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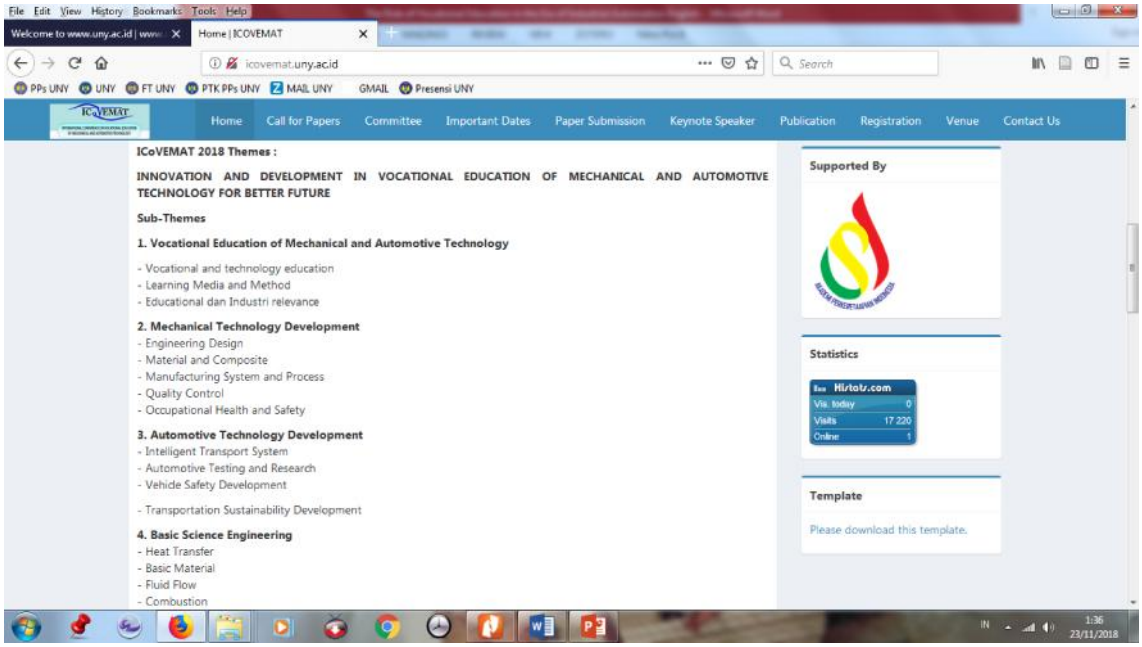
Introduction
THE FIRST INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION OF MECHANICAL AND AUTOMOTIVE TECHNOLOGY (ICOVEMAT) 2018
Automotive and Mechanical technologies are interconnected and evolving together. The community widely uses the applications of both technologies. The high demand for transportation and mobility, making automotive technology continues to be developed. These developments are followed by vocational education institutions that prepare skilled workers in Automotive and Mechanical Engineering.
Vocational education evolves with the development of technology, ranging from curriculum to application of technology used for the learning process. The principle of professional training demands vocational education demands vocational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ICoVEMAT 2018 Themes :
INNOVATION AND DEVELOPMENT IN VOCATIONAL EDUCATION OF MECHANICAL AND AUTOMOTIVE TECHNOLOGY FOR BETTER FUTURE
Sub-Themes
1. Vocational Education of Mechanical and Automotive Technology
- Vocational and technology education
- Learning Media and Method
- Educational dan Industri relevance
2. Mechanical Technology Development
- Engineering Design
- Material and Composite
- Manufacturing System and Process
- Quality Control
- Occupational Health and Safety
3. Automotive Technology Development
- Intelligent Transport System
- Automotive Testing and Research
- Vehicle Safety Development
- Transportation Sustainability Development
4. Basic Science Engineering
- Heat Transfer
- Basic Material
- Fluid Flow
- Combustion
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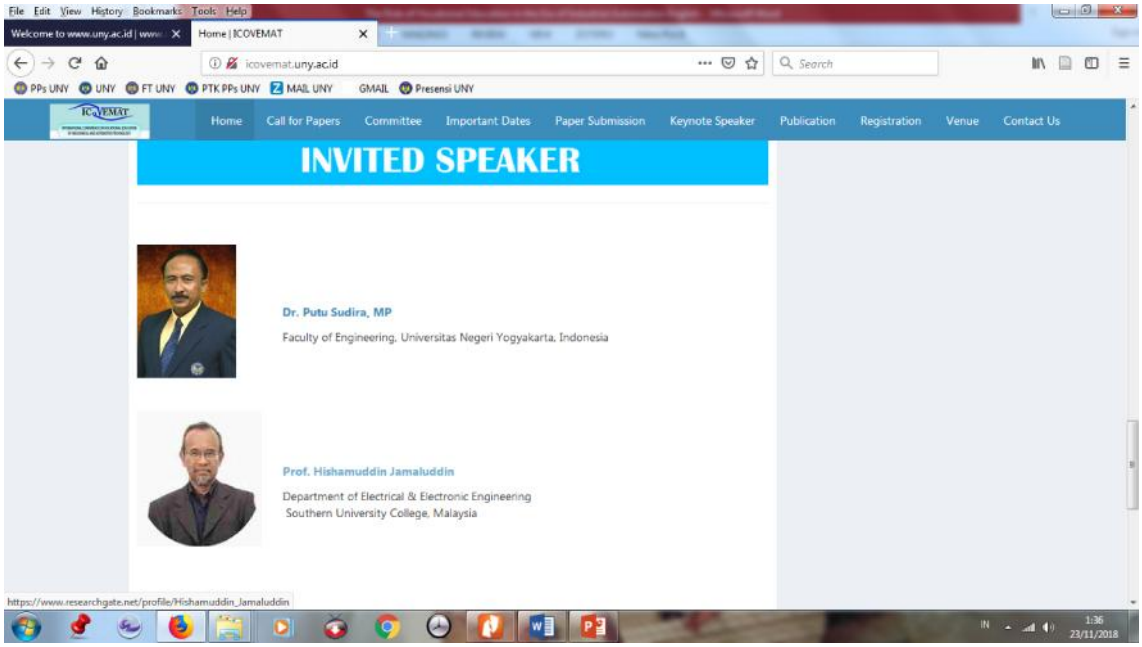
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INVITED SPEAKER
Dr. Putu Sudira, MP
Faculty of Engineering, Universitas Negeri Yogyakarta, Indonesia
Prof. Hishamuddin Jamaluddin
Department of Electrical & Electronic Engineering
Southern University College, Malaysia

INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION OF MECHANICAL AND AUTOMOTIVE TECHNOLOGY
INVITED SPEAKERS
ICoVEMAT
KEYNOTE SPEAKER:
Assoc Prof Ng Heong Wah
INNOVATION AND DEVELOPMENT IN VOCATIONAL EDUCATION
FOR BETTER FUTURE

THE ROLE OF VOCATIONAL EDUCATION IN THE ERA OF INDUSTRIAL AUTOMATION

Dr. Putu Sudira, M.P
Electronics and Informatic Engineering Department

INTERNATIONAL CONFERENCE ON VOCATIONAL EDUCATION OF MECHANICAL AND AUTOMOTIVE TECHNOLOGY (ICOVEMAT)
20 October 2018
Yogyakarta State University

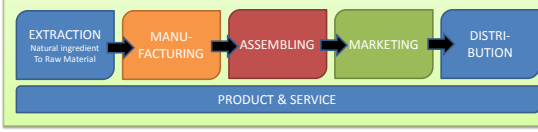
THE ROLE OF VOCATIONAL EDUCATION IN THE ERA OF INDUSTRIAL AUTOMATION

QUESTIONS REMARK

1. How does the world of work change in the next five to twenty years, and what is the meaning of vocational education in Indonesia ?;
2. What needs to be learned by the Indonesian people to be able to compete in the world of work and develop their work careers brilliantly in the digital era, the knowledge-based industry, and industrial revolution 4.0?;
3. What competencies and skills are needed by Indonesian children to be able to maintain a career for the next 35 years ?;
4. How should they learn everything effectively ?;

NEW CHALLENGES:

Industry 4.0 has now been used coin **AUTOMATION** to the New Responses (Toynbee, Arnold)



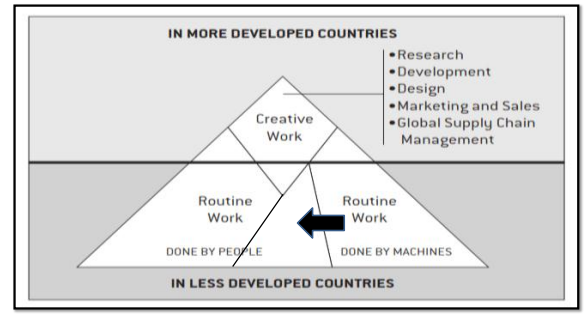
BMW X2 CAR MANUFACTURING

AUTOMATION CONSEQUENCES in WORKERS

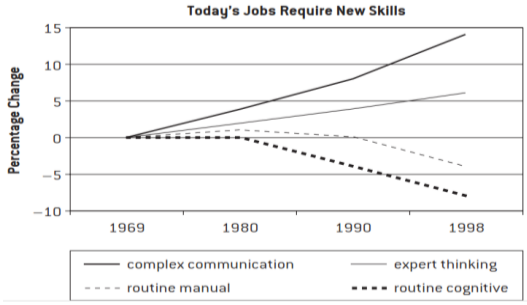
Trainers, Financial Managers, Lawyers, Sales Agents, Analysts, Physiological Therapists, Financial Advisers, HR, Nurses, Doctors, Programmers and Regular News Services.
Maintenance and Installation, Mediation, Medical, Data Analysts, Information Systems Managers, **Vocational Counselors**, Environmental Impact Analysts, Designers, **Artificial Intelligence Programming, Automation Machine Designers And Controllers, Software Designers And Online Games**

Administration Manager, **MECHANIC**, Printmaker, Mailman, Driver, Expedition Officer, **Factory Worker**, Sewing Machine Operator, Communication And Radio Device Operator, **Receptionists**, Carpenters, Three-dimensional Designs, Semiconductor Processors, Bank Tellers, Travel Agents, Fast-food Cooks, **Machine Operators**, **Welding Experts**, Accountant Staff, Truck Drivers, **Engineers**

NEW REALITIES OF GLOBAL WORK



NEW REALITIES OF GLOBAL WORK



NEW REALITIES OF GLOBAL WORK

Type of Task	*Task Description*	*Example Occupations*
Routine	Rules-based Repetitive Procedural	Bookkeepers Assembly line workers
Manual	Environmental adaptability Interpersonal adaptability	Truck drivers Security guards Waiters Maids and janitors
Complex thinking and communicating	Abstract problem solving Mental flexibility	Scientists Attorneys Managers Doctors Designers Software programmers

Cyber-Physical Productions System (CPPS)

- integrate computers that work as devices for Artificial Intelligence (AI),
- Augmented Reality (AR),
- Virtual Reality (VR),
- Internet of Thinks (IoT),
- Internet of Service (IoS),
- Intelligent robots,
- 3D printers

Cyber-Physical Productions System (CPPS)

- AI as a logical layer;
- Internet of Thinks (IoT) and Internet of Service as a Connectivity Layer; and
- Virtual Reality (VR), Augmented Reality (AR), Wearable Devices (WD), Smart Robots (SR), 3D printers as Physical Layer.

IINTELLIGENCE MACHINES BE ABLE TO LEARN AND SOLVE PROBLEMS CREATIVELY

Cyber-Physical Productions System (CPPS)

- Integrating the computer as an AI, AR, VR device with an internet network in a CPPS can oversee the physical processes of the extraction, manufacturing, assembly, marketing and distribution of products or services.
- Extraction, manufacturing and assembly machines can communicate with each other, exchange information in various applications and respond to environmental changes like humans in working to solve problems.

Cyber-Physical Productions System (CPPS)

- Industrial automation 4.0 produces smart products, smart services, works with big data, and cloud computing.
- Industrial automation 4.0 works with the principle of interconnecting machines, sensors, intelligent robots, actuators, and few people connected, communicating through IoT-based IoS media.

Cyber-Physical Productions System (CPPS)

- The application of sensors, VR, AR, in the AI system through IoS and IoT makes the system work with real time capabilities.
- The system becomes smart and becomes fast, accurate, real time servant.

Cyber-Physical Productions System (CPPS)

- The application of sensors, VR, AR, in the AI system through IoS and IoT makes the system work with real time capabilities.
- The system becomes smart and becomes fast, accurate, real time servant.
- Customers can interact directly in real time on the system through the network from anywhere and anytime.
- Industrial automation 4.0 makes the work service system efficient, effective, cheaper, safer, convenient, fun, and flawless.

VET RESPONSE TO NEW REALITIES

- Vocational education
  - ✓ Education preparing youth for Job: Production and Services
  - ✓ Relevance of **EDUCATION & JOB** need to be adjusted with the rapid development of science and technology, National Develoment
  - ✓ Global technology: Manufacturing, Construction, Communication, Transportation, Energy, Tourisms, Healt
- Response to Vocational Education
  - Vision. In Industry 4.0. The Internet of Things is the ubiquitous connection of people, things, machines, institution;
  - This connection is: the education and training, networking and collaboration, teaching and learning; job opportunity; producing a variety of new goods and sevices
  - Understanding
  - Clarity
  - Agility

Role of VET in Industries 4.0

- as a provider of skills workers in the implementation of CPPS in accordance with the concept of matching men and jobs as the basis for developing vocational education programs.

Role of VET in Industries 4.0

1. As a provider of competency education and training programs in the field of AI, intelligent control, VR, AR, IoT, IoS, Robotic for young children.
2. As a provider of skill training programs the use of 3D printers, sensors and transducers.
3. As a provider of retraining programs for workers requires increased competence in the areas of AI, VR, AR, IoT, IoS, and Robotic
4. As the executor of the competency certification program in the fields of AI, VR, AR, IoT, IoS, Robotic.
5. As the center of design and engineering for the application of AI, VR, AR, IoT, IoS, Robotic.

THERE IS NO WAY TO SUCCEED IN THE FUTURE

- Success is dependent on a balance of:
  - Iteration, Doing the same things better
  - Innovation, Doing the new things
  - Disruption, Doing new things that make the old one Obsolete

  - If you dont disrupt yourself, It will be a gift given to you by some one else
  - If A new generation do not disrupt them selves, another nation will displaced them

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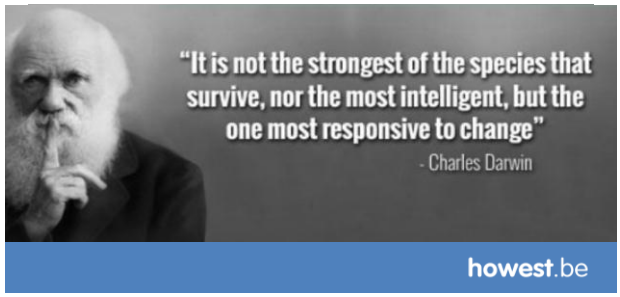
DARWIN how to deal with it?



Education is the most powerful weapon which you can use to change the world
(Nelson Mandela)

Terima Kasih

Thank You