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KEMENTERIAN PENDIDIKAN TINGGI

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UTM4.0 4th INDUSTRIAL REVOLUTION

DIGITAL NERVOUS SYSTEM

PRESENTED AT PRE-COUNCIL MEETING CHAIRED BY KSU KPT ON 13TH JUNE 2017, BY:

PROF DR ROSE ALINDA ALIAS,
HEAD, UTM 4.0 FOR 4TH INDUSTRIAL REVOLUTION TASK FORCE

SOARING UPWARDS
MALAYSIAN HIGHER EDUCATION

4IR (Fourth Industrial Revolution)

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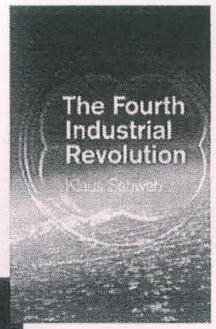
World Economic Forum Annual Meeting 2016, Davos-Klosters, Switzerland.

Theme: "Mastering the Fourth Industrial Revolution"

20-23 January 2016



Professor Klaus Schwab,

Founder and Executive Chairman of the World Economic Forum

FOREIGN AFFAIRS

THE FOURTH INDUSTRIAL REVOLUTION
Klaus Schwab

FROM THE ANTHOLOGY: THE FOURTH INDUSTRIAL REVOLUTION

SNAPSHOT December 12, 2015 Science & Technol...

The Fourth Industrial Revolution

What It Means and How to Respond

By Klaus Schwab

We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society.

innovative • entrepreneurial • global

What does 4IR mean?

- "We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society."

Professor Klaus Schwab,

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WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Executive Summary

The Future of Jobs

Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution

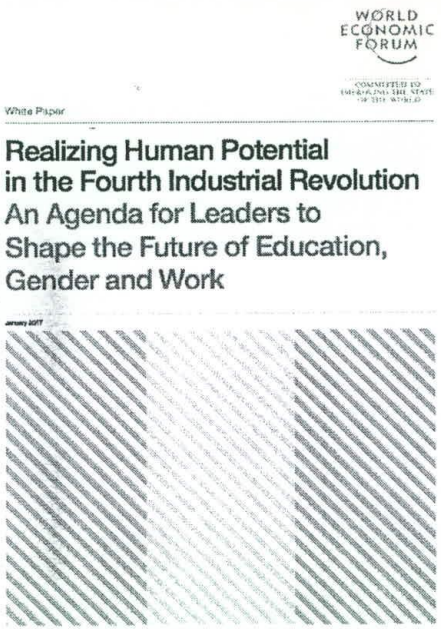
January 2016

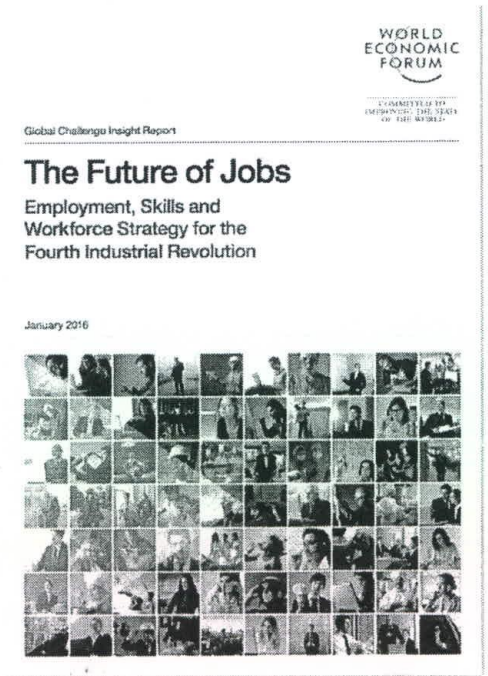
Methodology

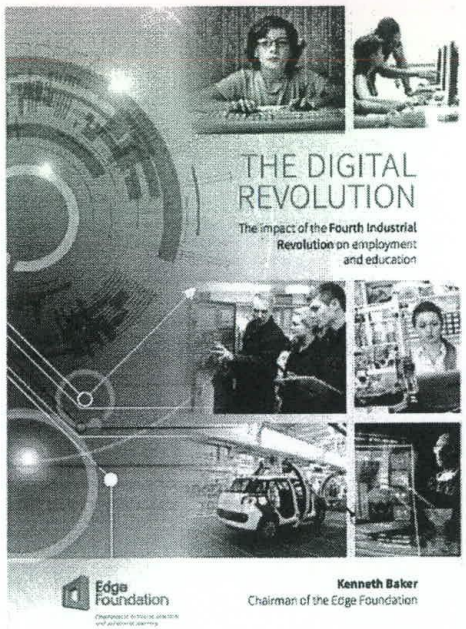
The *Future of Jobs Report*'s research framework has been shaped and developed in collaboration with the Global Agenda Council on the Future of Jobs and the Global Agenda Council on Gender Parity, including leading experts from academia, international organizations, professional service firms and the heads of human resources of major organizations. Our analysis groups job functions into specific occupations and broader job families, based on a streamlined version of the O*NET labour market information system used by researchers worldwide.

The dataset that forms the basis of the *Report* is the result of an extensive survey of CHROs and other senior talent and strategy executives from a total of 371 leading global employers, representing more than 13 million employees across 9 broad industry sectors in 15 major developed and emerging economies and regional economic areas.

4IR and the Future of Jobs







Future of Higher Education

Methodology

The *Future of Jobs Report*'s research framework has been shaped and developed in collaboration with the Global Agenda Council on the Future of Jobs and the Global Agenda Council on Gender Parity, including leading experts from academia, international organizations, professional service firms and the heads of human resources of major organizations. Our analysis groups job functions into specific occupations and broader job families, based on a streamlined version of the O*NET labour market information system used by researchers worldwide.

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WHY A 4TH REVOLUTION IS UNDER WAY?

- **Velocity**: Contrary to the previous industrial revolutions, this one is evolving at an exponential rather than linear pace. This is the result of the multifaceted, deeply interconnected world we live in and the fact that new technology begets newer and ever more capable technology.
- **Breadth and depth**: It builds on the digital revolution and combines multiple technologies that are leading to unprecedented paradigm shifts in the economy, business, society, and individually. It is not only changing the "what" and the "how" of doing things but also "who" we are.
- **Systems Impact**: It involves the transformation of entire systems, across (and within) countries, companies, industries and society as a whole.

INDUSTRY 4.0 TECHNOLOGIES

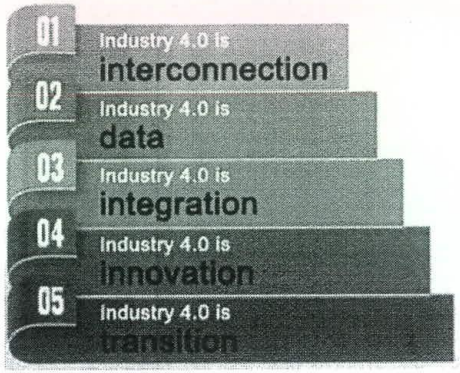


Table 1. Industry 4.0 technologies[22]

Product impact	Potential IT/OT applications
Physical ⟶ digital	• Sensors and controls • Wearables • Augmented reality
Digital	• Signal aggregation • Optimization and prediction • Visualization and POU delivery • Cognitive and high-performance computing
Digital ⟶ physical	• Additive manufacturing • Advanced materials • Autonomous robotics • Digital design and simulation

ce: Deloitte analysis.

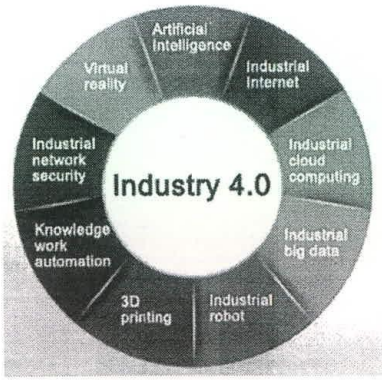
Graphic: Deloitte University Press | DUPress.com

Table 5. Potential Industry 4.0 applications for engineering transformation

Engineering impact	Potential IT/OT applications
Reduce idea-to-market time	Use rapid prototyping and production capabilities to design new products and eliminate supply chain dependencies; configure new software solutions through cloud-enabled development tools
Better link design to product intelligence	Use data to anticipate design flaws and correct for them; design products and simulate usage based on total cost of ownership and supply implications; evaluate product design options based on manufacturability
Improve the overall effectiveness of engineering[32]	Design and test new products through virtual simulation software; allow open source sharing of intellectual property to spur or improve designs

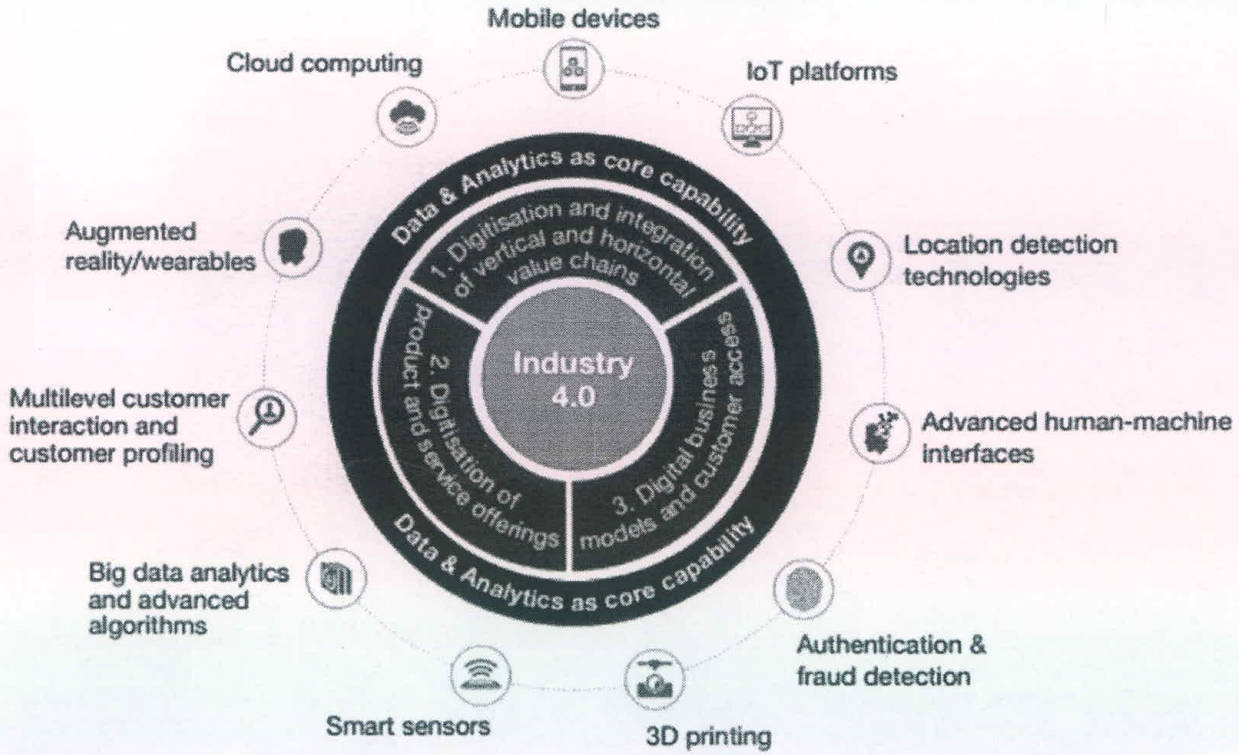
Source: Deloitte analysis.

Graphic: Deloitte University Press | DUPress.com



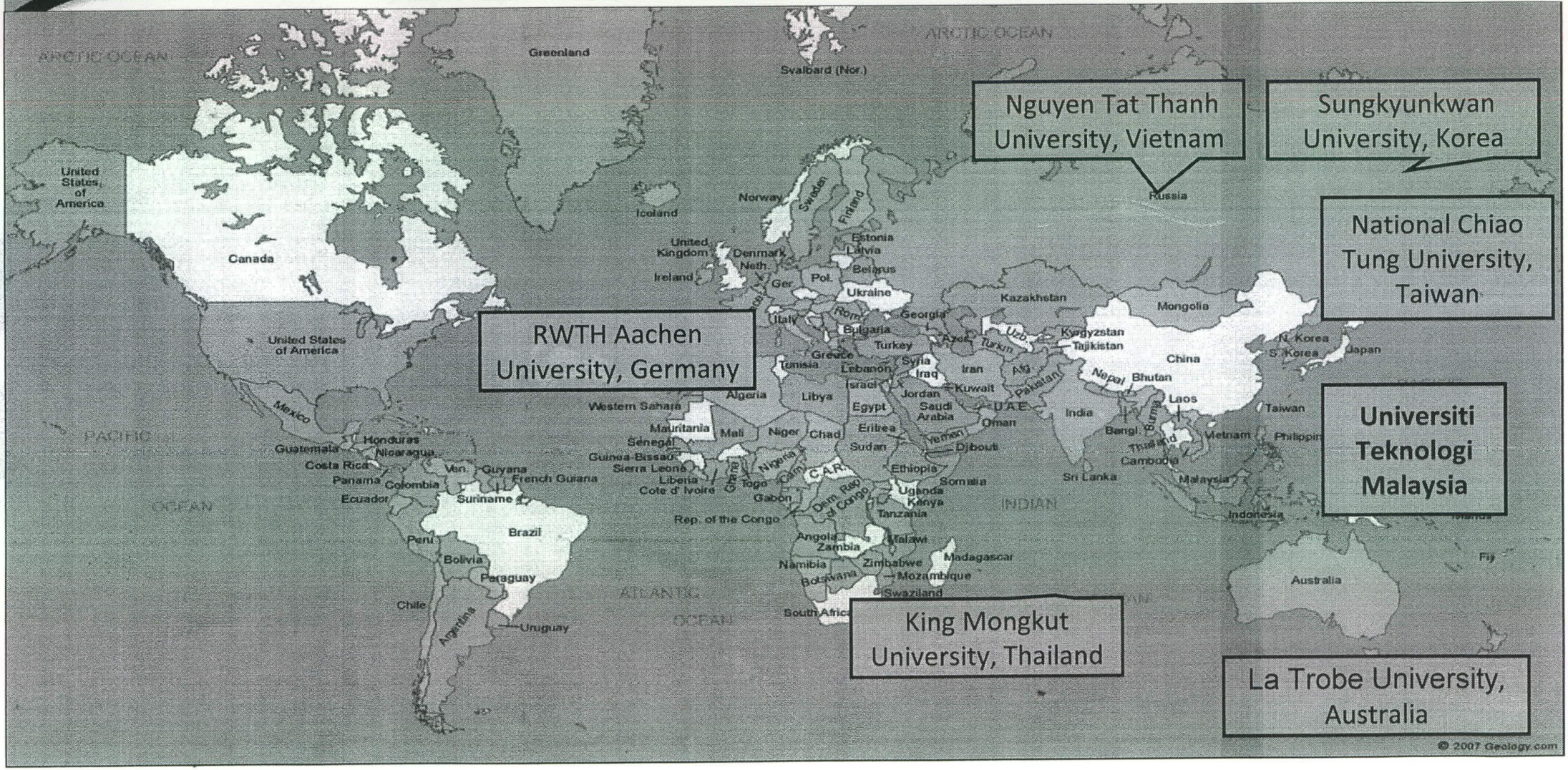
Industry 4.0 Framework

Industry 4.0 framework and contributing digital technologies



Source: PwC

Global Initiatives on University 4.0



Conference in
• Vietnam – July
(UTM - CIO pergi)

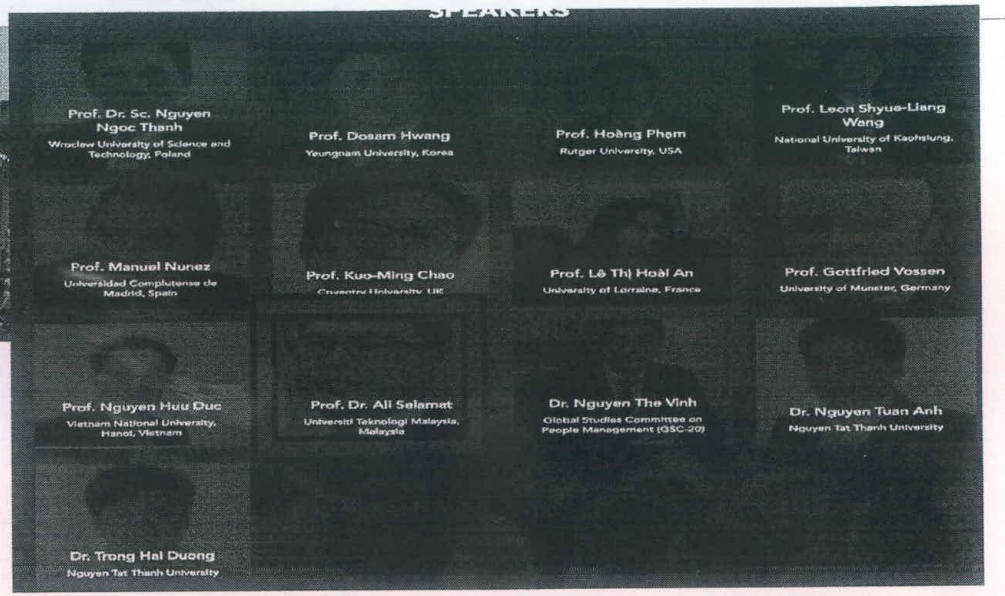
International Conference on University 4.0

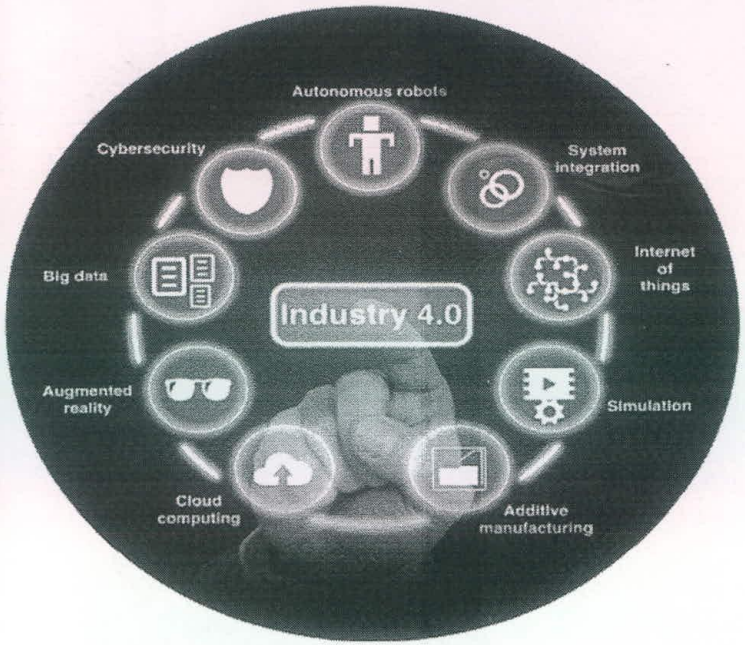
Nguyen Tat Thanh University on July 20-21, 2017

(http://university40.ntt.edu.vn/)

IN COOPERATION WITH

Coventry University · Universidad Complutense Madrid · Université de Lorraine · Rutgers · Yeungnam University





TOPICS:

- What are the required skills and knowledge that University 4.0 should equip the future generations with?
- How should University 4.0 change its learning design (curriculums, teaching methods, assessments) in the light of technological and social disruptions?
- How should the Fourth Industrial Revolution affect the administration, research, development and innovation agenda of University 4.0?
- How should University 4.0 collaborate with the industries and governments to foster innovative ecosystems?
- What are good practices of Universities 4.0?

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*UTM 4.0 fo[illegible] Framework

GLOBAL PROMINENCE

TALENTS

SHIFT 1 STUDENTS

SHIFT 2 EDUCATORS

21ST CENTURY CURRICULUM

SHIFT 4 TVET

SHIFT 3 LIFE LONG LEARNING

SHIFT 10
LEARNING DELIVERY SYSTEMS

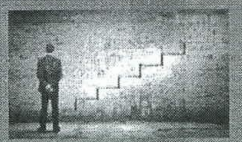
Anywhere Anytime

Individualisation

Flexible Delivery

MOOC & BLOSSOMS

Modular & Projects



Peers & Mentors

SHIFT 7
RESEARCH & INNOVATION

RESEARCH ALLIANCE

HICOE/ COE

RESEARCH GROUP

PARTNERS/ COLLABORATORS

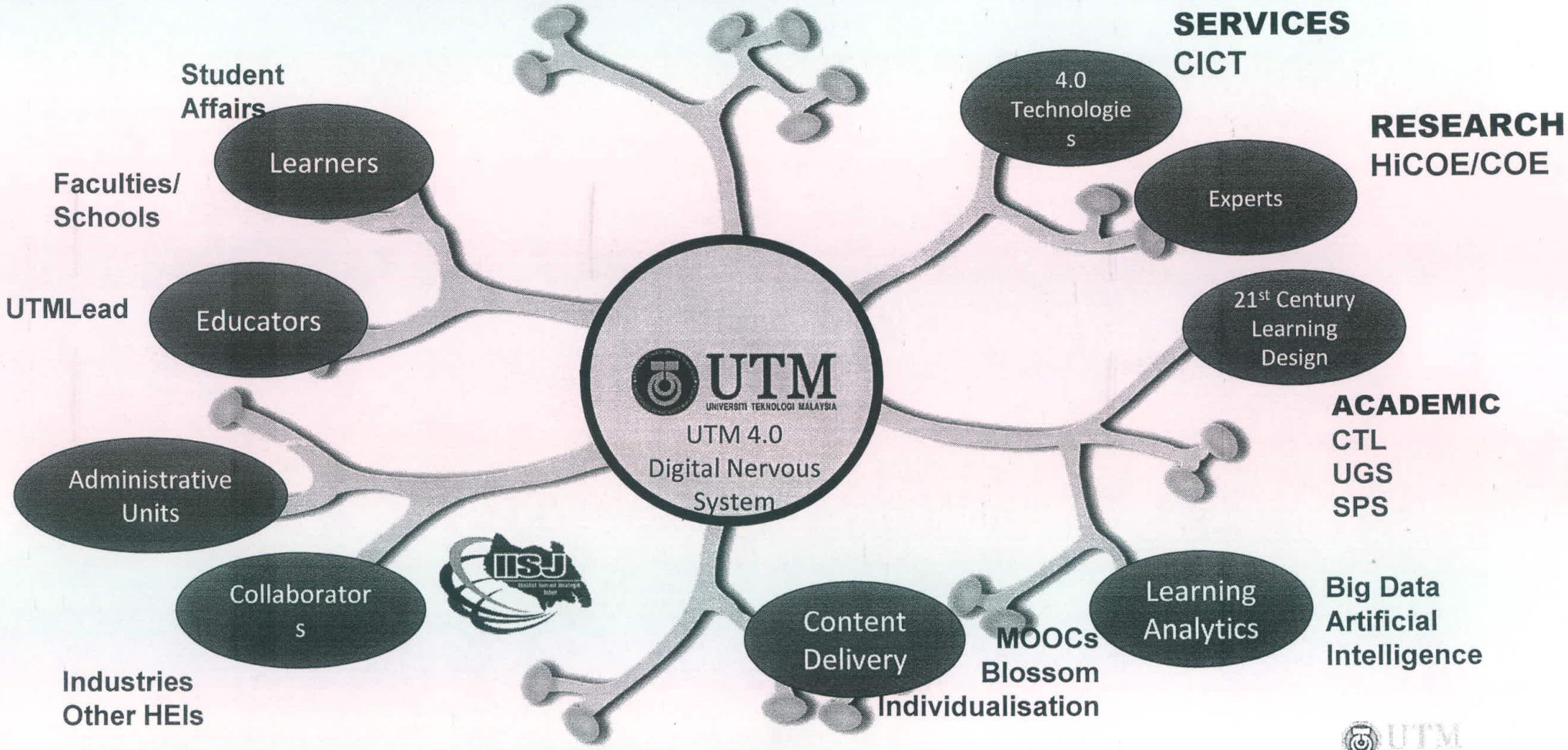
STUDENT INNOVATION

SHIFT 6 GOVERNANCE

SHIFT 5 FINANCIAL

SHIFT 9
4.0 TECHNOLOGIES & APPLICATIONS

UTM 4.0 4IR Digital Nervous System



3 Grand Challenges as Proof of Concept

GC#1:
Learning Technologies

GC#2:
21st Century Curriculum

GC#3:
Learning Analytics

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CENTRE FOR ENGINEERING EDUCATION
CEE
UNIVERSITI TEKNOLOGI MALAYSIA

UTM BIG DATA CENTRE
TOGETHER WE MAKE MOTIONS...

GC#1: Learning Technologies: Gamification, AIS and Robotics

Exhibit 7: Most educational technologies are focused on developing foundational literacies

	Personalized and adaptive content and curricula	Open educational resources	Communication and collaboration tools	Interactive simulations and games
Character Qualities	*Additional tools are strongly needed to develop competencies and character qualities*			• Games for Change
Competencies			• Google Apps for Education • OneNote • Facebook • Ponder	• Glass Lab • Games for Change • Molecular Workbench • Explore Learning • Tynker
Foundational Literacies	• Knewton • Dreambox • Read180 • Khan Academy • Smart Sparrow	• Betterlesson • LearnZillion • Curriki Geometry • netTrekker • Fishtree • Pearson • McGraw-Hill • Houghton Mifflin		• Explore Learning • Glass Lab • STMATH

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DIGITAL NERVOUS SYSTEM

Gamification Technology in Teaching and Learning

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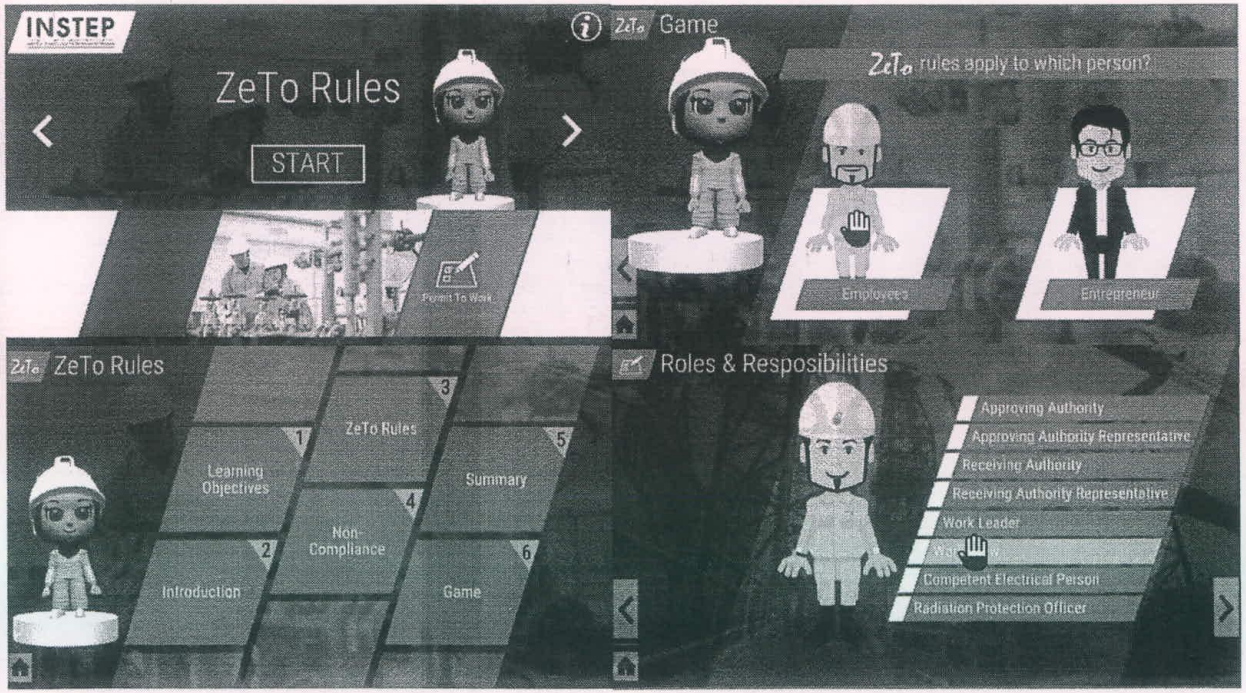
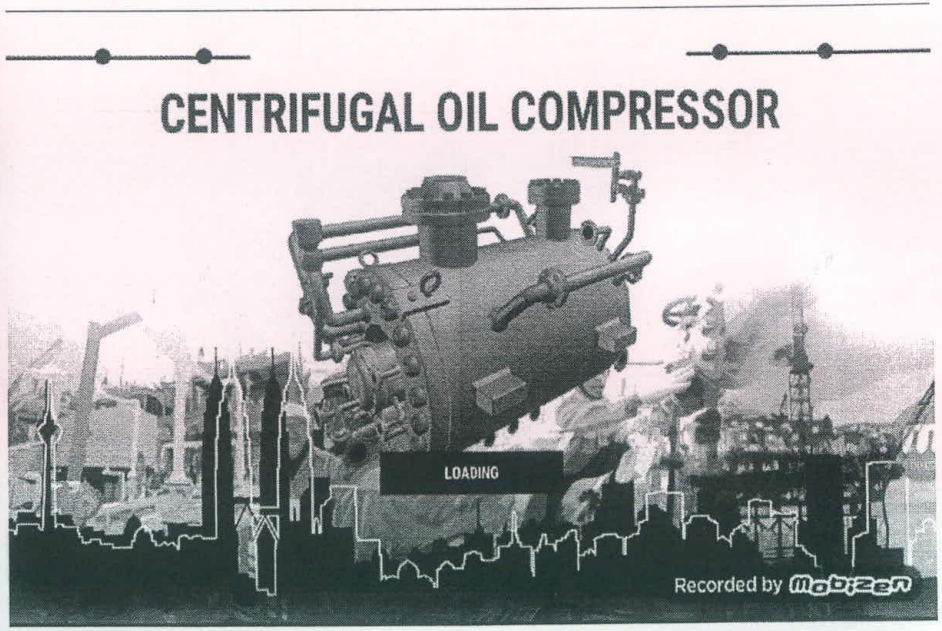
Media and Game Innovation Centre of Excellence

Gamification Technology in Teaching and Learning

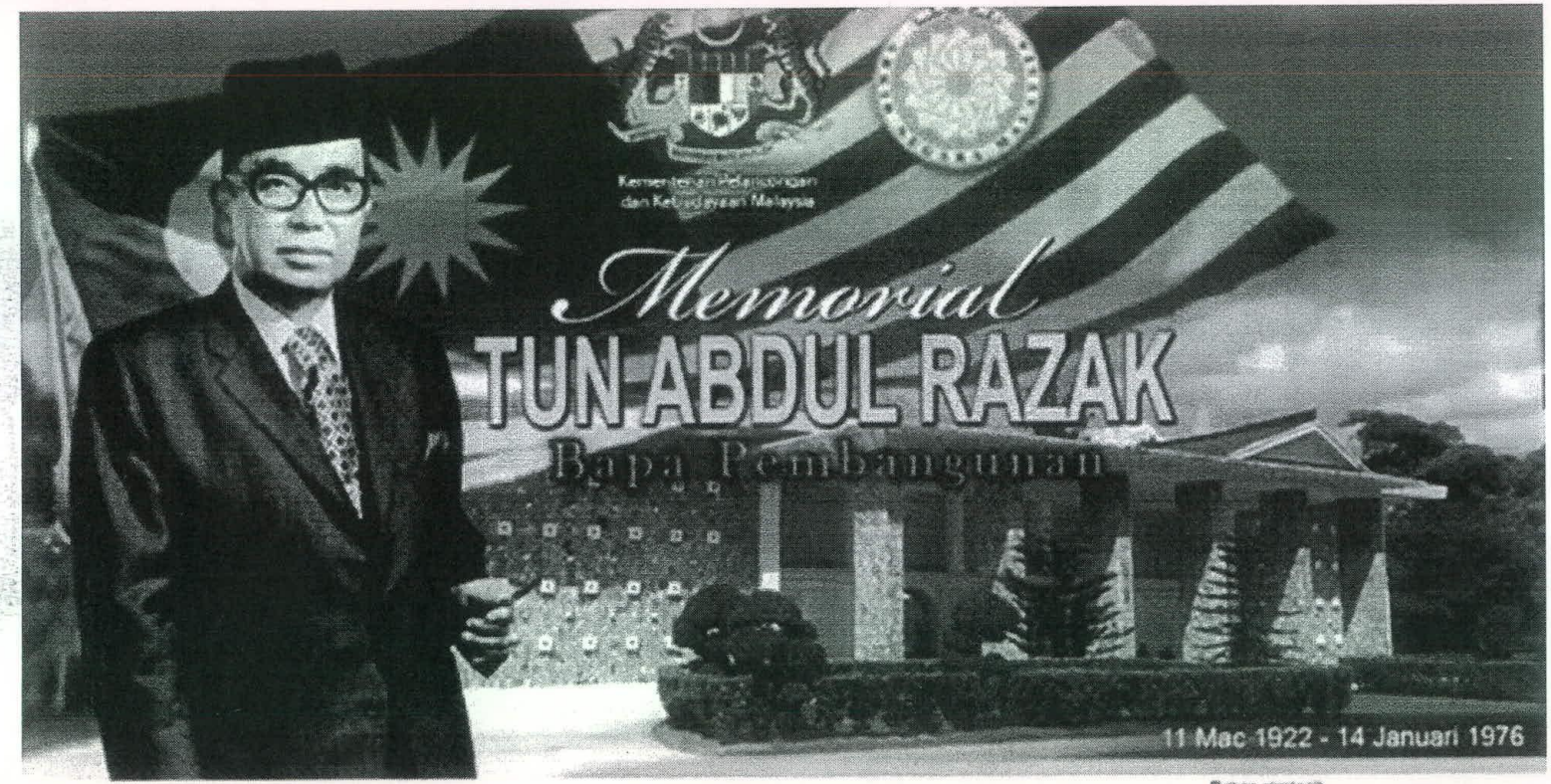
Health, Safety, Environmental for Oil and Gas Industry



Centrifugal Oil Compressor for Oil and Gas



Galeri Memorial Tun Abdul Razak



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Media and Game Innovation Centre of Excellence

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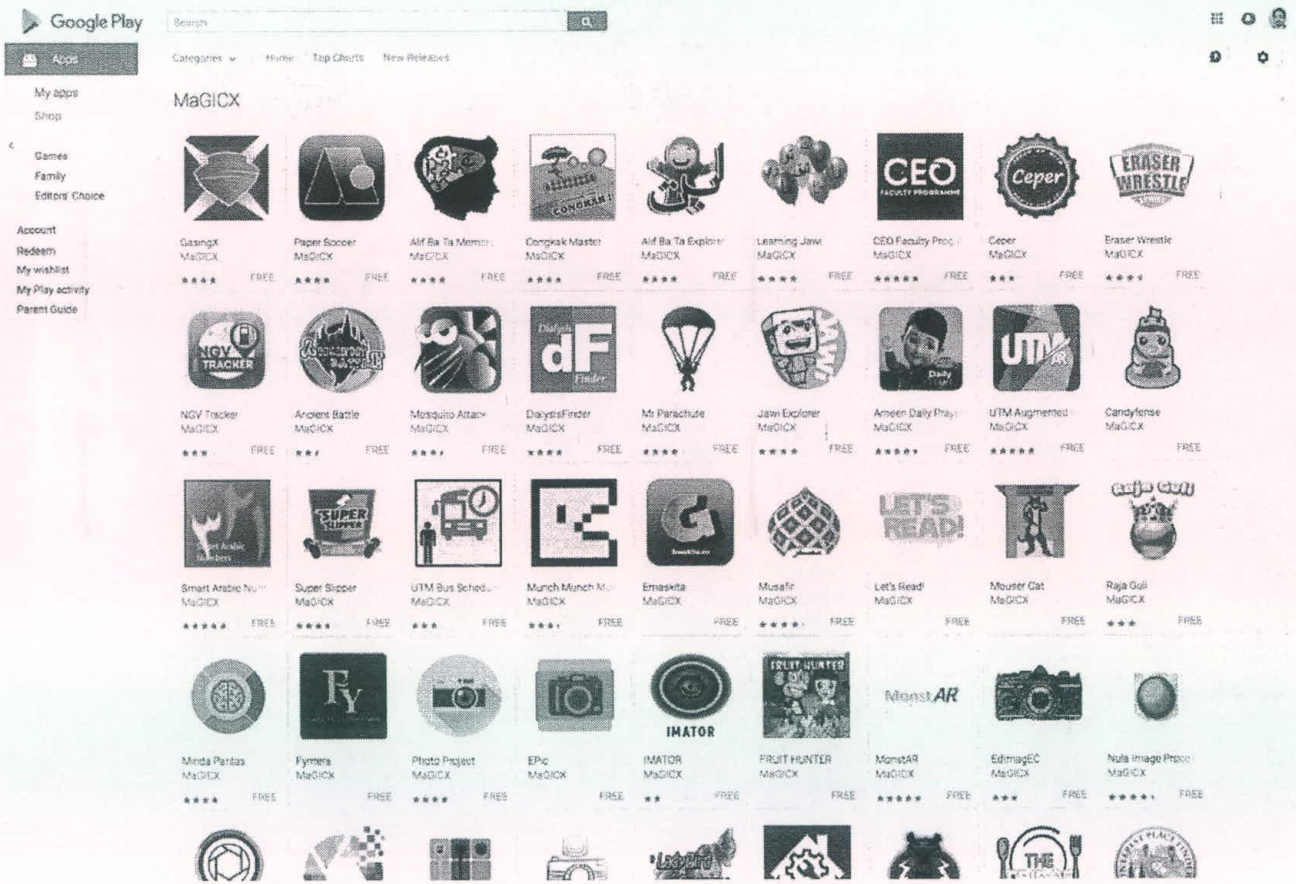
PELANCONGAN DAN KEBUDAYAAN
MALAYSIA

Mobile Games and Apps



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More than 150 mobile games/apps

GET IT ON Google Play

Download on the App Store

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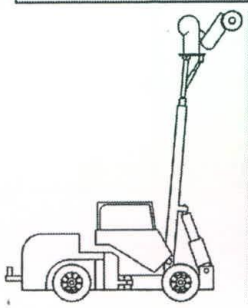
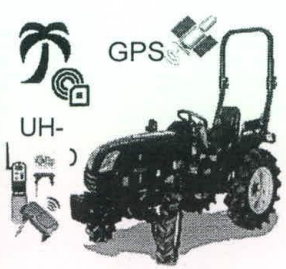
AGRICULTURE 4.0
Flagship Programme:

Digital Technologies for Oil Palm Industries

Harvesting Technology	Data Driven Plant Management
• Exoskeleton • Intelligent Harvesting • Harvesting Robot	• Growth Monitoring • Pest & Disease Control • Fertilizer Management • Yield Prediction





MANUFACTURING 4.0
Flagship Programme:

Industrial IoT Lab

CNC Machine, 3D Printer, Robotics Assembly, Intelligent Drone Delivery System, Automated Storage, Prototyping, Components Production, Consultancy, Training, Research

Production Optimization, Process Operational Efficiency, Predictive Maintenance, Real-time Info Display

IIoT Lab Layout

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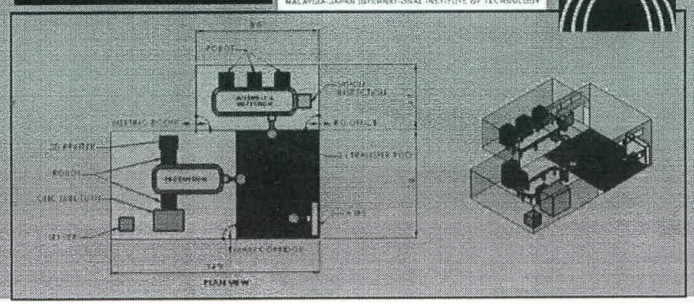
MIMOS



DISASTER MANAGEMENT
Flagship Programme:

Intelligent Drones for Disaster Rescue Operation

Request sets from field

↓

Generate optimized mission plan

↓

Drones mission assignment

↓

Guidance & Control

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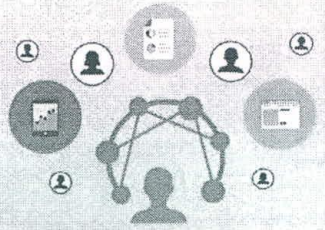
EXPERTS & TALENT DEVELOPMENT

- **CAIRO's Comprehensive IoT Training Programmes**
  - Embedded System, Internet Communication System, Artificial Intelligence, Data Analytics, Control & Instrumentation, Database System, Cloud Management.
- **Training on System Integration & Maintenance for Agriculture 4.0 and Manufacturing 4.0**
- **Awareness Programmes** for Executives to Onsite Personnel



KenalKayu – Wood Species Recognition System

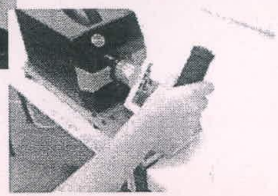
Web-Based KenalKayu

Handheld KenalKayu

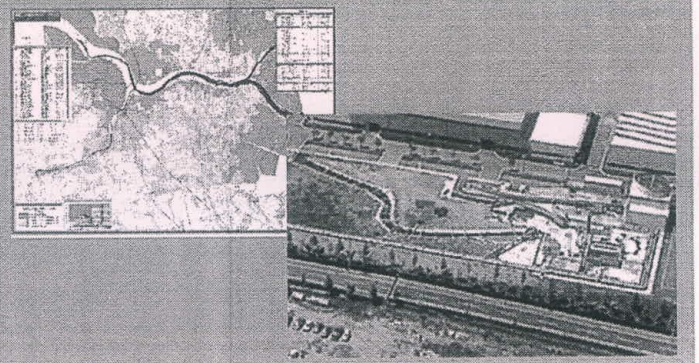
- Mobile
- Small
- Light
- Fast
- Accurate

CR2 – Rehabilitation Robot for Wrist &

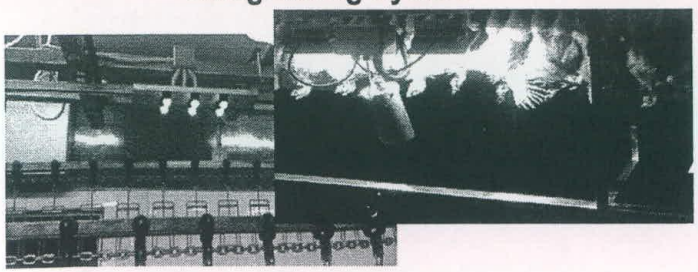
- Cloud-Based Monitoring
- Interactive
- Modular
- Portable



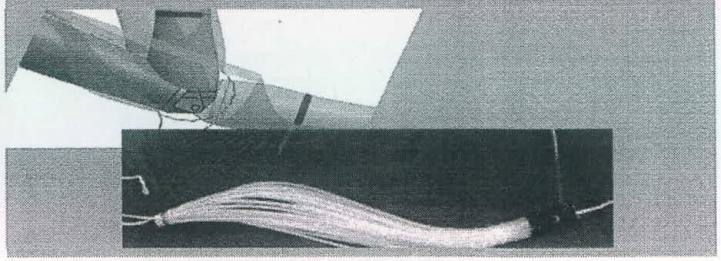
Flood/Landslide Simulation System



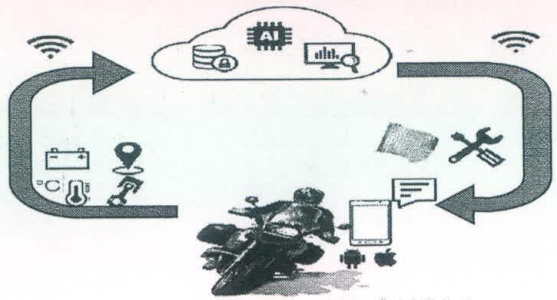
SYCUT – Syariah Compliant Chicken Slaughtering System



Lightweight Exoskeleton Suit for Oil Palm Harvesting



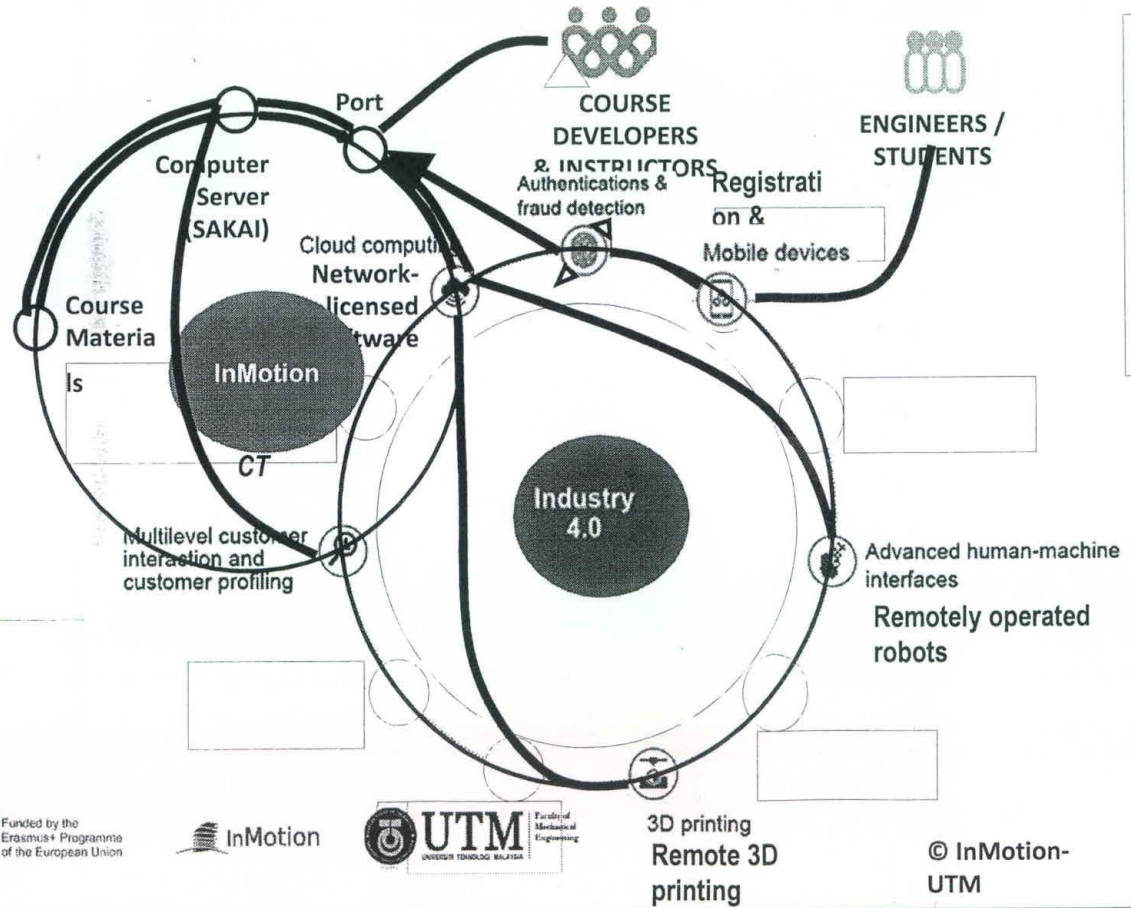
IoT Based Adaptive Fuel Map



InMotion Project in Relation to Industry 4.0

InMotion Concept

Innovative teaching and learning strategies in open modelling and simulation environment for student-centered engineering education



- an EU Grant project carried out in FKM (UTM), which aims to **create new eLearning Materials** for Computer Modelling and Simulation for Engineering (CMSE) field with **Open Modelling and Simulation Environment platform** (OMSE) based on innovative teaching strategies and creative learning approaches.
- InMotion target to train graduates, engineers, researches from European Countries and Pacific Countries to be competent in the CMSE field and hence the realization of Industry 4.0.

International Partners

Universität Bremen · SPIIRAS · University of Ljubljana · SMTU (State Marine Technical University) · Novosibirsk State Technical University · POLYTECH (Peter the Great St. Petersburg Polytechnic University) · UNED · UTP · UniKL Universiti Kuala Lumpur

Funded by the Erasmus+ Programme of the European Union

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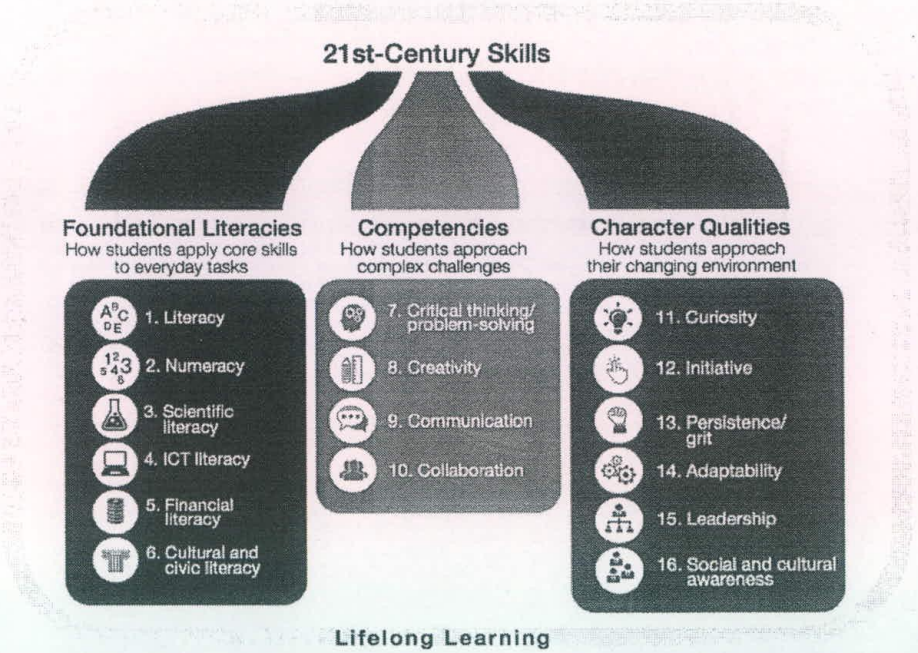
GC#2: 21st Century Curriculum

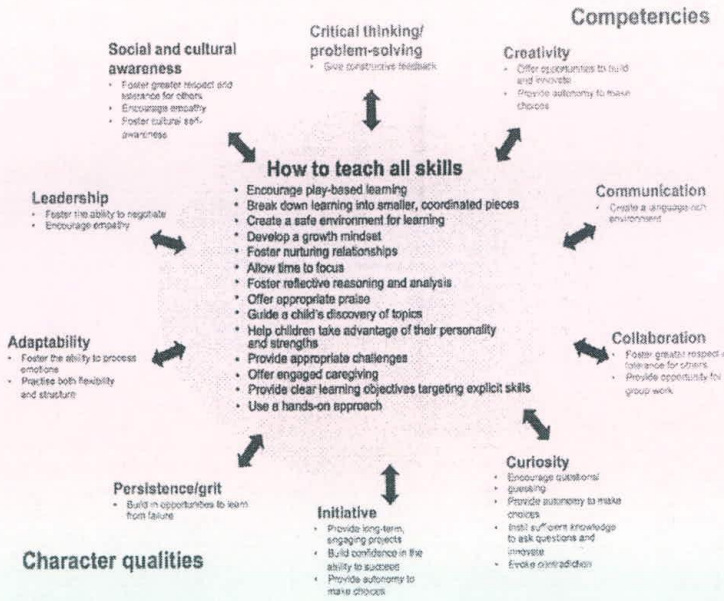
Exhibit 1: Students require 16 skills for the 21st century



Note: ICT stands for information and communications technology.

4 New Vision for Education

Exhibit 3: A variety of general and targeted learning strategies foster social and emotional skills



8 New Vision for Education

21st Century Skills and Learning Strategies

(Source: Soffel, 2016, Website Editor, World Economic Forum)

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DIGITAL NERVOUS SYSTEM

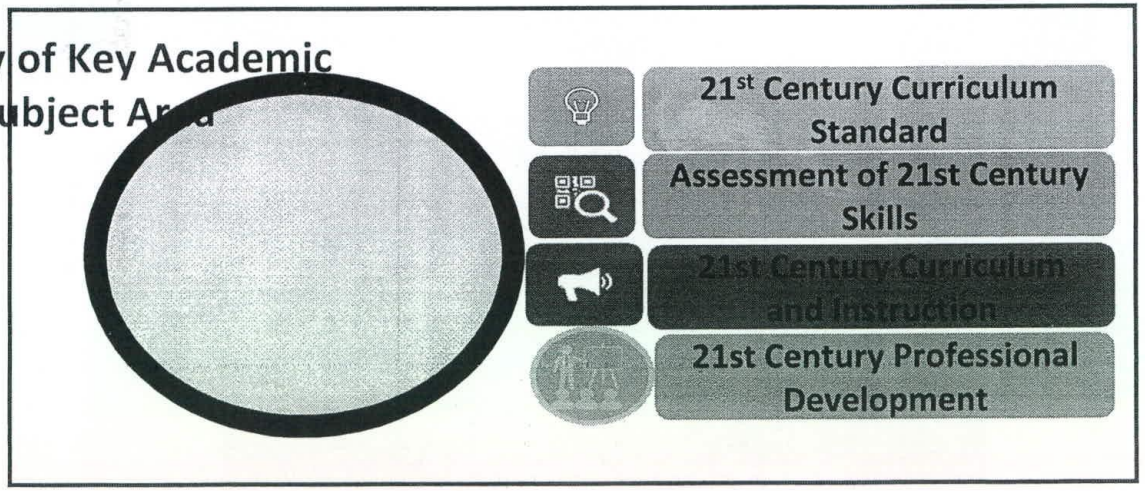
The Impact of 21st Century Curriculum & 4.0 Technologies

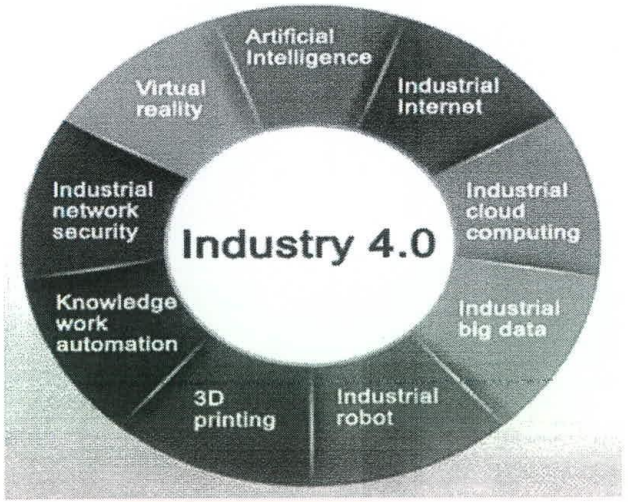
Ethics & Spirituality | Leadership Skills | National Identity | Language Proficiency | Thinking Skills | Knowledge

AKHLAK (Ethics and Morality) — ILMU (Knowledge and Skills)

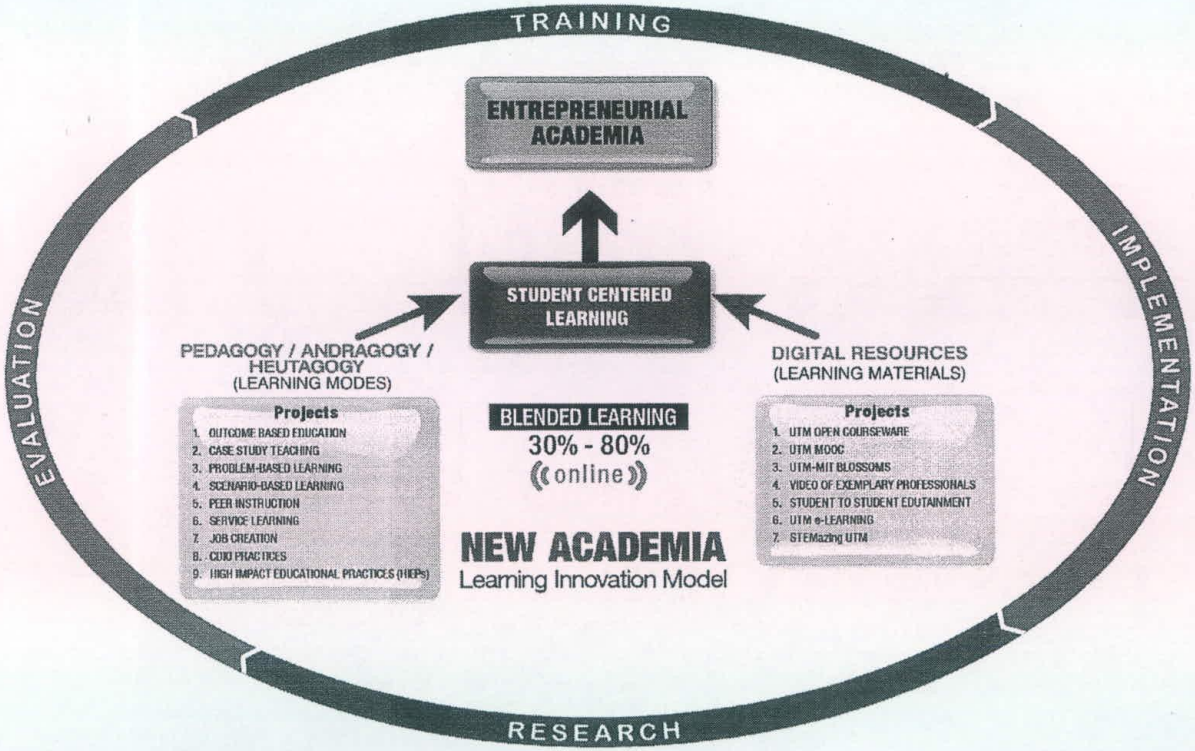
BALANCE

tery of Key Academic Subject Ar



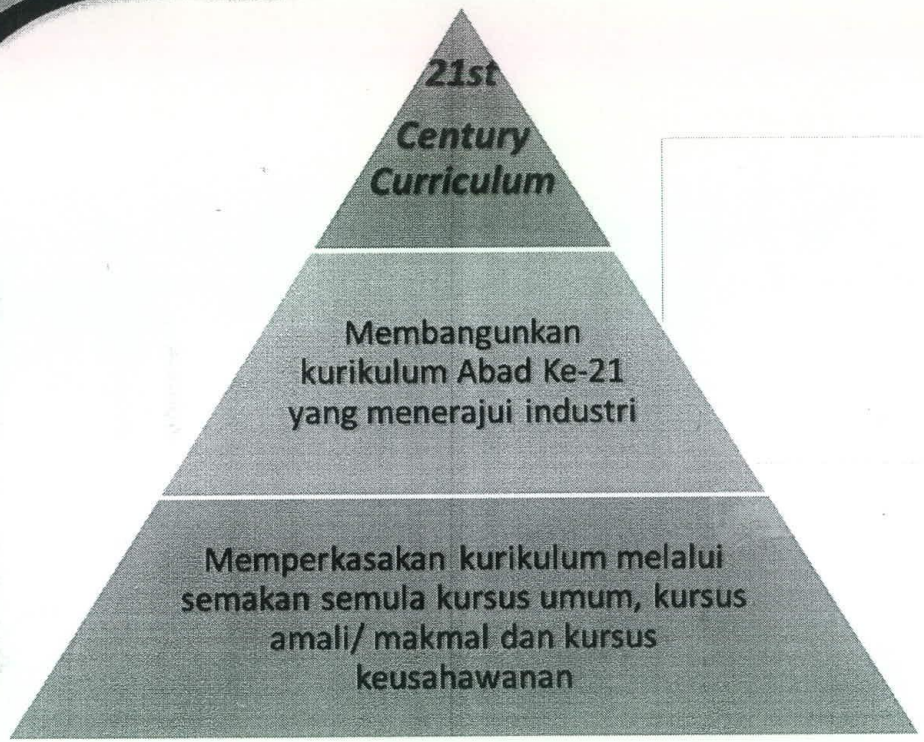


UTM New Academia Learning Innovation (NALI)
21st Century Learning Model to support 4IR

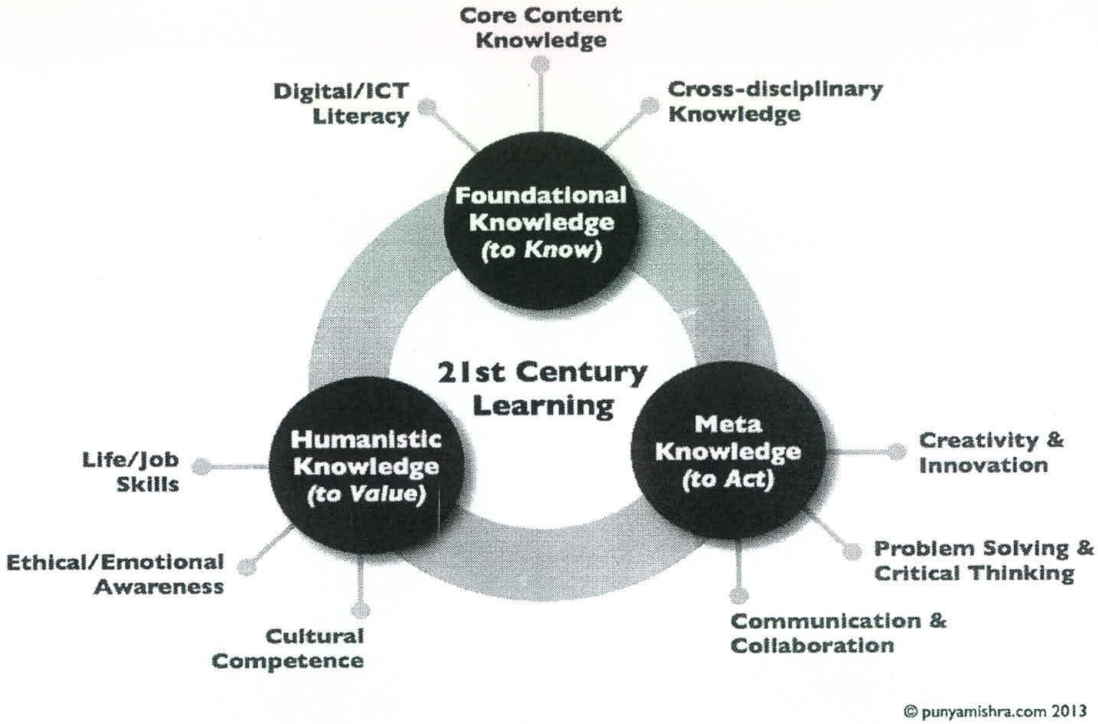


	New academia academia	Action
Faculty members	Professors, inventors, entrepreneurs	Adjunct staff, fellows
Learning materials	Books, journals, experiences, Internet, internship	Internship, students' business venture
Philosophy	Integration	New pedagogy, RA
Funding	Grants, fees, VC, endowment, REITs	Creative fund raising
Students	School leavers, mid-career, businessmen, early-career, life-long	Top UG; PG from corporations, research
Venue	Campus, Internet, incubators, brands	Wifi, 4G, MTDC, Proton
Learning modes	Lectures, tutorials, lab, studios, peer instruction, internship, incubators, experiential learning, 5 minds	**NEW PEDAGOGY:** learner-centric, Silicon V-culture, **GOP**, ethics
Outcomes	Degrees, expertise, business models, capital, networks, culture *	**JOB CREATION**; micro-credit, spin-off, projects

UTM Curriculum Review for 21st Century Learning



Critical Agenda Project 2015-2017



Principles of 21st Century Learning

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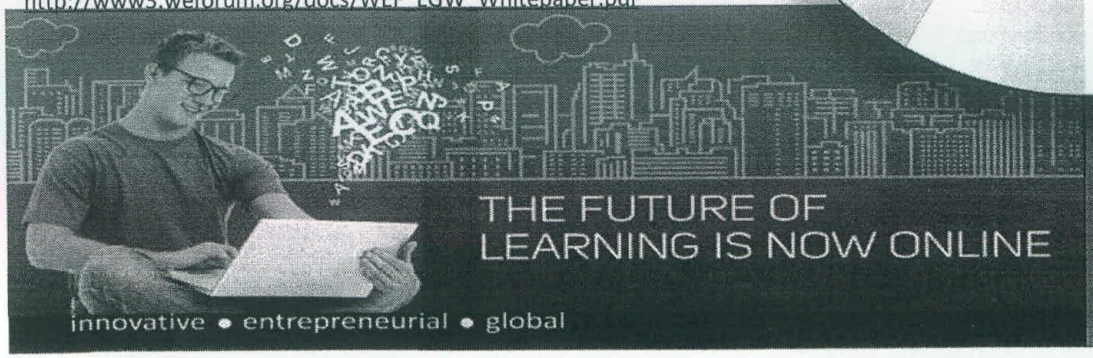
The impact on people

"One of the features of this 4th Industrial Revolution is it doesn't change what we are doing but it changes us" – It changes the role of educators in UTM!

Focus:

Open access learning (BLOSSOMS, MOOC, STEMazing etc.) with pedagogy, andragogy, and heutagogy approaches enhances creativity, reduce gaps (every individual poor or rich able to get access to quality education), empower many people to improve their living conditions.

Source:
http://www3.weforum.org/docs/WEF_EGW_Whitepaper.pdf



Initiatives related to 4IR CTL, UTMLead

NALI 21st Century learning

"Future-ready" curricula: Design and deliver interventions that strengthen STEM skills, employability skills, and/or global citizenship skills

MOOC

- A new deal on lifelong learning
- Adult learners: It is vital to ensure that the 3 billion people already in the workforce get access to quality training and learning opportunities;
- Other than andragogy and pedagogy, HEUTAGOGY approach is required to cater professionals/ working individuals .
- Develop more MOOC Courses for Technical and vocational education and training (TVET)

BLOSSOMS & STEMazing

- While increasing the STEM-literacy of the population is certainly very important, currently these subjects are often taught in a way that reinforces a disconnect between sciences and humanities and existing education gender gaps, and focuses on theory over application and experiential learning
- bridging gap between lower and higher education
- Teachers have regular opportunities to refresh their own skills and knowledge.

Source: http://www3.weforum.org/docs/WEF_EGW_Whitepaper.pdf

The University of the Future

Source: **Sabina Jeschke**, Engineering Education for Industry 4.0, 2016

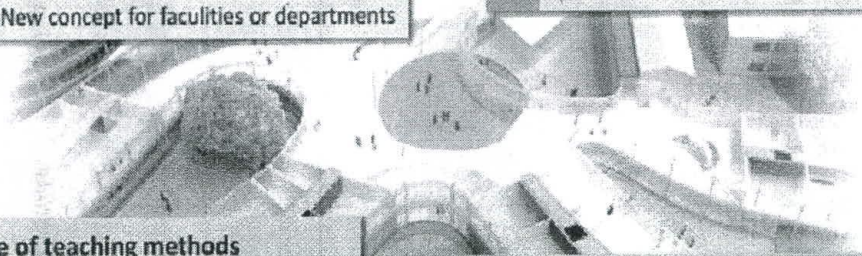
! Challenges of future teaching and learning must be turned into opportunites for change!

Change of organisational structures

- Change of business models
- Cooperative Structures enhancing interdisciplinarity
- New concept for faculities or departments

Change of accreditation procedures

- New role of examination offices
- No fixed degree programms
- Accelerationin education according to fast innovation cycles



Change of teaching methods

- New teaching concepts (e.g., flipped classroom)
- New teaching infrastructures (e.g. equipment for virtual worlds)
- Digital rights management

Change of learning

- Massive vs. Personalized learning
- New learning infrastructures e.g. increased computing capacities
- Shift from presence learning to distance learning

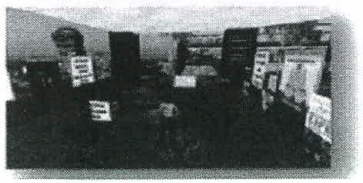
Digital culture

- Digital technologies pervade and **connect** all aspects of daily life
- Development of **various digital lifestyles**
- **New mental models**, e.g. distance no longer dominated by geogr. distances

!

- New forms of social communication, participation and organisation
- Leading to globalization of education
- New learning/problem solving styles
- NLP, Web „4.0" on its way

- Semantics makes „search" more efficient
- Googles on-demand philosophy spreading
- Melting of all types of information, seamless integration



Individualization

- Individualism – a global phenomenon
- Few strong, many lose relationships

!

- **Complex biographies and identities**
- Personalisation and individualisation in learning and education **„DIY education"**
- Social cohesion shifted from physical to virtual world
- Distances in mind sets become even more visible

- Individual education for the masses
- Self-paced learning
- Individual modular degrees

21st Century Curriculum for Engineering Education

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Redefining the role of an engineer

- Developer of technology for society
- Participant in the societal process through which technology shapes society
- Integration of science and the humanities

Engineer of the 21st Century needs to develop competence not only in **technical** matters, but also in **humanistic** concerns

- Humanistic – understanding oneself and how one relates to nature and to the social environment
- Does not mean taking a few extra courses in the humanities or take a double major
- **Bridge the gap** inherent in the reductionist paradigm; the need for integration

Curriculum Reform

- Holistic curriculum
- Engineering ethics and societal values
- Shift of focus from problem solving to problem formulation
- Communicate about the costs (i.e. risks) of complex technology as well as its benefits
- Globalization and producing "flexible" engineers

The need to broaden and strengthen engineering curriculum

neurial • global

Essential Elements

- New context based on shift from linear to nonlinear paradigm
- New and revised content consistent with this context
- New and existing pedagogical approaches for reinforcing the context and supporting the delivery of the content

Implication of newest technology

Change in Paradigm	
Reductionist	**Holistic**
• Engineer is considered to be separate from and independent of the technical system that he or she is developing • Technology is assumed to be value neutral and engineer's personal point of view is considered irrelevant	• Engineer is understood to be part of the technical system in that his or her point of view and values are necessarily expressed in the technology • To act responsibly, the engineer must understand the implications of this recursive relationship

Principle of **Context**

World perceived as machine, engineer as mechanic - linear

World is alive as complex adaptive system, engineer is apart – nonlinear

- Analogy: magnetic field that gives shape and meaning to the content
- Shaking up the curriculum (content and pedagogy) without reorienting the field (context) may produce some temporary changes
- Contextual shift is from **linearity** to **nonlinearity**

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Reference & platform for community of practice in Training & Research in Engineering Education

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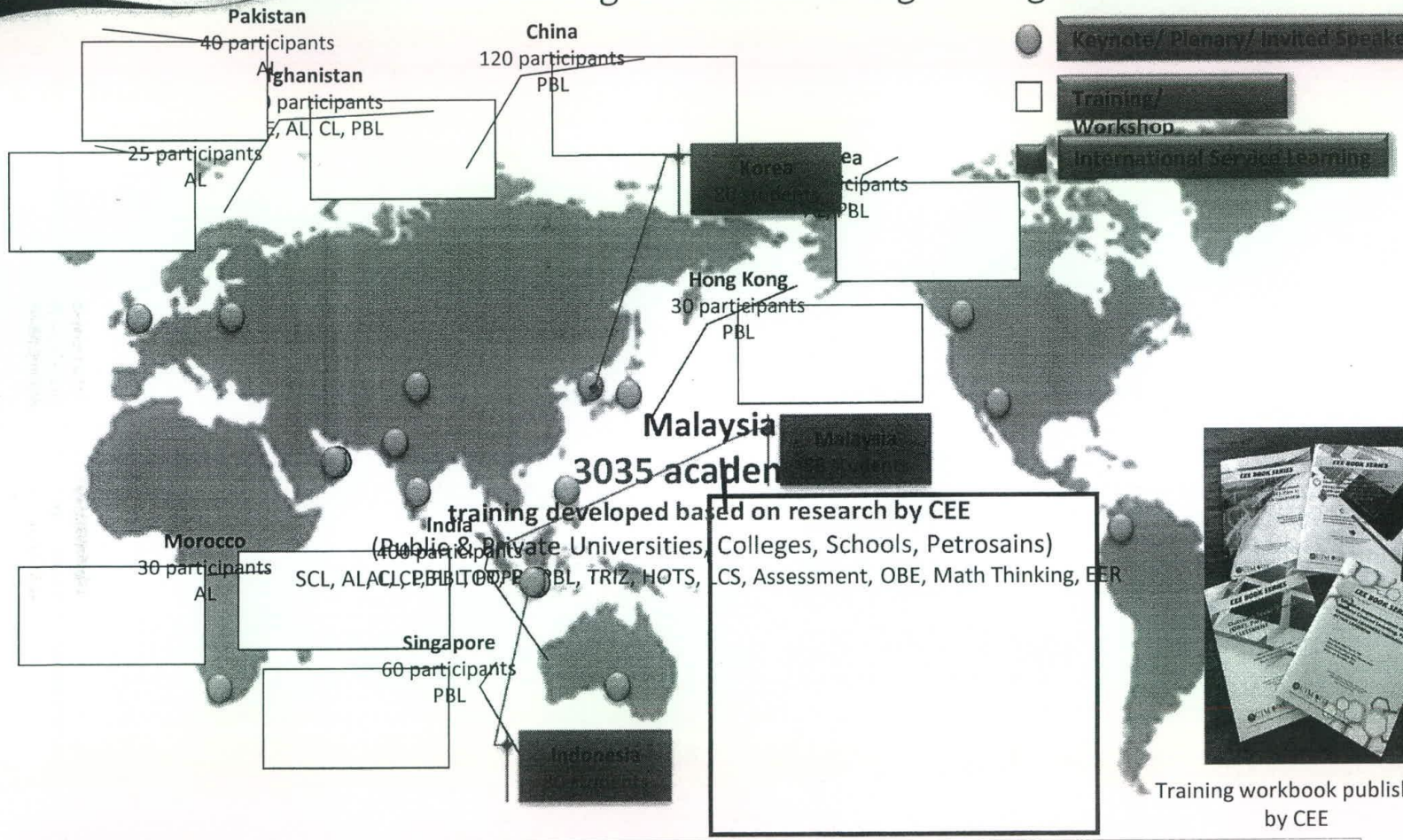
CEE
CENTRE FOR ENGINEERING EDUCATION



Training workbook published by CEE

AL: Active Learning, CL: Cooperative Learning, OBE: Outcome Based Education, PBL: Problem Based Learning, POPBL: Project Oriented Problem Based Learning, TOT: Training of Trainers, TRIZ: Theory of Inventive Problem Solving, HOTS: Higher Order Thinking Skills, EER: Engineering Education Research

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CEE
CENTRE FOR ENGINEERING EDUCATION

7 International Conferences & Expos Organized in Malaysia

*RCEE 2007 | RCEE 2010 | RCEE 2012 | #REES 2013 ##IRSPBL 2013 | **I-PHEX 2014 LaTICE 2014 | I-PHEX 2015 TRIZ Carnival | I-PHEX 2016 RCEE 2016 | WEEF 2017

8 Conferences
3 Expos
1 Carnival
1 Journal

Total papers: 760+
Total in CEE network of community of practice: 3000+ Academics in Malaysia & around the world

Recent International Awards/ Recognition

- 2015 IChemE Morton Medal Institution of Chemical Engineers Global Award for Excellence in Chemical Engineering Education
- Shortlisted Wharton-QS Stars Reimagine Education Awards 2015

IChemE medal winner

QS STARS AWARDS 2015
REIMAGINE EDUCATION

Appointments/MOU - International/ National Journals/ Professional Bodies

Journals	Professional Bodies
Journal of Engineering Education (JEE)	International Federation of Engineering Education Societies (IFEES)
European Journal of Engineering Education (EJEE)	International Research in Engineering Education Network
International Journal of Engineering Education (IJEE)	American Society for Engineering Education (ASEE)
Journal of Engineering Education Transformations (JEET)	Research in Engineering Education Network
IChemE Journal Education for Chemical Engineers	Society of Engineering Education Malaysia
Journal of PBL in Higher Education	Malaysian TRIZ Society

IFEES
International Federation of Engineering Education Societies

ASEE
AMERICAN SOCIETY FOR ENGINEERING EDUCATION

REEN
Research in Engineering Education Network

IChemE
Institution of Chemical Engineers

*RCEE: Regional Conference in Engineering Education. #REES: Research in Engineering Education Symposium, ##IRSPBL: Int. Research Symposium in PBL,
**I-PHEX: Innovative Practices in Higher Education Expo, LaTICE: Int. Conference on Teaching & Learning in Computing and Engineering

7TH WORLD ENGINEERING EDUCATION FORUM 2017

The Era of Synergistic Collaboration

In Conjunction with:
The 7th Regional Conference on Engineering Education & Research in Higher Education 2017 (RCEE & RHEd 2017)
The 1st International STEAM Education Conference (STEAMEC 2017) and
The 4th Innovative Practices in Higher Education Expo 2017 (IPHEX 2017)

13-16 November 2017
Berjaya Times Square, Kuala Lumpur, Malaysia

Organiser

KEMENTERIAN PENDIDIKAN TINGGI

IFEES
INTERNATIONAL FEDERATION OF ENGINEERING EDUCATION SOCIETIES

SOCIETY OF ENGINEERING EDUCATION MALAYSIA

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Malaysia Convention & Exhibition Bureau

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BEM
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The National University of Malaysia

UNIVERSITAS INDONESIA

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Learning Analytics: Data and Social Media

UTM4.0 4th INDUSTRIAL REVOLUTION

DIGITAL NERVOUS SYSTEM

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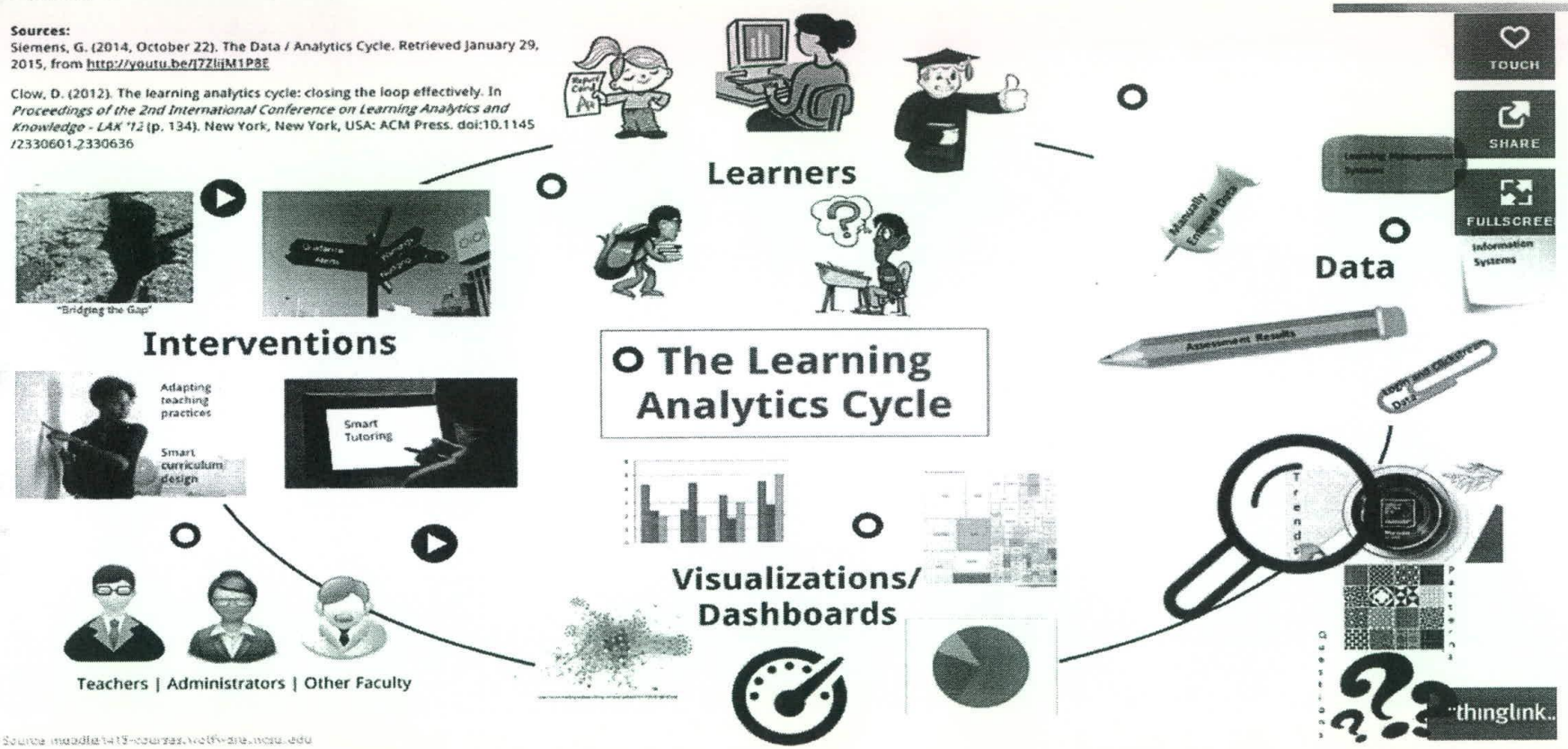
Learning Analytics

Sources:
Siemens, G. (2014, October 22). The Data / Analytics Cycle. Retrieved January 29, 2015, from http://youtu.be/l7ZlijM1P8E

Clow, D. (2012). The learning analytics cycle: closing the loop effectively. In *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge - LAK '12* (p. 134). New York, New York, USA: ACM Press. doi:10.1145/2330601.2330636



Source: moodle1415-courses.wolfware.ncsu.edu

Learning Analytics: Improvements in Teaching Practice

Innovative Research Universities

Malaysian Research University Network

Headline findings

- A lot of interest about learning analytics in both countries.
- At different stages of development in terms of the learning analytics journey.
- The use of an LMS varies considerably between countries and that influences the survey findings in terms of usage and relevance.
- Expectations and understandings vary considerably due to context and infrastructure.
- Professional development – more interest in attending in Australia when it is offered. In Malaysia it is not available.
- Interesting finding regarding ethical concerns which could be a reflection of institutional policies, understandings or cultural difference.

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Data Analytics @ Faculty of Computing

Bioinformatics and Cheminformatics

- Computer Aided Drug Design
- Genomics & Proteomics
- Disease Outbreak Prediction
- Adverse Drug Effect Mining from Text

Text & Financial Analytics

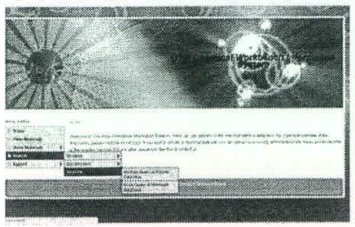
- Idea, Cross Lingual & Multimedia Plagiarism Detection System
- Automatic, Abstractive Multidocument Text Summarization System
- Stock Market Prediction based on Sentiments in News

Social Media Media Analytics

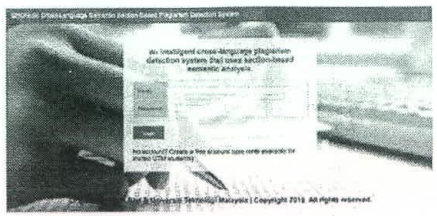
- Automatic FAQ Generation, Retrieval & Summarization of Online Forum
- Sentiment Analysis of Tweets & Students Feedback
- Recommendation Systems based on Social Media Analysis

For further info, contact:
Professor Naomie Salim,
Department of Information Systems, UTM
email: naomie@utm.my

Sample Products
UTM Chemical Workbench ©



Oricheck ™



Industry Partners

aBy res Absolute Binary Resources

PhillipCapital

digital chemistry

HOLISTIC FRAMEWORK OF BIG CYBER LEARNING DATA MANAGEMENT

PROF. DR. ZAIDATUN TASIR (Project Leader), ASSOC. PROF. DR. JAMALLUDIN HARUN, DR. ZALEHA ABDULLAH, DR. NOOR DAYANA ABD HALIM, DR. NURUL FARHANA JUMAAT, DR. NOR BAHIAH HJ AHMAD, ASSOC. PROF. DR. MOHD SHAHIZAN OTHMAN
- UNIVERSITI TEKNOLOGI MALAYSIA -

METHODOLOGY

Need Analysis – Define and Design the Study

1 Critical review and meta-analysis on previous literature on big data, big learning data management, and deep learning analytics

2 Identify the Structured Data and Useful Indicators to benefit Teaching and Learning Practice

Structured data (fixed data about students) that comes from the library, student affairs office, AIMS2000 and OBE will be gathered and useful indicators will be extracted out

Identify the Unstructured Data and Useful Indicators to benefit Teaching and Learning Practice

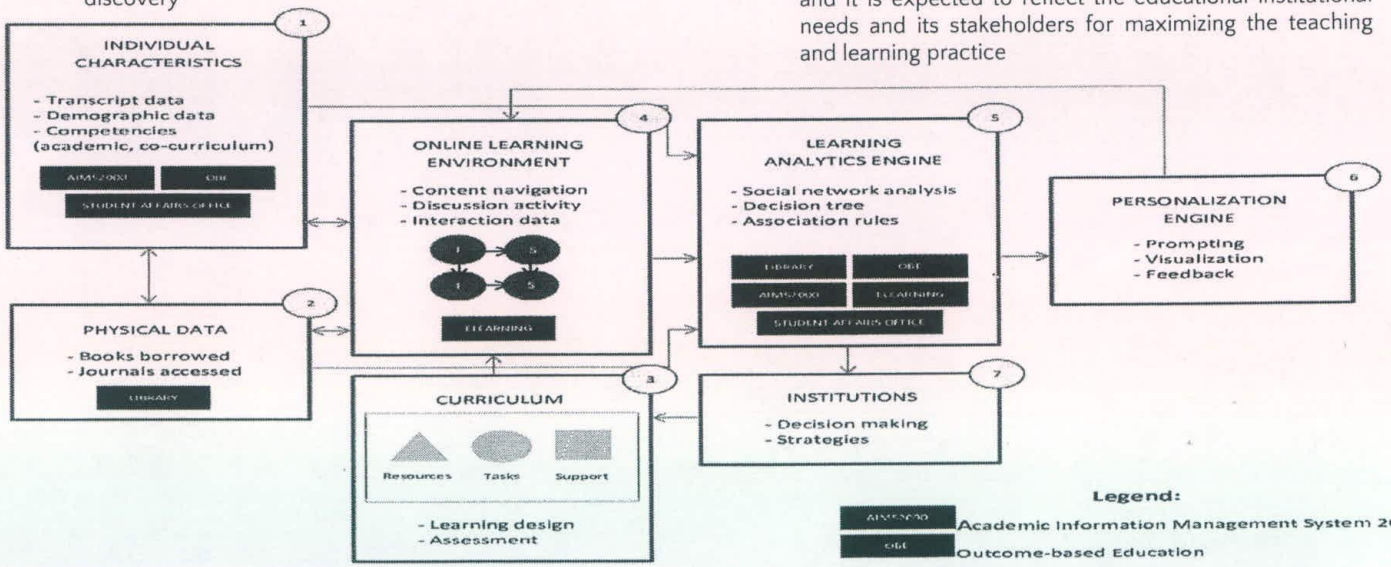
3 Unstructured data (not a fixed data) that can be found in cyber learning platform will be identified and extracted out. These include text and multimedia content, email messages, word processing documents, videos, photos etc.

4 Analyze both data through Deep Learning Analytics

Both data from Phase 2 and Phase 3 will be analyzed using machine learning big data predictive knowledge discovery

5 Formulate the Holistic Framework of Big Cyber Learning Data Management

A holistic framework which takes into account of big learning data and predictive analysis will be developed and it is expected to reflect the educational institutional needs and its stakeholders for maximizing the teaching and learning practice

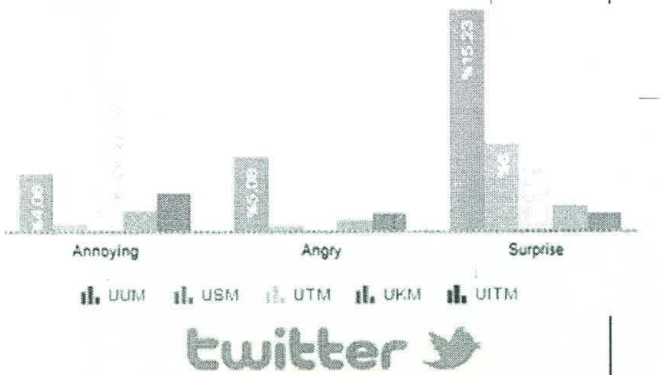


Social Media Analytics

Social media data are the most dynamic evidence base of human behavior. Research in Social Media Analytics concentrates on analysis of real online social networks and to understand individuals, groups and society.

Twitter's Data for Emotion Mining in Malaysia Universities

Happy = { }
Sad = { }
Annoying = { }
Angry = { }
Surprise = { }



twitter

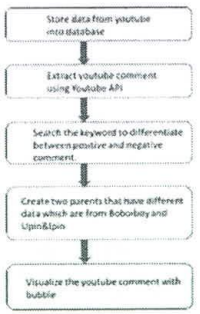
Opinion Mining in Malaysia Political Context

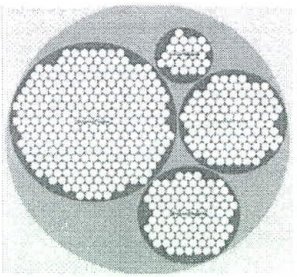
Table 1 The results of positive and negative traits from Malaysian Political Leaders

Malaysian Political Leaders Name	Opinion Mining Positive	Opinion Mining Negative
Najib Razak	24,569	9,699
Ahmad Maslan	180	615
Zahid Hamidi	1,642	1,241
Lim Guan Eng	1,641	1,756
Wawi	4,869	3,914
Mohamed Azmin Ali	5,281	22,207

facebook

Sentiment Analysis for Malaysia Animated Series





YouTube

Contact: Associate Professor Dr. Nor Azman Ismail, Department of Software Engineering, UTM
email: azman@utm.my

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Google Online Marketing Challenge

Google™
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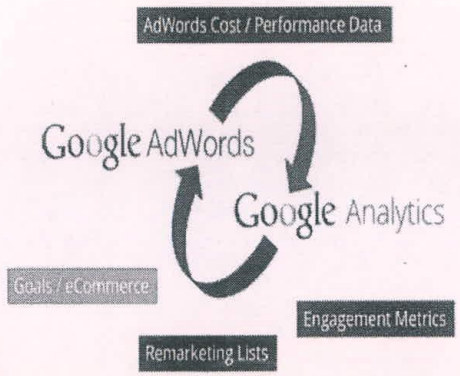
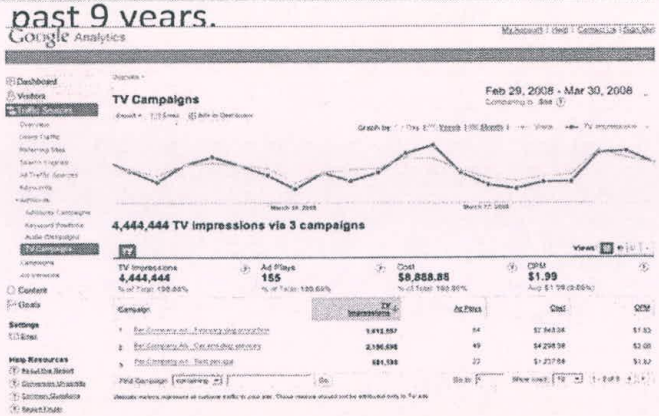
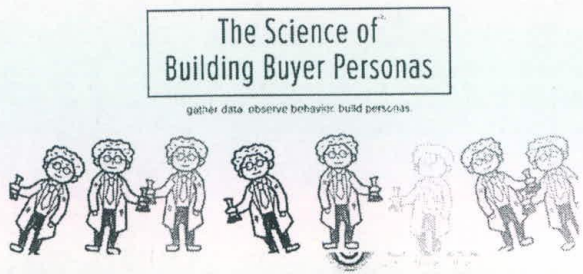
The Google Online Marketing Challenge is a unique opportunity for students to experience and create online marketing campaigns using Google AdWords. Over 110,000 students and professors from almost 100 countries have participated in the past 9 years.





Noor Hazarina Hashim (Malaysia) is a Senior Lecturer at Universili Teknologi Malaysia. She teaches E-Marketing, E-Business and other marketing courses to both graduate and undergraduate students. Dr Hazarina earned her PhD from The University of Western Australia, and her research and consultation interests include effective Internet use in organizations, application of Internet in tourism industry and destination marketing. Dr Hazarina's passion is teaching, and she believes that learning goes beyond the classroom. Her publications have appeared in Tourism Management, Journal of Computer Mediated Communications, Internetional Journal of Hospitality Management and Journal of Information Technology and Tourism.

The Global Academic Panel



Academic Programmes

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DIGITAL NERVOUS SYSTEM

Current Academic Programmes Related to 4IR

**Enrolment (as of 27th March 2017)*

FACULTY OF COMPUTING	
Bachelor of Computer Science	7
Bachelor of Computer Science (Graphics & Multimedia Software)	221
Bachelor of Computer Science (Data Engineering)	35
Bachelor of Computer Science (Computer Networks & Security)	646
Bachelor of Computer Science (Software Engineering)	628
Bachelor of Computer Science (Bioinformatics)	101

FACULTY OF CIVIL ENGINEERING	
Bachelor of Engineering (Civil)	902

FACULTY MECHANICAL ENGINEERING	
Bachelor of Engineering (Mechanical)	626
Bachelor of Engineering (Naval Architecture and Offshore Engineering)	134
Bachelor of Engineering (Mechanical-Aeronautics)	137
Bachelor of Engineering (Mechanical-Automotive)	142
Bachelor of Engineering (Mechanical-Industrial)	101
Bachelor of Engineering (Mechanical-Materials)	76
Bachelor of Engineering (Mechanical-Manufacturing)	97

Current Academic Programmes Related to 4IR

**Enrolment (as of 27th March 2017)*

FACULTY CHEMICAL & ENERGY ENGINEERING	
Bachelor of Engineering (Chemical)	458
Bachelor of Engineering (Chemical-Gas)	151
Bachelor of Engineering (Petroleum)	278
Bachelor of Engineering (Nuclear)	98
Bachelor of Engineering (Chemical-Bioprocess)	171

FACULTY OF ELECTRICAL ENGINEERING	
Bachelor of Engineering (Electrical)	1394
Bachelor of Engineering (Electrical-Electronic)	546
Bachelor of Engineering (Electrical-Mechatronic)	264

Malaysia-Japan International Institute of Technology MJIIT	
Bachelor of Electronic Systems Engineering	379
Bachelor of Mechanical Precision Engineering	334

FACULTY OF SCIENCE	
Bachelor of Science (Mathematics)	138
Bachelor of Science (Industrial Mathematics)	173

FACULTY OF BUILT ENVIRONMENT	
Bachelor of Architecture	170
Bachelor of Science (Quantity Surveying)	351

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UTM4.0

SHIFT 8 GLOBAL PROMINENCE

PEOPLE	SHIFT 1 STUDENTS	SHIFT 2 EDUCATORS
CURRICULUM	SHIFT 4 TVET	SHIFT 3 LIFE LONG LEARNING

SHIFT 10
DELIVERY SYSTEMS

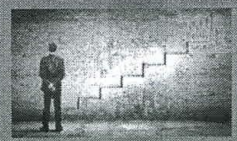
Anywhere Anytime

Individualisation

Flexible Delivery

Practical Application

Modular & Projects



Peers & Mentors

SHIFT 7
RESEARCH & INNOVATION

RESEARCH ALLIANCE | HICOE/ COE | RESEARCH GROUP | PARTNERS/ COLLABORATORS

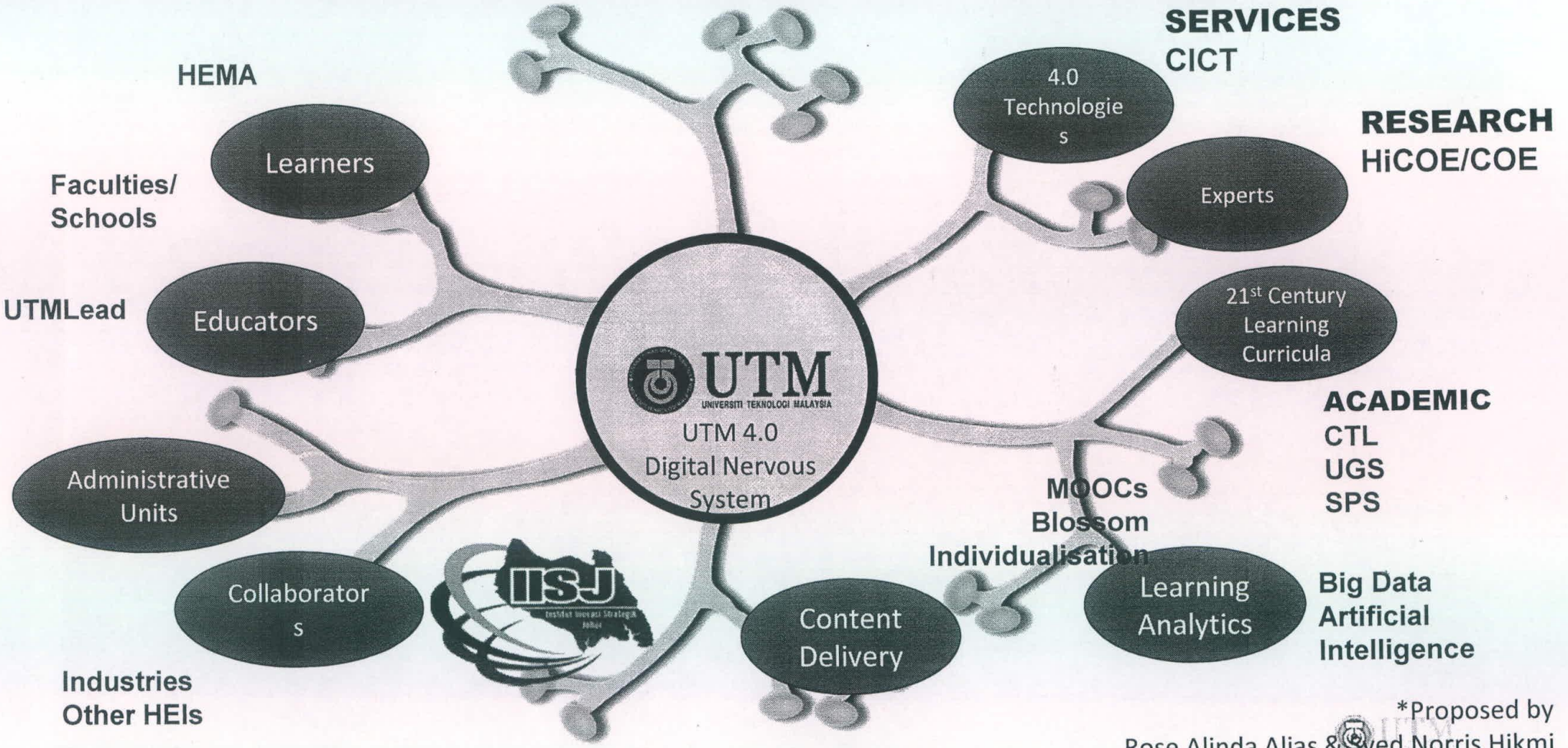
SHIFT 5 FINANCIAL

SHIFT 6 GOVERNANCE

SHIFT 9
4.0 TECHNOLOGIES & APPLICATIONS

Higher Education Blue Print — PPMPT

*UTM 4.0 Digital Nervous System



*Proposed by
Rose Alinda Alias & Syed Norris Hikmi

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