

Innovating Education in Response to Opportunities and Challenges of Digital Industry

R. Alpha Amirrachman, M.Phil., Ph.D

SEAMEO Regional Open Learning Centre (SEAMOLEC) Director

SEAMEO-University of Tsukuba Symposium VII

10 February 2019, Tokyo, Japan

Abstract

We live in an era of globalization where most of the things in life are handled by utilizing technology. The globalization has caused speedy changes which bring about shifts in knowledge, economy, and the 4th industrial revolution. It also changes the workforce need which requires high skilled workers. Some jobs will be declined, and new faces of jobs are predicted to emerge in the near future.

Southeast Asia as a growing region with 11 nations is also facing these challenges. All countries must together develop education system which is forward-looking, future oriented, and strategic to prepare today's youth to becoming a vital part of the digital economy through their education.

Unfortunately, not all children are lucky to experience proper education. Particularly in West Java province, Indonesia, where enrollment rate of students was very low. In 2014-2015 there were more than 200,000 students unable to continue their education to high school level.

Starting 2017, SEAMOLEC in cooperation with West Java Provincial Education Office develops models of Open High School and Distance Learning Vocational School. The main objective of this programme is to improve access, quality, and relevance of secondary education through distance learning system in Indonesia, especially in West Java province.

This programme allows a learner to study by using an independent learning system that cooperate with business and industry by combining distance learning using internet network and face-to-face learning, and practice with facilitator from business/industry practitioners. At a wider scope this programme is expected to reduce unskilled labor.

Keywords: *Distance Learning, Industrial Revolution, Secondary Education, West Java Province*

Innovating Education in Response to Opportunities and Challenges of Digital Industry

R. Alpha Amirrachman, M.Phil., Ph.D

SEAMEO Regional Open Learning Centre (SEAMOLEC) Director

SEAMEO-University of Tsukuba Symposium VII

10 February 2019, Tokyo, Japan

The world is more globalized where it is becoming smaller due to the existence of technology and its impacts. Being aware that we live in an era where everyone can connect with someone anywhere, most of the things in life are handled by utilizing technology. Decision making by people, businesses, organizations, communities and the Government are commonly supported by technology nowadays. This phenomenon has changed the ways we live, communicate, work, including the implementation in the field of learning.

A student from Indonesia could easily interact and share interests with other students in Middle East, Vietnam or Mexico. Around the globe all kind of individuals and groups are connected easily and no single crisis could slow down their activities, not even an economic crisis. As quoted from Nairn (2009) in one of his articles entitled 'Globalization', Globalization is such a diverse, broad-based, and potent force that not even today's massive economic crash will dramatically slow it down or permanently reverse it. Love it or hate it, globalization is here to stay.

Industrial Revolution

The globalization has caused speedy changes which bring about shifts in knowledge, economy, and the 4th industrial revolution. According to Xu, David, and Kim (2018), industrial revolution is often considered a separate event, together they can be better understood as a series of events building upon innovations of the previous revolution and leading to more advanced forms of production.

The first industrial revolution changed our lives and economy from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. Oil and electricity facilitated mass production in the second industrial revolution. In the third industrial revolution, information technology was used to automate production. The fourth industrial revolution now involves computer generated product design and three dimensional (3D) printing, which can create solids object by building up successive layers of materials.

As quoted from ADB's paper entitled "ASEAN 4.0: What does the Fourth Industrial Revolution mean for regional economic integration?", the Fourth Industrial Revolution refers to a set of highly disruptive technologies, such as artificial intelligence (AI), robotics, blockchain and 3D printing, that are transforming social, economic and political systems and putting huge pressure on leaders and policy-makers to respond.

It is easy to see the advantages of industrial revolution. All technological aspects that made our life much easier, such as electricity, a car, or air conditioner, are among the good impacts of the revolution. Xu, David, and Kim (2018) further predicted the opportunities that comes with the fourth industrial revolution, are: 1) lower barriers between inventors and markets, 2) more active role for the artificial intelligence (AI), 3) integration of different techniques and domains (fusion), 4) improved quality of our lives (robotics) and 5) the connected life (Internet).

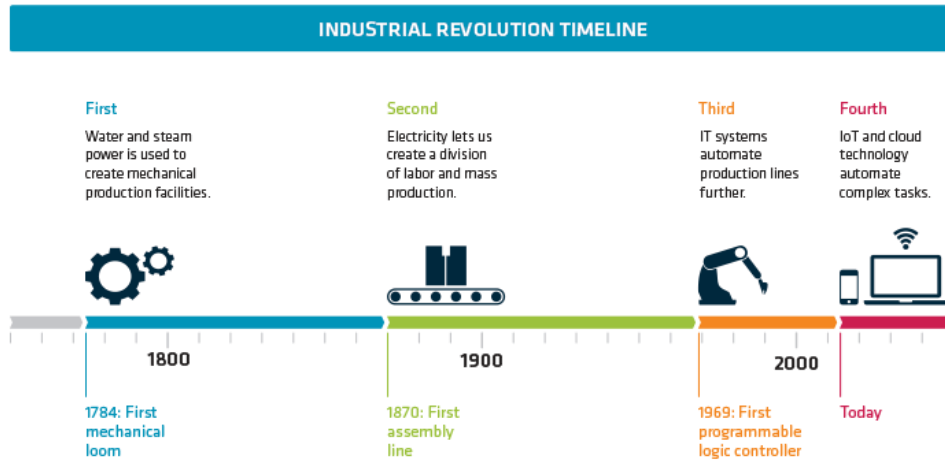


Figure 1. Industrial Revolution Timeline

On the other hand the fourth industrial revolution also changes the workforce need which requires high skilled workers. It has affected some jobs will be declined, and new faces of jobs are predicted to emerge in the near future.

The technologies are today progressively used across different sectors; therefore education should as well be reinforced through them, including learning at the workplace and mentoring tracks, vocational training and community based courses.

Challenges for Southeast Asia

Southeast Asia as a growing region with 11 nations is also facing these challenges. The transformative impact of this revolution will demand that countries think deeply about their policies and priorities at a national scale. Southeast Asian countries must together develop education system which is forward-looking, future oriented, and strategic to prepare today's youth to becoming a vital part of the digital economy and digital citizen through their education.

Unfortunately, not all children are lucky to experience proper education. In one of his paper entitled "Challenges in Education in Southeast Asia", Sadiman (2004) mentioned that inequality access to education in the region is one of many educational challenges for Southeast Asia. The problem exists due to some conditions that result to disparities in the delivery of quality learning opportunities. The following factors are the main contributor to the problem: (1) Lack of available school building and classroom with all required facilities, (2) shortage of teachers, especially in remote areas, (3) uneven spread of population, (4) lack of good textbooks and other learning materials, (5) geographical location, (6) student's and parent's low appreciation toward education, (7) level of socio-economic condition of the family, (8) lack of budget for building more schools, classrooms, learning facilities.

Case Study in West Java Province, Indonesia

Particularly in West Java province, Indonesia, one of the closest provinces to the capital city of Jakarta which enrolment rate of students was very low. In the year 2013-2014, the achievement of the West Java Province Education Enrolment Number has 10% gap of targeted Middle School Enrollment Number. It is indicated there are 247,067 students not able to continue to high school level. In the year 2014-2015, the data of graduates of Junior High School/Madrasah Tsanawiah (SMP/MTs) showed 703,747 students, and the school capacity only provided for 469,567 students so there were 234,180 students unable to continue education to high school.

To overcome the disparity in school capacity, the Government of West Java Province through the Office of Education has implemented several excellent programmes including new classroom development, new school unit, afternoon school and C Package equality programme, but the result has not be able to meet the target of high school enrolment number achievement.

One of the big reasons is the physical capacity condition of secondary schools in West Java is still unable to accommodate the needs. There are other factors that cause the participation number of secondary schools still less than expectations, for instance the low economic status of parents or community and the remoteness of student residence, social and geographical difficulties to reach regular education services, either through Senior High School/Vocational High School (SMA / SMK) or other level of education.

SEAMOLEC's Role

To accelerate the achievement of Enrolment number of Secondary Education, West Java Regional Office of Education initiated to pilot distance learning in its region assisted by SEAMEO Regional Open Learning Centre (SEAMOLEC) with the wishes to encourage 16 to 21-year-old residents to attend secondary education and increase participation rates of senior high schools and vocational high schools by providing distance learning opportunities for those students that have limitation to access regular secondary education.

Based on its providers, there are two types of distance learning implementation in West Java province Senior High Schools and Vocational Schools with learning centers as an integral part in both types. The main difference is that the vocational type provides industries as learning centers, so that it can attract young workers in industries to pursue their secondary education without leaving their current jobs. The Concept of Distance Learning for Secondary Education applied in West Java Province is shown in figure 2.

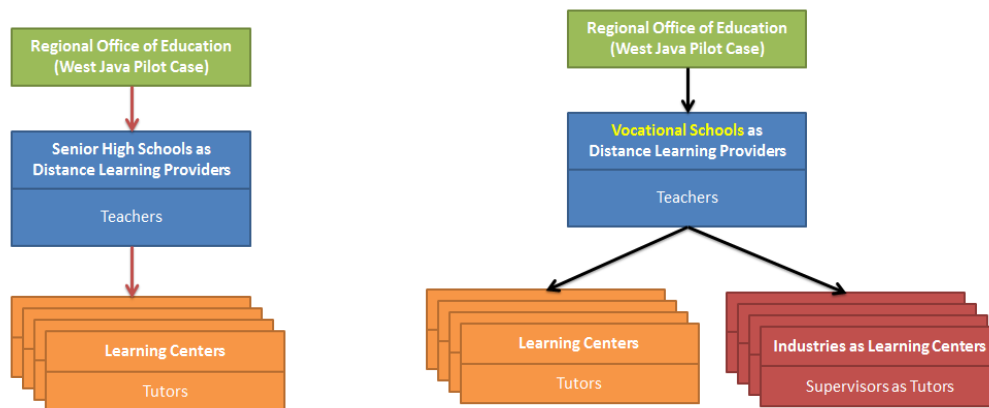


Figure2. Concept of West Java ODL Programme

The objectives of this programme are to improve access, quality, and relevance of secondary education in supporting the achievement target of Universal Secondary Education in Indonesia, and to improve access to secondary education for the junior high school graduates who are unable to continue their education due to economic, geographical, time, social and cultural constraints. This modeling is also implemented to increase the enrolment number, as well as to improve the quality and access of education through distance education system in Indonesia, especially in West Java province.

This programme allows a learner to study by using an independent learning system that cooperate with business and industry by combining distance learning using internet network and face-to-face

learning, and practice with facilitator from business /industry practitioners. At a wider scope, this programme is expected to reduce unskilled labor and improve their working skills and capabilities, also to provide the widest possible learning opportunities for those who cannot attend regular high school education, through independent learning systems, tutorials and online.

General Design of Distance Learning in Secondary Education Programme

This project is substantial on the national scale as it involves many stakeholders from different institutions. SEAMOLEC is deeply involved in developing the general design of this programme, including creating guidelines, curriculum adjustment, programme development, as well as instructional materials development and teacher training.

Distance education is carried out with the concept of the main school which is assisted by the Learning Centres as a substitute for classrooms. There are 2 types of Learning Centres for vocational schools, which are aimed for knowledge competency and skills competency. The one for skills competency involves business and industrial sectors. The location of Learning Centres is not limited to formal educational facilities; it could also be at the market, agricultural land, or utilizing community facilities such village halls or the Mayor office.

The learning patterns are carried out every day and at any time. The Learning process is designed to be flexible, where students can learn from their places at any convenient time for them. To support the effectiveness of learning, the learning pattern is created where in 1 week, there are 5 days are used by students to study independently using printed or non printed modules. And in the weekend students attend tutorial activities at the learning centres, assisted by tutors.

The distance-learning programme has been designed to employ hybrid or blended mode of ICT-based ODL. In this case, the proportion of ICT component is ranging from 30-79%, while allowing 30% of delivery to be face-to-face. By employing the hybrid mode, this programme:

1. allows students to study while not leaving their work (economic, geographic, financial reason as well as scarcity of students).

The programme is designed for in-service workers age between 16 – 21 years old. It is a distance education to allow students to join the programme without having to leave their work. The admission process is conducted once a year, similar with regular class in secondary school.

The programme has been designed to have a face-to-face and independent study component in the learning process. The face to face tutorial can help students learn the learning materials better, and tutorial session also is an effective way to interact with tutors and their peers. Meanwhile, independent study is facilitated through Learning Management System (LMS).

The Learning Management System (LMS) for distance learning programme in West Java is called SIAJAR (Sistem Informasi Pembelajaran Jarak Jauh/ Distance Learning Information System) which is available on <http://jass.disdik.jabarprov.go.id>, which provides a powerful set of features to create and manage courses, learning evaluation, communication forum, tracking of student attendance and performance. The expectation of utilization of LMS is that

students will become more familiar with the online learning activity and the medium which is very important when student are not in a face to-face situation.

2. conducts its learning interaction in the hybrid form, i.e., face-to-face tutorial (synchronous), face-to-face online tutorial (LMS) (asynchronous), face-to-face video conference tutorials (synchronous). Communication between students and tutors, at this stage of development is carried through emails, mobile communication application, etc.
3. delivers its learning materials via three types of blended mode, i.e., face-to-face based, video conference based, and web-based.

The face-to-face based is implemented during the practice and practicum session assisted and facilitated by tutors.

The web-based course becomes the main delivery mode, and enhanced as well as blended with face-to-face and video conference component. This type of delivery is implemented during the independent study period.

The video conference based is mainly for coordination among teachers and tutors, and for discussion of learning problems that students might found during independent learning. This delivery system could also be explored to be instructional medium for instructional activities of the programme.

4. uses various forms of learning resources. The web-based learning resources are also made available for the students and institutions. The web-based courses for this programme, at present, are still under development. Learning object materials have been prepared, and the interface with the learning management system will soon follow. URL linkages for each course and or even each topic within a course are also identified and provided, so that students can explore the richness of learning resources available in the internet.

Until now the LMS has been facilitating more than 7,000 accounts for teachers, tutors, and class administrators, as well as more than 17,000 students' accounts. The LMS already provides more than 1700 learning object material as student learning modules. Furthermore, the development of LMS features still continues to provide better digital class for distance learning students.

SEAMOLEC will continually provide beneficial services to the region in order to help the SEAMEO Member Countries to find alternative solutions in education through the effective use of ODL. In the future, SEAMOLEC will keep initiating more innovations in its effort to improve the quality of education, as stated in its motto "Reaching the Unreachable, Making the World into One World of Learning".

References

Nairn, Moses. (2009). Globalization. ProQuest Social Science Journal. Retrieved from: <http://e-resources.perpusnas.go.id:2057/docview/224027022?pq-origsite=summon>

Sadiman, Arief S. (2004). *Challenges in Southeast Asia*. Paper presented at the International Seminar on "Towards Cross Border Cooperation between South and Southeast Asia: The Importance of India's North East Playing Bridge and Buffer Role", Kaziranga, India, 16-19 November 2004. Retrieved from <http://www.seameo.org/vl/library/dlwelcome/publications/paper/india04.htm>

World Economic Forum and Asian Development Bank. (2017). ASEAN 4.0: What does the Fourth Industrial Revolution mean for regional economic integration? Retrieved from: <https://www.adb.org/sites/default/files/publication/379401/asean-fourth-industrial-revolution-rci.pdf>

Xu, M., David, J.M., & Kim, S.H. (2018). The Fourth Industrial Revolution: Opportunities and Challenges. *International Journal of Financial Research* Vol. 9, No. 2; 2018. doi:10.5430/ijfr.v9n2p90