Preparing Higher Education Graduates For The 4th Industrial Revolution Through Extracurricular Activities

Ied Veda Sitepu

Email: iedveda.sitepu@gmail.com; Iedveda.sitepu@uki.ac.id

Abstract
The relationship between higher education (HE) and the world of work has been discussed for the past few decades, in terms of, among others, contribution of higher education to the labour market, in the form of manpower. The market requires that higher education graduates fulfil certain competencies and in fact they considered more important in the recruitment process than the degree itself. In Industrial Revolution 4.0 which is characterized by trends such as Internet of Things, robotics, virtual reality (VR) and artificial intelligence (AI), the way people live and work has changed and because many jobs are predicted to be lost due to, among others, automation, it is important that HE comprehends the changing nature of the work and map the labour market condition. With the challenge of the 4th Industrial Revolution, it is of utmost necessity to prepare students during their study time, 3-4-year period. This paper will discuss the importance of higher education institutions in mapping the labour market in their efforts to prepare graduates with competencies for the 4.0 industrial revolution. Secondly this paper will discuss the importance of extracurricullar activities in higher education level because when designed carefully, extracurricular activities will become very effective for students to gain certain competencies
Keywords: Higher education, graduates, labour market, extracurricullar activities

1. INTRODUCTION
The fourth industrial revolution is changing the world around us. Artificial intelligence (AI), robotics, big data and the internet o things will combine to impact on jobs and industry. However, the 21st century's intellectually intensive jobs will be impacted just as much as those manual activities that were changed forever by the industrial revolution of the 19th century (The World University Ranking, https://www.timeshighereducation.com/hub/jisc/p/preparing-education-40#survey-answer)
The world has entered the 4th industrial revolution era and impacted industries because many manual activities are now replaced by internet and robots. It also changed the way people think of job opportunities and many (new) jobs are created. When the many available jobs started to be replaced by robots, a question arises, what will happen to the many study programs whose graduates used to fulfil the needs of industry? Higher education is forced to revisit their programs. This is another challenge that higher education (HE)--the so called producer of manpower--faces. Many advancement were made with invention of electricity, including the mass production, as the consequence. With the fast shifting from one industrial era to another, HE have to start preparation students for this era and the era afterwards with knowledge, skills this era demands. This paper will discuss the challenges that HE faces in the industrial revolution 4.0 era, what competencies that students must possess to face this. The top skills of the year 2020 by the Asian Economic Review 2016 have been revealed, i.e.

complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intellingence, judgement and decision making, service orientation, negotiation, and cognitive flexibility. To achieve certain skills, extracurricular activities have been proven to be the vehicle. Therefore this paper will discuss importance of extracurricullar activities in higher education level because when designed carefully, extracurricular activities will become very effective for students to gain certain competencies.

2. HIGHER EDUCATION IN INDONESIA WELCOMING THE 4TH INDUSTRIAL ERA

Before discussing further about how higher education welcomes the 4th. industrial revolution, let us first see the challenge that higher education face in their effort to produce graduates that meet the expectation of the users or community at large. It is indeed true that higher education institutions have so far become the producers of competent labour, however, getting more and more complicated since the community and industries have demanded that higher education can in translate their need into well preparation of the graduates. this part will discuss about the challenges that higher education.

Indonesian HE has faced certain challenges, among others, the continuous quality improvement and the input-process-output-outcome paradigm. The challenges when addressed accordingly will result in capable graduates that will contribute to the society. Each process in the link must meet certain standards in order to guarantee the good quality of higher education and a consequence, graduates that meet the criteria of level 6 of Indonesian Qualification Framework. This inquires a regular assessment or internal assessment or internal quality audit done annually by institutions to assure that every unit in the institution functions well. Every five years, the institutions must undergo an external quality assurance process on the input – process -- output – outcomes.

Since 2012, Indonesia has implemented outcome-based education where its curriculum is based on the Indonesian Qualification Framework (IQF). For a *Sarjana* (bachelor) degree program (in level 6 out of 9-level qualification), the IQF has stated that the holders of the Sarjana degrees, aside from possessing certain moral and ethical qualifications which indicate that the holders carry Indonesian values and acknowledge the state principle of Pancasila, they must possess the followings:

•   Capable to apply science, technology and art within her/his expertise and adaptable to various situations faced during solving a problem

•   Mastering in-depth general and specific theoretical concepts of a certain knowledge and capable to formulate related problem solving procedure.

•   Capable to take strategic decision based on information and data analysis and provides direction in choosing several alternative solutions.

•   Capable to take strategic decision based on information and data analysis and provides direction in choosing several alternative solutions.

Since the curriculum is based on outcome then the measurement of whether education has been successful or not is based on the outcome. Outcome is defined as a final result of something, of a process; it is the benefit of a process and it may be expected or not expected but it will surely the final effect. So the outcome is a phase that follows output.

Measuring outcome of an education is not easy since it may require a series of research to check whether the graduates (with the diploma which states what competencies that the graduates possess—output) can survive in the next phase: work places (the place where they practice their comptencies)

Following the dawn of the fourth era, the hot issue of the future of work have been discussed since it is feared that due to the characteristics of this era, many jobs will disappear and be change by robotic system. Works that deals with rountinity such as accounting, will easily be

replaced by a computing software which works automatically. Many manual works will also be replaced changed by automatization. The increasing use of robots in developed countries will reduce labor-cost. In other words, lower price of the product or service is guaranteed. If many jobs that used to exist in the past no longer exist, what will? Securing the future by preparing students with skills needed to deal with the changing demand is the answer. Skills which will likely be accepted to survive in the 4th era. What additional role(s) that higher education must take in order to guarantee that the graduates are well accepted in any situation that any era will require?

3. CURRICULUM FOR COMPETENCY ACQUISITION?

From the above, we can conclude that the challenge that higher education faces will not stop with the industrial revolution era of 4.0. The next era is on its way and more new challenges are waiting ahead, therefore it is imporant that higher education prepare their students in any way that make them ready for the next phase, the after education life.

Indonesian higher education is governed by regulations and decrees as the basis of education in Indonesia for its more than 4500 institutions. For example, as it is discussed before, the graduates of undergraduate degree, as stated in the IQF Level 6 must possess certain qualifications as the basis of the learning outcome in the program. Related to the kowledege and skills, there are certain keywords that graduates must possess problem solving skills, adaptability, ability to formulate, and responsibility.

In Ministerial Decree Number 73/2013 about Implementation of IQF in Higher Education dictates (1) kinds and level of education, (2) quality leverage of the graduates, (3) curriculum development, (4) Development of Quality Assurance System , (5) Facilitating the long life eduation. In addition to that, Ministerial decree number 49/2014 point 5 (1) on Higher Education National Standard states that the minimum competency standard of graduates cover attitude, knowledge and skills which are formularized in the learning outcomes of the progam, therefore each study program must design its curriculum according to this standard and optimize the use of learning facilities and resource to assure that the learning outcomes are achieved.

The two regulations have celarly indicate that higher education has to design a curriculum of a study program which focuses not only on the study program specific outcomes but also other outcomes that will help them in practicing their expertise. Therefore learning outcome in the curriculum has to clear and measurable. In designing the curriculum, study program must get enough foundation, both from internal and external. With the internal factor, which is the vision of the study program and the external factor, which is information from the graduates and users of the graduates (industries and society), the profile of the graduates is formularize. This is the first step of the curriculum development. The next is the defining the learning outcomes that will help study program design learning activities for students to achieve specific knowledge, skills and attitude, or competencies.

The learning experience that students have in higher education is designed as slosely as possible to the reality. Knowledge is gained not only from the lecturers but from many other sources the world has to offer:

... acknowledging the wide range of pedagogical approaches around the world, there is a growing consensus that forward-looking curricula must focus on: the linguistic, mathematical and technological literacies all job roles will require in the future; ensuring the breadth and depth of subject knowledge and the ability to make inter-disciplinary connections; developing global citizenship values, including empathy and character; non-cognitive employability skills such as problem solving, critical thinking, project management and creativity (World Economic Forum 2017: 8).

Technologies have replaced the sole the providers of knowledge. The era of the dominant has ended and students can easily access knowldege from the internet. Learning must be designed to be interesting and interactive and most importantly it responds to students' needs. So in short learning experience nowadays must also be challenging to students because the labour market is dynamic and it changes rapidly.

4. EXTRACURRICULAR ACTIVITIES TO ENHANCE LEARNING OUTCOMES

Survey by Partnership for 21st Century Skills (2006) and American Management Association's (AMA) in 2010:

[...] many employers believe that higher education is failing in its role to adequately develop needed skills in students. In higher education, professors can influence students by promoting the skills businesses are seeking in future employees and helping students achieve these skills through course activities. Professors can also influence the choices students make through advising relationships (Hodge and Lear, 2011: 29).

Extracurricular activities (ECAs) are defined as activities that students take alongside with their curricular activities. The classroom activities, however, do not provide enough experience of the close to reality experience. The classroom learning are to the best of my knowledge provides more on subject knowledge, the softskills attained in classroom is somehow limited although various learning methods are used, such as, seminar where students are encouraged to write their scientific paper and present it, group work where students have the opportunity to work together for a certain purpose, brainstorming, role play, field trip, and many others that will provide them with competencies.

In addition to the above, extracurricular activities should also be designed. The World Economic Forum (2016) specifically list skills needed in 2020: complex problem solving, critical thinking, creatvity, people management, coordinating with others as the top 5 of the list.

Extracurricular activities offer a powerful resource for personal development and in acquiring social competencies. In extracurricular activities, students are trained to work in a close to reality experience and help them visualize the real work in the future. They are known to students as activities that they take outside classrooms, without credit units but they are compulsary. Therefore they are associated with sports or other outside classroom experiences, such as Student Government (Student Council), publication, clubs, debating team, internships, volunteer work, and many others. They mostly attract students because they do not expect students to learn from textbooks. More often than not, students do not realize that outside classrom activities enrich students with experience, increase their skills, and, this is very important, give them advantage to learn about the real world they are dealing after they cmplete their studies.

For Indonesia, the multicultural country with many ethnicities and religions, a competence of appreciative of other religions or way of life is also a good addition. A simple example of extracurricular activity that is useful for students in nd many social events that are packaged with simple organization for small gatherings. Since Indonesia observe 5 different religious holidays and each requires a celebration, students can learn how to organize the events and at the same time celebrate the big day, for example. A small goup of students can actually form a small organizing committee to celebrate an occasion associated with a religious event. This work in the small organizing committee help them understand the real work setting. The successful event relies on their teamwork, where the process of communication, administration, decision making and others take place. The process and an success of the

program do not always be granted by a grade but this eventually give students experience they will need for their career later in the future.

Skills Acquired from extracurricular activities cover among others communication skills, negotiation, tolerance, perseverance, appreciative of diferent ponts of views, leadership, and working under pressure.

5. CONCLUSION

Industrial Revolution 4.0 is here and higher education as providers of human resource must prepare their students to face the era and the era afterwards. This can be done with the curriculum which consists of study plan and learning activities that will lead to competences acquisition. The design of the curriculum, however, must include all selection of competencies that we want the students to possess. However, it is proven that the way of acquiring more competencies is through curicular activities. Curicular activity is like a laboratory for students in acquiring certain competencies, such as complex problem solving, critical thinking, creativity, peaople management, coordinating with others, etc which are needed in the labour market.

Higher Education must regularly check the updates of the labour market in order to keep track of the world of work therefore it is imperative that higher education design their extracurricular activities,.

REFERENCES

[1]. Bartkus, Kenneth R., Blake Nemelka, Mark Nemelka and Phil Gardner. 2012. Clarifying The Meaning Of Extracurricular Activity: A Literature Review Of Definitions American Journal Of Business Education. December, Volume 5, Number 6

[2]. Hodge, Kay H. and Janet L. Lear. 2011. Employment Skills for 21st Century Workplace: The Gap Between Faculty and Student Perceptions. Journal of Career and Technical Education, Vol. 26, No. 2, Winter, 2011

[3]. Martin Wollschlaeger, Thilo Sauter, Juergen Jasperneite. 2017. The Future of Industrial CommunicationAutomation Networks in the Era of the Internet of Things and Industry 4.0. IEEE Industrial ElectronIcs Magazine March 2017

[4]. Student Expectations and Perceptions of Higher Education. A Study of UK Higher Education. A Project Report. Quality Assurance Agency. King's College, London,

[5]. Wolf, Roger. 2014. Defining the concept of creativity. Thesis. Netherlands: University of Twente, Netherlands

[6]. Examining the Effect of Extracurricular Activities on Academic Achievements among the Public University Students in Malaysia. Asian Social Science · January 2014

[7]. World Bank East Asia and Pacific. Putting Higher Education to Work Skills and Research for Growth in East Asia. Regional Report. 2011

[8]. World Economic Forum. Realizing Human Potential in the Fourth Industrial Revolution. An Agenda for Leaders to Shape the Future of Education, Gender and Work. January 2017. http://www3.weforum.org/docs/WEF_EGW_White_Paper.pdf January 2017