknik Negeri Banjarmasin
57. Univ Widya Mandala Surabaya
58. UNIMED
59. UNPATTI
60. Univ Bengkulu
61. Politeknik Negeri Kupang
62. IAIN Palu
63. ULM Banjarmasin
64. UNIMOR
65. POLIJE
66. UPN Veteran Surabaya
67. Politeknik Negeri Semarang
68. POLNES Samarinda
69. UIN Ar-Raniry Aceh
70. UNIMA Manado
71. IPDN Papua
72. Univ Sembilanbelas November Kolaka
73. Universitas Halu Oleo Kendari
74. IAIN Jember
75. UINSA Surabaya
76. UMM Malang
77. Universitas Papua
78. UNMUL Samarinda
79. UIN Imam Bonjol Padang
MANFAAT IdREN

IdREN memfasilitasi interaksi antar STAKEHOLDER untuk SINERGI dalam pengembangan EKONOMI DIGITAL

REGULATOR
1. Kemenristekdikti dan Kementerian lain
2. LPNK dan lembaga lain
3. PEMDA

AKADEMISI
1. PTN
2. PTS
3. Rumah Sakit Pendidikan
4. PUI-PT, dll.

PENTAHELIX

INDUSTRI
1. BCE (BUMN Center of Excellence)
2. UMKM, Start up
3. Industri lainnya

MEDIA
1. Media Cetak
2. Media Elektronik
3. Media Digital
4. Contact Center, dll.

KOMUNITAS RISET
1. Lembaga Riset: LIPI, BPPT, LAPAN
2. Asosiasi Profesi/Industri
3. LSP, LSM, dll.
INOVASI PEMBELAJARAN DARING/DIGITAL

PENGEMBANGAN DAN INOVASI

Pengembangan modul dan model pembelajaran digital:
- Pengembangan SPADA
- Menawarkan mata kuliah daring (nasional) rintisan prodi inovatif
- Pengakuan Kredit dan Transfer Kredit
- Mobilisasi Mahasiswa dan Dosen
- Teknologi asistif untuk difabel
- Kolaborasi Pengembangan Materi daring

Synchronous Telelearning
Satu Dosen Mengajar Ribuan Mahasiswa di banyak PT

SPADA Indonesia
Mata Kuliah Daring, Mata Kuliah Terbuka, & Materi Terbuka

GLOBAL Education
School of Internet, Telemedicine Education Community, International Worshhop/Seminar

GLOBAL Research
Trans Euro-asia Information Network (TEIN), Asia Pacific Advance Network (APAN), AUN SEED NET, ASEA UNINET
INOVASI MODUL DIGITAL (MICROLEARNING)
Membangun Konten Indonesia

PLATFORM
Sumber Belajar Digital Terbuka pada SPADA

FORUM
Pengembangan dan Pemanfaatan Materi Pembelajaran Bersama

EKSPOSE
Video Ekspert Indonesia

REPOSITORI
• Jurnal Ilmiah
• Hasil Karya
• Data Sains
Proses Penyelenggaraan

• **CP**: sama dengan tatap muka.
• **Beban studi**: sama dengan tatap muka.
• **Credit earning**: pengakuan yang sama oleh PT penyedia dan PT penerima.
• **Penyelenggaraan Pembelajaran**: fleksibel, terbuka, belajar mandiri, belajar di mana dan kapan saja, dan berbasis TIK. Interaksi tatap muka tetap dilakukan minimal/termediasi, praktek/praktikum/studio/bengkel
• **Evaluasi hasil belajar**: 2x per semester secara tatap muka atau berbasis TIK terproktor, sumberdaya untuk penilaian hasil belajar, tanda lulus MK/prodi & SKPI.
• **Prodi**: dosen/asisten yang kompeten, proses pembimbingan daring/tatap muka, penjaminan mutu pembelajaran daring.
• **Soft skills**: keterampilan mahasiswa dan kesiapan bekerja lulusan bertambah melalui introduksi literasi baru berbasis TIK.
• **Penjaminan Mutu**: Internal dan Eksternal sesuai karakteristik PJJ, penguatan SPMI untuk memantau dan mengevaluasi mutu pembelajaran daring.
TERIMA KASIH