

# PEMANFAATAN TEKNOLOGI DALAM PEMBELAJARAN DI ERA REVOLUSI INDUSTRI 4.0



# Cita-cita **INDONESIA**

**Misi Kemenristekdikti:**

Meningkatkan akses, relevansi, dan mutu Pendidikan Tinggi untuk menghasilkan SDM yang berkualitas

**>262 Juta**

**POPULASI**

Bonus Demografi

**Ke-7 Dunia  
Tahun 2030**

**EKONOMI**

McKinsey Global  
Institute, 2012

**Ke-4 Dunia  
Tahun 2050**

**EKONOMI**

Pricewaterhouse  
Coopers (PwC),  
2017





"Perguruan Tinggi dihadapkan dengan **tantangan** untuk mempersiapkan dan melengkapi **SDM** dengan **kompetensi serta keterampilan yang tepat** untuk menghadapi **revolusi industri ke-4**, agar terus mampu **berkontribusi** terhadap pertumbuhan ekonomi dan kesejahteraan bangsa,"

Moh. Nasir  
Menteri Riset, Teknologi dan Pendidikan Tinggi  
Mei 2018

# Mahasiswa Indonesia **8.388.763 = 35,8%**



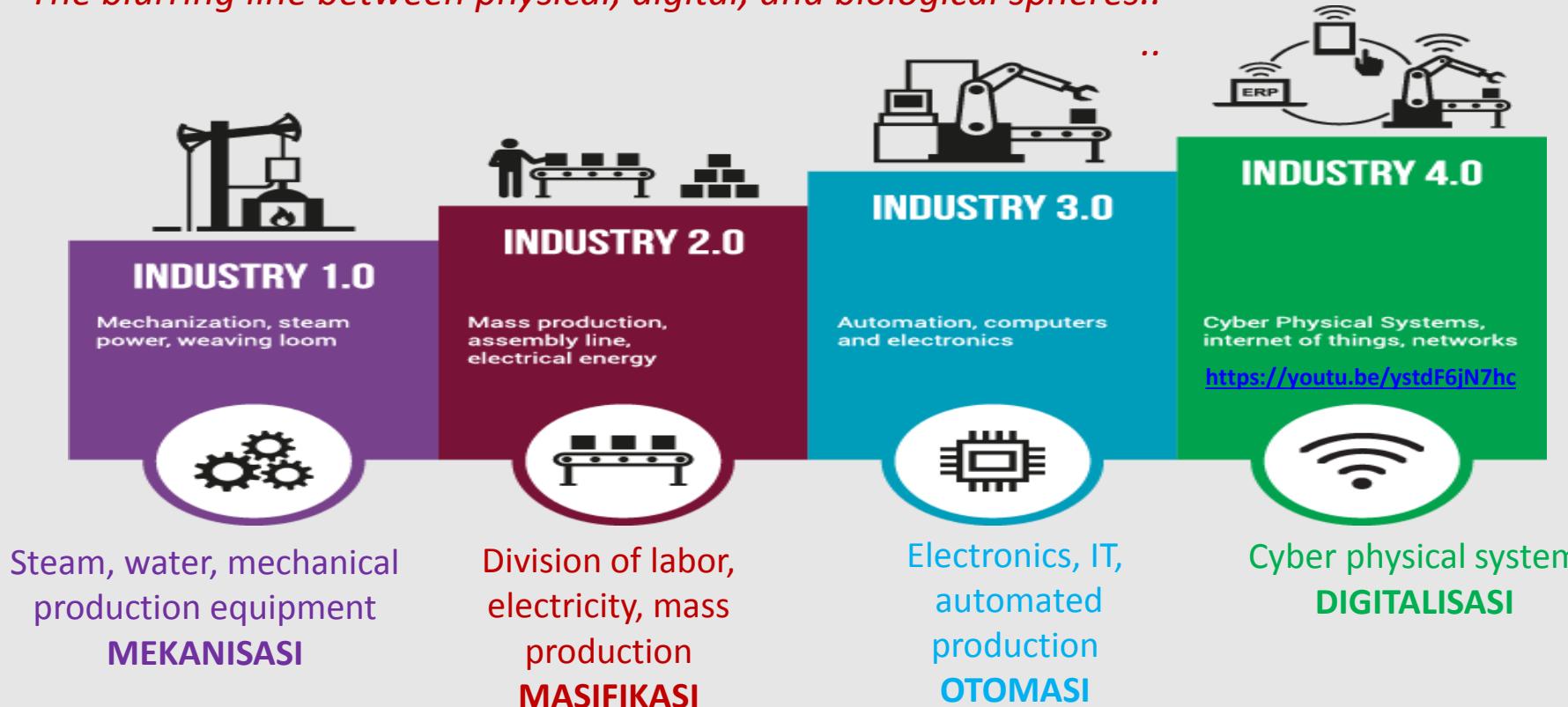
"Tangan kalianlah yang akan menjalankan reformasi Indonesia, hati kalianlah yang akan merawat kedekatan dengan rakyat dan yang melayani rakyat, tekad kalianlah yang akan memperkokoh Pancasila, NKRI dan Bhinneka Tunggal Ika. Saat ini adalah sebuah permulaan bagi perjalanan belajar dalam upaya berkontribusi untuk negeri ini, mengabdi kepada ibu pertiwi, dan berjuang untuk kemajuan Indonesia."

*(Jokowi, Juli 2018)*

# Revoluti Industri 4.0



*The blurring line between physical, digital, and biological spheres..*



# SOCIETY 5.0

Masyarakat yang berpusat pada manusia (*a human-centered society*), menyeimbangkan kemajuan ekonomi dengan penyelesaian masalah sosial melalui sistem *cyberspace* dan ruang fisik yang terintegrasi.

(Cabinet Office, Government of Japan, 2018)

Society 4.0 (Masyarakat Informasi) ➔ Society 5.0

Cyberspace



CLOUD

Orang mengakses, mengambil, dan menganalisis informasi.



Orang mengemudi dibantu sistem navigasi (arah)

Orang menganalisis informasi

Orang mengontrol robot untuk memproduksi

Cyberspace



BIG DATA & AI

SENSOR INFO (ANALISIS)

Memberikan high-added value information



AUTONOMOUS CAR



Mengemudi otomatis (automatic driving)



AI mengusulkan seseorang  
Robot industry memproduksi secara otomatis

Physical Space

Sumber:

- <https://www.japan.go.jp/abenomics/>
- [https://www8.cao.go.jp/cstp/english/society5\\_0/index.html](https://www8.cao.go.jp/cstp/english/society5_0/index.html)

Era of IR 4.0 and beyond: **75% works** involve competencies in science, technology, engineering, mathematics, internet of things, and lifelong learning (Zimmerman, 2018)

IR 4.0 is based on **Cyber Physical System**, the blurring among digital, physical, and biological domain.  
(Klaus Schwab, 2017)

## INDUSTRIAL REVOLUTION 4.0: TECHNOLOGY DISRUPTION → NEW CULTURE



- ▶ >55 % organizations are experiencing widening *digital talent gap* (LinkedIn, 2017).
- ▶ Indonesia needs to improve *skills and capacity* of its human resources through digital technology (Parray, ILO, 2017).
- ▶ *Social skills* are becoming important in works (The Economist, 2017).

# Disrupsi Teknologi: Budaya Baru



Human Machine  
communication



Connection:  
global village



Smart Robot



Internet of Things



3D Printer



Driverless car



Big Data



Online/virtual ed

Fakta ini harus bisa dimanfaatkan untuk peningkatan mutu dan relevansi pendidikan tinggi (era Big Data, AI, Cloud Computing).

Potensi  
**PEMANFAATAN**  
**TIK** Indonesia



Sumber:

- Digital in 2018, We Are Social and Hootsuite, 2018
- Kominfo, 2018

## Pengguna Internet Indonesia



**54,68%**

atau 143,26 juta jiwa dari total populasi penduduk Indonesia.

### Akses Internet Perhari



**~9 Jam**

dari berbagai perangkat digital (Lebih besar dari USA 6,5 jam).



**~4 Jam**

dari ponsel/smartphone (Lebih besar dari USA 2 jam).



Connectivity

© Steve Wheeler, University of Plymouth, 2014

"I store my knowledge with my friends"

Wisdom of the crowd

Uber, gojek, dll

by Steve Wheeler

# Mahasiswa jaman *Now*



Kreatif dan Inovatif



Global Citizen

Mahasiswa  
Berkarakter  
**Unggul**  
Era  
Revolusi  
Industri  
**4.0**



Data, Technology and Human Literacy

Cerdas,  
tangguh,  
jujur, peduli

Main

Belajar

Bekerja

Pensiun



Main

Belajar

Bekerja

# Kelas yang berbeda

1. Learning is open
2. Learning is social
3. Learning is personal
4. Learning is augmented
5. Learning is multirepresented
6. Learning is mobile

Pembelajaran  
Daring

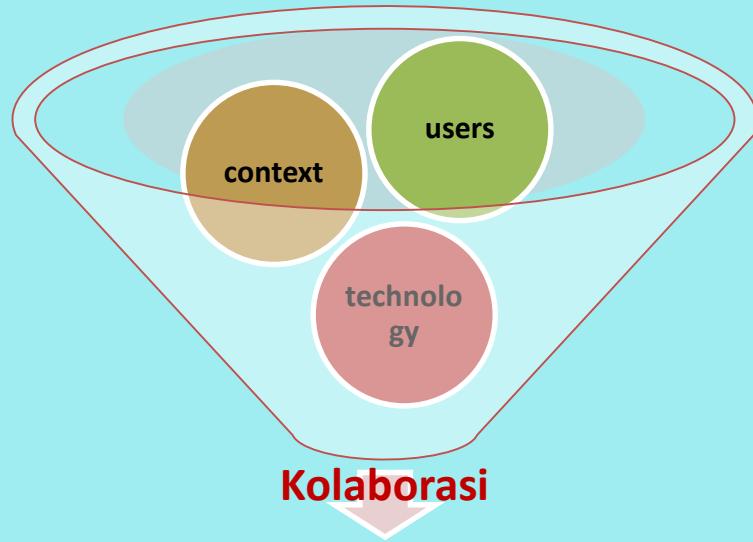
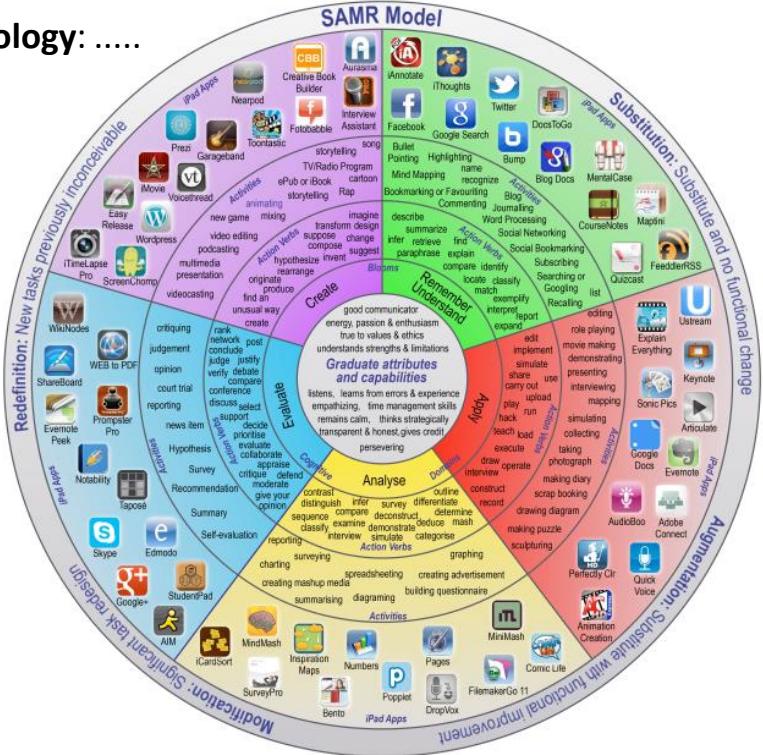


The future is now....

**Users:** teachers/lecturers, researchers, students

**Context:** learning, experiments, working, teaching, researching

**Technology:** .....



# Tujuan Pendidikan

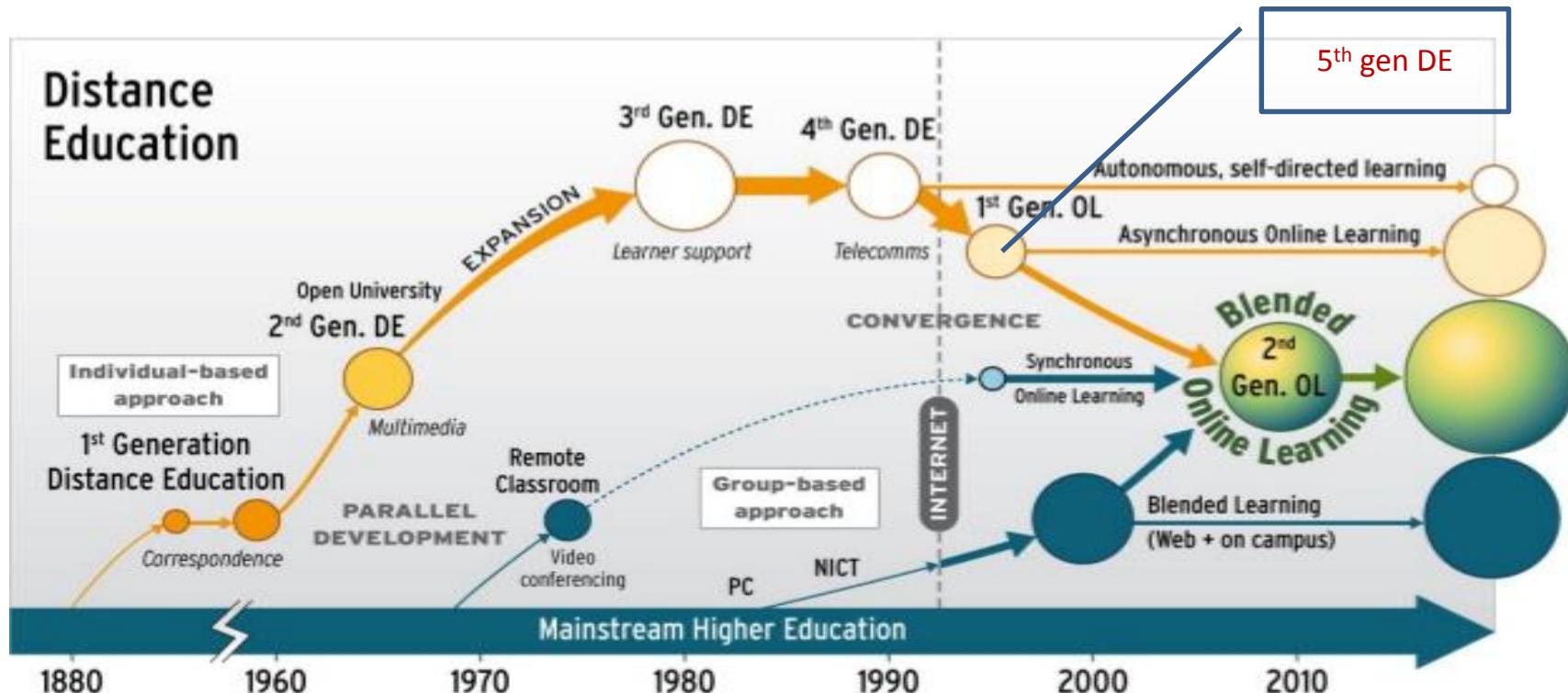


Pekerja Terampil

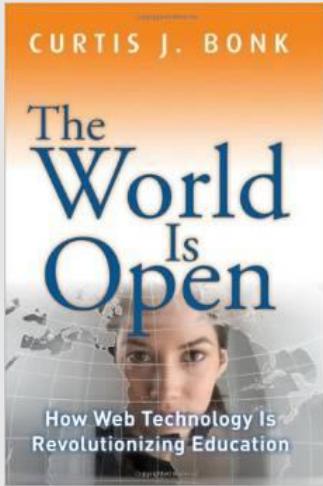


Inovasi

# TEKNOLOGI & PENDIDIKAN



# Learning is Open



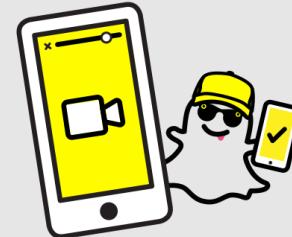
IndonesiaX

OER University

Coursera

Udacity

EdX



# Contoh Sumber Belajar



Secure | <https://phet.colorado.edu/in/simulations>

A Letter To My Child! How US libraries are Teacher Resources free Menggunakan Teknologi Google Zimbra New Tab SRV5 PDDIKTI : P

## PHET INTERACTIVE SIMULATIONS

University of Colorado Boulder

Simulasi

- Simulasi Baru
- HTML5
- Fisika
- Biologi
- Kimia
- Ilmu Kebumian
- Matematika
- Berdasarkan Tingkat / Kelas
- By Device
- ▶ Seluruh Simulasi
- Simulasi Terjemahan

Bagi Para Guru

- Riset
- Accessibility
- Donasi

Search bar

- Balon dan Gaya Apung
- Balon dan listrik statis
- Bending Light
- Bentuk dan Perubahan Energi
- Bidang Miring
- Buat Atom
- Buat Pecahan
- Circuit Construction Kit (AC+DC), Virtual Lab
- Davission-Germer: Difraksi Eletron

MINECRAFT

DOWNLOAD REALMS STORE MENU

CREEPY CASTLE FORGOTTEN DEPTHS PRIDE AND PALACES

American Astronomical Society WorldWide Telescope Learn Use Get Involved AAS

### WorldWide Telescope Resources

- Run WorldWide Telescope on the Web
- Learn To Use WorldWide Telescope
- Resources for Astronomers
- Install WorldWide Telescope for Windows
- Check out our Videos
- Resources for Educators

# Contoh Sumber Belajar



<https://phet.colorado.edu/in/simulations>  
<http://www.worldwidetelescope.org/home>  
<http://songsmith.ms/index.html>  
<http://www.gamesforchange.org/games/>  
<https://belajar.kemdikbud.go.id/LabMaya>  
<https://www.learn4good.com/games/for-high-school-students.htm>

The top screenshot displays the Songsmith website, which is a Microsoft Research project. The page features a video of a man and a young girl singing together. The text "Everyone has a song inside..." is displayed above the video. The left sidebar contains links for Home, Learn More, Download, Sound & Video, News & Updates, Screenshots, Help & How-to, Forum, For Musicians, and For Teachers.

The bottom screenshot displays the Learn4Good website, which is described as an educational online resource for high school students. The page features a banner for "IXL Math Practice Problems". It includes sections for Games, Sponsored Links, Top Games, and Highschool Games. The Highschool Games section shows a game titled "Arm Surgery 2" with a brief description and a thumbnail image.

# Learning is Social



- Connected
- Communication
- Collaboration
- Creation



# Learning is Personal



## ○ Personal knowledge construction

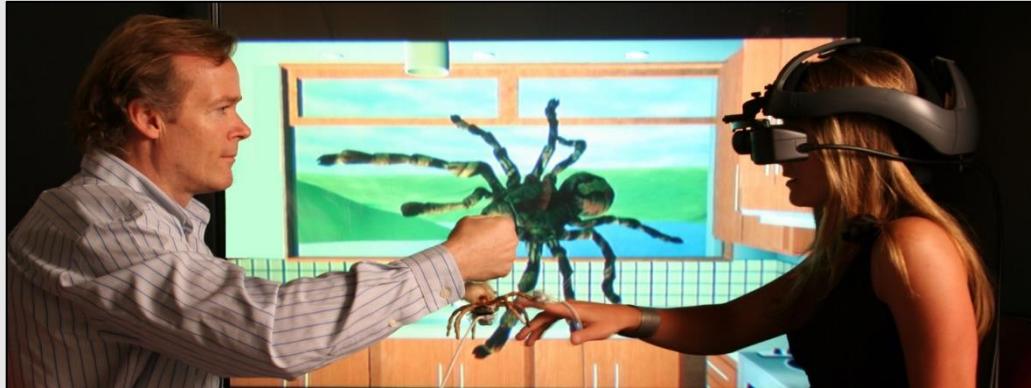
Khalil Gibran

*You may give them your love but not your thoughts, For they have their own thoughts.*

*The teacher who walks in the shadow of the temple, among his followers, gives not of his wisdom but rather of his faith and his lovingness.*

*If he is indeed wise he does not bid you enter the house of his wisdom, but rather leads you to the threshold of your own mind.*

# Learning is Augmented



# Learning is Multirepresented



Text  
Audio  
Video  
Games  
Multimedia

...



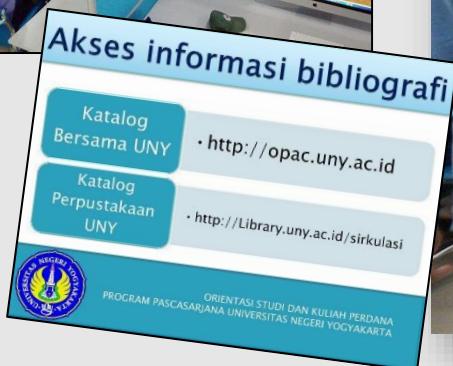
# Learning is Mobile



ANYWHERE, ANYTIME, ANYBODY

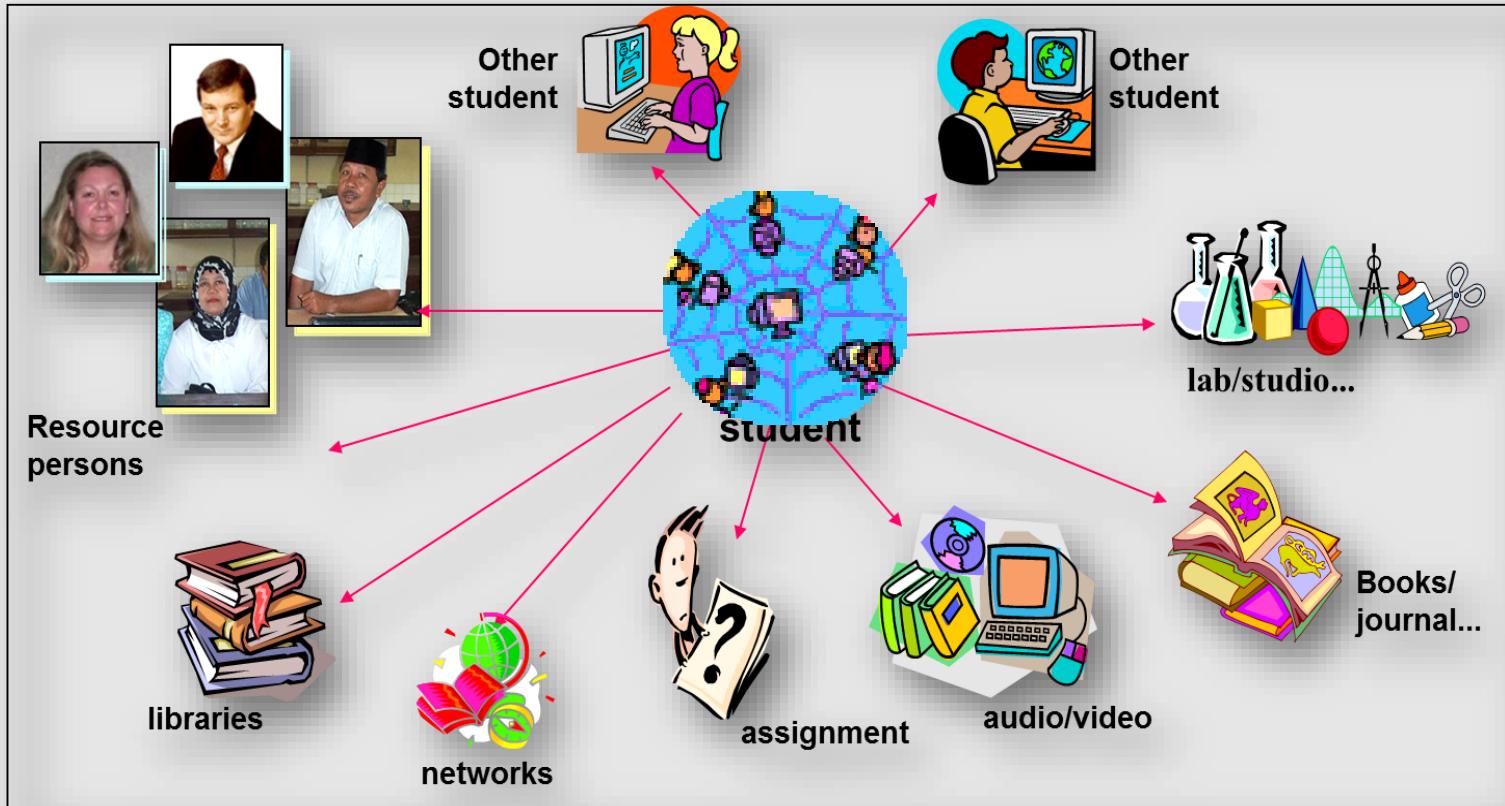


# Digital Library



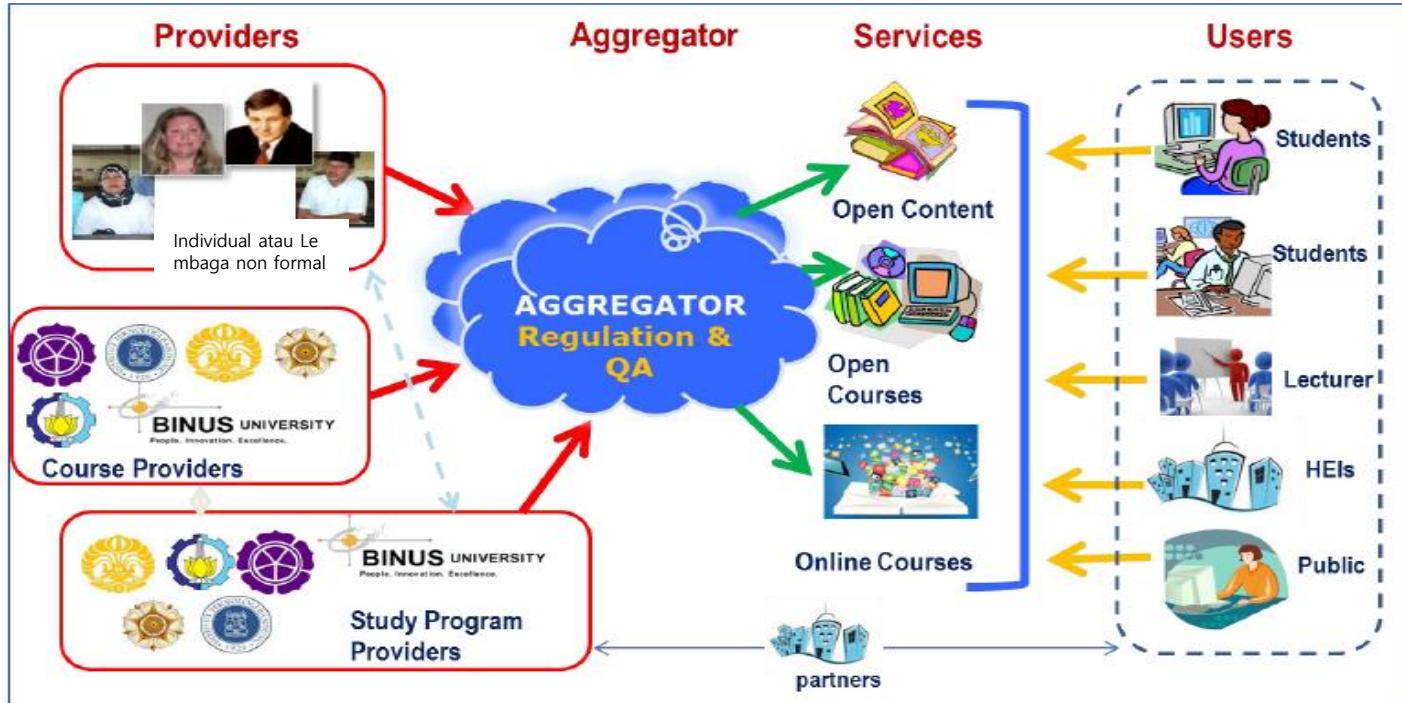
# Belajar jaman *Now*

= belajar daring



# Sistem Pembelajaran Daring Indonesia (SPADA)

## (Indonesia MOOCs – 2014) (<https://spada.ristekdikti.go.id>)



# Program Studi PJJ di Indonesia



No	Name of Institutions	# Program of Study
1	Universitas Terbuka	36
2	Bina Nusantara University	5
3	Poltekkes Kaltim	2
4	Poltekkes NTT	2
5	London School of Public Relations	1
6	Universitas Pelita Harapan	1
7	Politeknik Elektronika Surabaya	2





# SPADA Indonesia

Sistem Pembelajaran Daring Indonesia

54 PT Penyelenggara

201 PT Mitra

18.138 Mahasiswa

## SERVICES

### SPADA

Open Content

297

Open Courses

221

Online Courses

279

### ONLINE COURSES

Online Courses 7in1

102

Online Courses Student Exchange

29

## PPG HYBRID

Bidang Studi PPG Hybrid

53

MHS Batch I

677

Mahasiswa Batch II

1059

MHS Batch II Tambahan

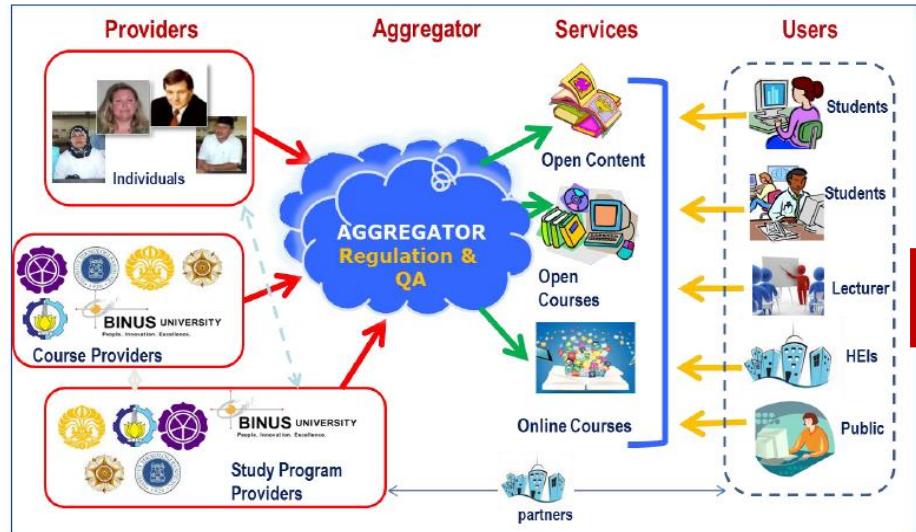
732

Total 18103

Lulus Daring 16567

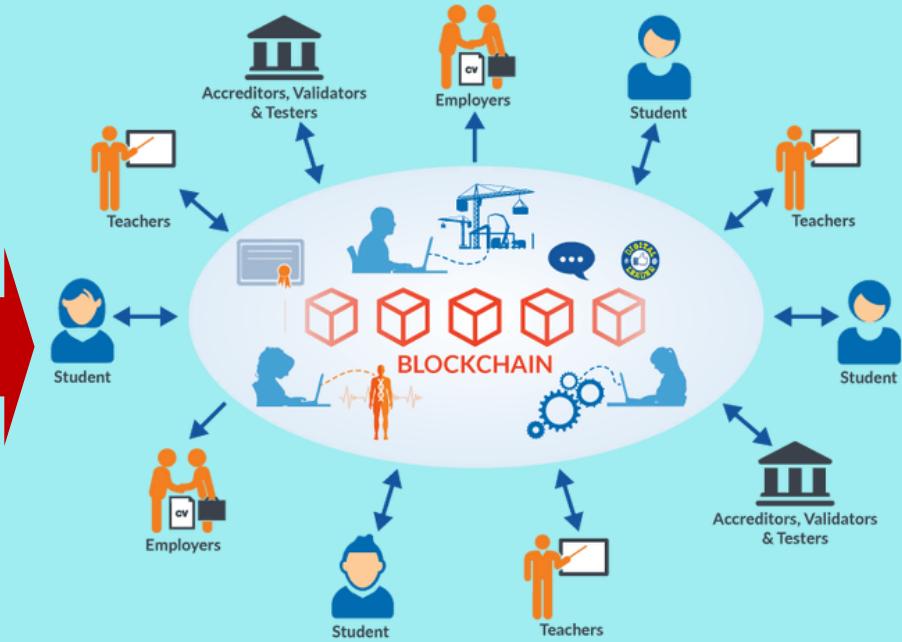
Tidak Lulus Daring 804

# Model Bisnis Baru Pendidikan



## Pembelajaran Daring

- retail: courses, competency packages
- wholesale: study program
- Degree/certificate/diplome



## Blockchain dalam pendidikan

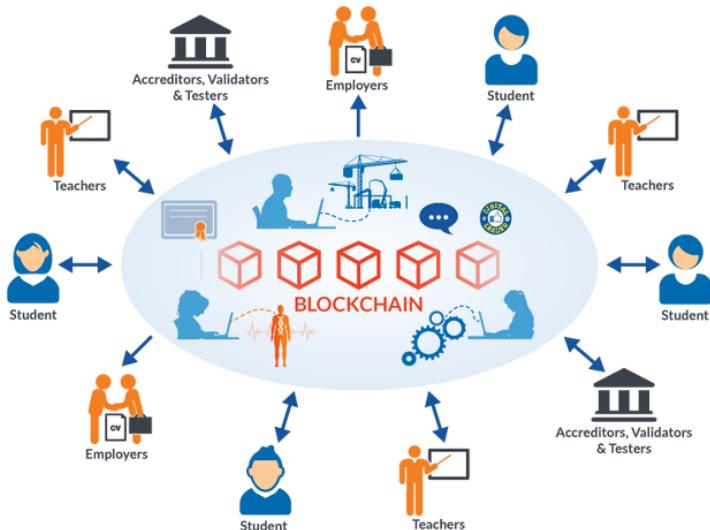
- retail: blocks/LOM, courses, competency packages,
- Recognition of prior learning certificate

# Menuju Institut Pendidikan Siber Indonesia (ICE Institute)

Permenristekdikti No. 51/2018 pasal 52



1. Penjaminan Mutu
  2. Fasilitator
- Pembelajaran Daring



## Blockchain dalam pendidikan

- retail: courses/ subjects, skills set/competency packages
- Recognition of Prior Learning
- Certification
- Stackable and transferable
- Job market oriented

# Penjaminan Mutu Pembelajaran Daring

- **Institution**

- Vision, Mission
- Organization
- Human Resources
- Infrastructure
- Collaboration
- Fund
- Quality Assurance Mechanism
- Sustainability Strategy

- **Study Program**

- Vision, Mission
- Organization
- Human Resources
- Curriculum
- Students
- Output and Outcomes
- Infrastructure
- Collaboration
- Fund
- Sustainability Strategy

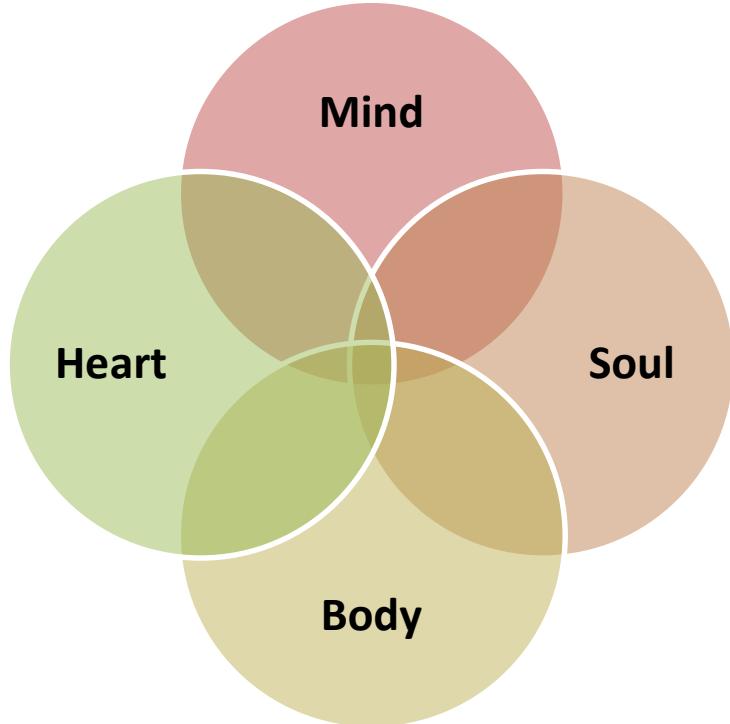
- **Course**

- Design and Development
- Materials
- Delivery system
- Interaction Strategy
- Assessment
- Course evaluation

- **Block**

- Design and Development
- Materials
- Delivery system
- Interaction Strategy
- Assessment
- Block evaluation

# Nation' Characters Development





*...future ready education....*



*Indonesia harus jadi pemenang,  
tidak hanya mengejar ketertinggalan*