Blended Learning as a way Vocational School (VS) Students of confronting The Industry 4.0

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Info Articles	Abstract
	_____ Industry in Indonesia need to have a Human Resources (HR) which is able to compete with the HR of other countries. The utilization of modern Technology in the process of learning in Vocational schools (VS) which have the purpose of preparing students to be able to deal with the needs of the industrialized world. The purpose of this research is to know the importance of learning-based blended learning in Vocational School to prepare HR of Indonesia facing industry 4.0. The research method used is the literature review. The journal used as the Foundation of thinking is related to the journal-based learning, blended learning with the world of industry. The research found that the blended learning-based learning, capable of providing a better knowledge about the industrial world so that students can learn the industrialized world who want students go well.

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INTRODUCTION

Unemployment remains the main enemy of Indonesia at the moment. The impact of unemployment is an increasingly high poverty communities. Unemployment and poverty flourish due to the faster flow of globalization that seems not be dammed. Human resources (HR) are there in Indonesia need to able to compete with the community in the world. Need for reform of the education for HR into HR nor the necessary changes in the workers in General. Declining interest in studying HR experience resulted in failed knowledge. According to the Human Development Index (HDI), Indonesia still has not been able to improve the quality of education compared to Malaysia and Singapore.

One of the institutions which focus on industry i.e. the VS. Governments continue to make improvements through VS to improve the quality of HR in Indonesia. According to ACT No. Sisdiknas of 20 years 2003 VS unit is a form of secondary education that prepares students especially for working in a particular field. Students who choose to study at VS had orientation to work in industry namely in the fields of mechanical engineering, computer engineering, pharmaceuticals, and tourism.

Reality happening in Indonesia is very surprising that according to the Central Bureau of Statistics (BPS) of the year 2018 VS students are expected to have jobs after graduating instead became the biggest contributor to unemployment amounting to 8.92%, then the elementary schools of 2.67%, 5.18% of Junior High School, the University of 6.31%, High School of 7.19% and a Diploma of I-III of 7.92%. It is an issue that must be resolved.

Government regulation of the Republic of Indonesia No. 17-year 2010 On the management and organization of Education article 76 States that the purpose of vocational secondary education is to equip learners with the ability of science and technology as well as vocational skills the profession in accordance with the needs of the community. Before

Indonesia plunged HR on the industrialized world, HR must get learning in accordance with the State of the field that will be encountered. VS is the school that prepares its students to a particular field of expertise with its head of competence to be able to enter the workforce or industry (Simarmata, 2016:1845).

The development of technology and the current globalization that cannot be reduced resulting in HR of Indonesia needs to get knowledge in the industrial world as a whole. Especially at the high school level. Technological developments have resulted in a shift in the process of learning, among others: a) the shift from classrooms to learning anytime anywhere, b) the shift from paper to online, shift and c) physical facilities to the network facilities of work (Rosenberg, 2001:8) . It supported Steep (2002:165) that the existence of a tendency: a) to shift the education-oriented teacher learning to student-oriented, b) grows and the more educated the people open or distance, then the more the number of available learning resources (Riyana, 2010:42).

The utilization of information technology and to support the positive impact against the learning outcomes (Kayler & Wayler, 2007:114; Mubaraq, 2009; Gulberg & Pilkington, 2007:67). Web-based learning is very able to develop independence students to construct knowledge, which can be known through an increased mastery of concepts, increased generic science and students gave a good response (Mubaraq, 2009). Later, Cheng (2006:147) explains that a web-based learning helps teachers to be more effective in making plans and learning materials. The study makes the students more active and communicative problem-based learning in the process (Capus & 2006:173 Hou, Sung). The utilization of information and communication technology in web-based learning aims to provide substantial material contents in the form of a question and the solution, the subject matter, the virtual teaching, examinations, assignments and discussion (Kayler & Weller, 2007:138). Then the web-based learning can also help improve

the student's misperceptions about style and motion (Dimirci, 2007:40).

Etymologically, blended learning blended meaning comes from the word combination or mixing and learning means learning. The actual meanings of blended Learning is generally centered on learning with combines or mixes between face-to-face and computer-based pebelajaran. Khan, Ali Shaik & Bebi (2012) explained that blended learning is given different names throughout the year such as: a) hybrid, instruction b) mediated learning, c) technology enhanced instruction, d) web enhanced instruction, and e) web assited instruction. Throne (2003) describes the blended learning as an opportunity to integrate the advancement of innovative technologies which are offered on an online-based learning, interaction and participation is offered in the best shape on the learning the traditional. Another definition of blended learning is generally known for its combines online learning with face-to-face learning (traditional) (Garrison & Kanuka, 2004:96-97; Baum, 2003; Akkoyunlu & Soylu, 2008:183; Garrison & Vaughan, 2008:6; Cheung & Hew, 2011:1319;

METHODS

Blended Learning

Samarescu, 2006:620; Elena Mosa, 2006; Semler, 2005).

Blended learning model of learning is a learning model that combines traditional learning with online learning or learning to use media with ofline sophisticated technology (Idris, 2011:62). While, So & Bonk (2010) defines blended learning as learning systems made by learning face-to-face with mediation technology. According to Driscoll & Carliner (2002) see blended learning from four different perspectives: a) a combination of web-based technology mode; b) combination of various pedagogical approaches; c) combination of instructional technology with face-to-face instruction; and d) instructional technology mixed with the actual job duties.

Blended learning developed around the year 2000 until now widely used in the United Kingdom, America, Australia and among world universities and training (Dwiyogo, 2014:73). Learning blended learning combines various sources of physical and virtual with such an approach is presented in table 1.

Table 1. Blended Learning Approach

Live face-to-face (formal)	Live face-to-face (informal)
Instructor-led classroom	Collegial connections
Workshops	Work teams
Coaching/monitoring	Role Modelling
On-the-job (OTJ) training	
Virtual Collaboration/ synchronous	Virtual Collaboration/ asynchronous
Live e-Learning classes	E-mail
E-mentoring	Online bulletin boards
	Listservs
	Online communities
Self-paced learning	Performance support
Web learning modules	Help System
Online resource links	Print job aids
Simulations	Knowledge databases
Scenarios	Documentation
Video and audio CD/DVDs	Performance/decision support tool
Online self-assessments	

Source: Allison Rosset, Felicia Douglis, and Rebecca V. Fraze (2003:1)

Then the four that have been classified were developed to become six types of e-learning are presented in table 2.

Table 2. Classification of e-learning as the basic concept of blended learning

Classification	Presentation	Electronic Communication	The Term Learning
Tipe I	Yes	No	Face-to-face
Tipe II	No	No	Independent Study
Tipe III	No	Yes	Not Synchronous
Tipe IV	Yes	Yes	Synchronous
Tipe V	No	Yes	Blended/Hybrid-Out Of Sync
Tipe VI	Yes	Yes	Blended/Hybrid-Synchronous

Source: Negash dan Wilcox, Emerson (2007: 3)

Blended learning is needed to state that there is a demand to hold the combination or mixing a variety of sources and media learn to achieve learning objectives. When distance learning not so needed then it takes face-to-face learning to maximize the learning to achieve learning objectives. Blended learning is needed at the moment: (1) teaching and learning not only face-to-face, but adds to the learning time by utilizing the technology of virtual worlds, (2) simplify and accelerate the process of non-stop communication between educators and participants the students, (3) help the process accelerating instructional (Prayitno, 2016:8).

Based on the description above can be expressed that the goal of blended learning is; (1) help students to thrive better in the learning process in accordance with learning style and preferences in learning, (2) provide the time and the opportunity to learn practical, realistic for teachers and students for independent learning, rewarding, It continues to grow, (3) increased scheduling flexibility for learners, learning by combining face-to-face and online learning. Face-to-face classes can be used to engage students in an interactive experience. While online learning provides students with a rich, multimedia content of knowledge at any time, and anywhere as long as students have internet access (Prayitno, 2016:6), (4) address the learning needs settlement through the use of varied learning methods.

Based on explanation above can also be drawn the conclusion that blended learning, has 2 (two) components of a learning environment that is blended learning and online learning offline (face to face). From both the learning environment there are six elements: 1) face-to-face, 2) independent study, 3) applications, 4) tutorials, 5) cooperation, and 6) evaluation.

Online Learning

Online learning is an educational material delivered by utilizing a computer connected with the internet. In Asynchronous Online Learning students can access lessons anytime and anywhere, while the Synchronous Online Learning allows real interaction (real time) between the learners with educators (Ally, 2007).

Rosenberg (2001), explained that the e-learning refers to the use of internet technology to transmit the learning material and a series of solutions that can solve learning problems as well as improving skills to use on -based learning, blended learning. E-Learning can be done formally or informally. E-learning formally for example i.e. learning with curriculum, syllabus, subjects and tests that have been arranged and compiled based on the schedule agreed upon related parties (management of e-learning and students). So, online learning is a learning environment that uses the technology of internet, intranet, and web-based learning

materials access which allows the learning interaction between occurrence of fellow learners or educators anywhere and anytime.

There are disadvantages and advantages of learning based on blended learning is described in table 3.

Table 3. Advantages and disadvantages blended learning

Advantages	Disadvantages
1. Students free colleagues specializing subject matter independently by leveraging online media	1. A bit of research to support the defenders online in the industrialized world
2. Students can communicate with the teacher or with another student without having face to face	2. There is a problem of accountability in terms of student learning and performance.
3. Learning Activities can be carried on anywhere by the teacher controls	3. Internet Media susceptible to use for the negative
4. The teacher can give the material online	
5. The teacher can ask students to learn first before teachers provide the material in class	
6. Teachers can take advantage of online media to create quizzes, give feedback and make use of the test results with effective	
7. Students can share files with fellow students without having to meet	

Sumber: Mohnsen, 2012: 42; Wardani, Toenlloe, & Wedi, 2018:15

Blended learning is learning that combines learning with face-to-face learning, computer-based (offline) and computer online (Idris, 2011). The following description of visually blended learning in Figure 1.
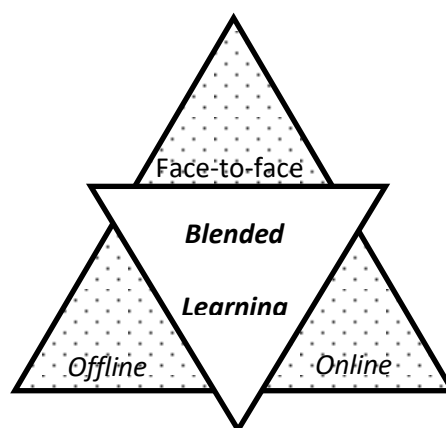

Figure 1. Visualization of blended learning

Blended learning developed refers to the notions described in table 4. So, the development of online learning is no longer as a complement face-to-face activities, discussions or forums. All activities are conducted in a systematic and integrated with the web was developed. The following percentages of the various web learning materials developed.

Table 4. Percentage of learning materials

The percentage of web-based learning materials	Model	Description
0%	*Traditional*	1. Learning without avail Online facilities. 2. Learning with face-to-face.
1% - 29%	*Web Facilitated*	The utilization of web in the learning process to help increase the mastery of learning materials that are not met in the process of face-to-face (the granting of additional material through web technology), It is used more in the collection task
30% - 79%	*Blended*	The learning process using a combination of web-based materials and face-to-face. The share of online learning is greater than face-to-face The process of learning, interaction (discussion forums) more done
100%	*Online/ E-Learning*	The whole process of learning through online. There is no face-to-face learning.

Source: Idris (2011:64)

The industry 4.0

The industry 4.0 introduced the idea of the fourth industrial revolution. Based on Davies (2015) in the European Parliamentary Research Service say that the industrial revolution happened four times. The industrial revolution first occurred in the United Kingdom the year 1784 where are the invention of the steam engine and mechanization began replacing human beings. The second industrial revolution happened at the end of the 19th century where the machines are already using electricity to produce. The third revolution is marked by computer technology for the automation of manufacturing in 1970 and the last four industry revolution (the industrial revolution 4.0) which is characterized by rapid technological developments, emerging ideas for integrating the whole technology for the industry.

The industry 4.0 is a comprehensive transformation of the overall aspect of the production in the industry through the incorporation of digital technology and the internet with conventional industry (Merkel, 2014). Later, Luke, Kagermann & Wahlster (2013) 4.0 is industry Integration of Cyber Physical Systems (CPS) and the Internet of Things and services (and Ios IoT) to include industrial process manufacturing and logistics as well as other processes. CPS is a technology for combining the real world with the virtual world. Later Hermann, Pentek & Otto (2016) explained that the industry 4.0 group of technology and organization of value chains in the form of smart factory, CPS, IoT and IoS. Smart Factory is a modular factory with the technology of CPS.

The term Industrial use 4.0 was introduced in Germany precisely enliven Honnover Fair in 2011 (Kagermann, 2011). It was not separated from the interests of Germany which has a policy of construction of so-called High-Tech Strategy 2020. The purpose of the policy is to defend Germany in order to always be in the forefront in the field of manufacturing (Heng, 2013). 4.0 industry has potential benefits and challenges that are described in table 5.

Table 5. The potential benefits and challenges of industrial revolution 4.0 according to some research

Potential benefits	Challenges of industrial
✓ product development becomes faster, embody the individual nature of the request (product customization), production of which is flexible and fast in responding to the problem as well as resource efficiency, ✓ the improvement of productivity, encourage the growth of income, an increase in the needs of skilled workforce, increased investment, ✓ Realization of mass customization of products, ideas and improvements to data utilization time of the production, ✓ is able to meet the needs of individual customers, process engineering and business into a dynamic, decision making becomes more optimal, giving birth to new business models and new ways in create added value, ✓ Realizing efficient manufacturing processes, intelligent and on demand and costs.	✓ the emergence of resistance to the changing demographic and social aspects, the instability of the political conditions, limitations of resources, the risk of natural disasters and the demands of the application of environment-friendly technologies, ✓ a pretty wide gaps from the tech side between current industry conditions with the expected condition of the industry 4.0, ✓ existence reluctance of companies in applying the industry 4.0 because of worry about the uncertainties of its benefits.

Sources: Lasi, Fettke, Kemper, Feld & Hoffmann (2014); Rüßmann, Lorenz, Gerbert, Waldner, Justus, Engel, & Harnisch, (2015); Schmidt, R., Möhring, M., Härting, R. C., Reichstein, C., Neumaier, P. & Jozinović, P. (2015); Kagermann, Lukas, & Wahlster, (2013); Neugebauer, Hippmann, Leis & Landherr (2016); Drath & Horch (2014) Qin, J., Liu, Y., & Grosvenor, R. (2016); Balasingham, K. (2016).

Industrial Work Practice Learning

Working practices of the industry is a program that was made in middle school particularly VS to provide knowledge and skills for the students to face the world of business/industry. The industry is an economic activity that is processing the raw materials, raw materials, intermediate goods to be managed. Program planning is done with industrial work relating to what will to do, planning precedes implementation, given the planning is the process that determines where to go and identify the necessary requirements in the most effective and efficient (Tan, 2011:2). Basically the implementation of the business or industry based on planning work practices with industry (Wena, 1996:228). Careful planning will produce results that correspond to what has been planned.

This research uses the international journal as a primary source in developing the theory. The method used is the literature review which is then elaborated qualitatively.

RESULTS AND DISCUSSION

Blended Learning-based learning in the industrialized world in VS

Blended learning-based learning has advantages compared with the traditional way just learning or just using the media without using a face to face manner. Blended learning-based learning has many advantages. Based on the excess, it-based learning, blended learning can be implemented in VS as an effort to give the overall understanding and knowledge. VS that have a focus on the corporate world needs to have a special way in learning to give good competence to students.

VS have a concentration in the field of mechanical engineering, industrial engineering, accounting and so on should be given real

learning through the medium of technology that can be used to deepen the student's understanding of the world the industry they will learn in the future. The industrial world has entered the industry 4.0 should be anticipated the world of education to prepare qualified HR. 4.0 industry suggests that employees who work in the industrialized world should have a good knowledge and skills.

Blended learning-based learning can be implemented with attention to several things including: a) the teaching resources, teachers must have the knowledge and ability to manage learning material using a sophisticated tech nowadays. It can take advantage of the internet to connect with computer and smartphone owned VS, teachers and students, using time outside of school by giving the task to do independently students anywhere, b) source power technology, technology in schools well prepared as well as possible to support the passage of the learning-based blended learning

as an instrument in the form of message delivery or media materials business world needed students, technology It takes the form of a computer school, a good internet connection and any other application that supports, c) students ' ability, the ability of students VS varied can't be done the same treatment, students first need to be introduced with the technology that will be used so that students can benefit from learning-based blended learning with optimal, d) partner company school, VS need in the real world of industrial partners to provide training and skills and knowledge in the industrialized world, in addition to using the learning in the classroom and outside the classroom, students need to be given for real experiences in the industrialized world as a manifestation of the real learning.

Through thought-provoking explanations above can be described-based learning, blended learning in Vocational School to prepare students in the industrialized world in Figure 2.
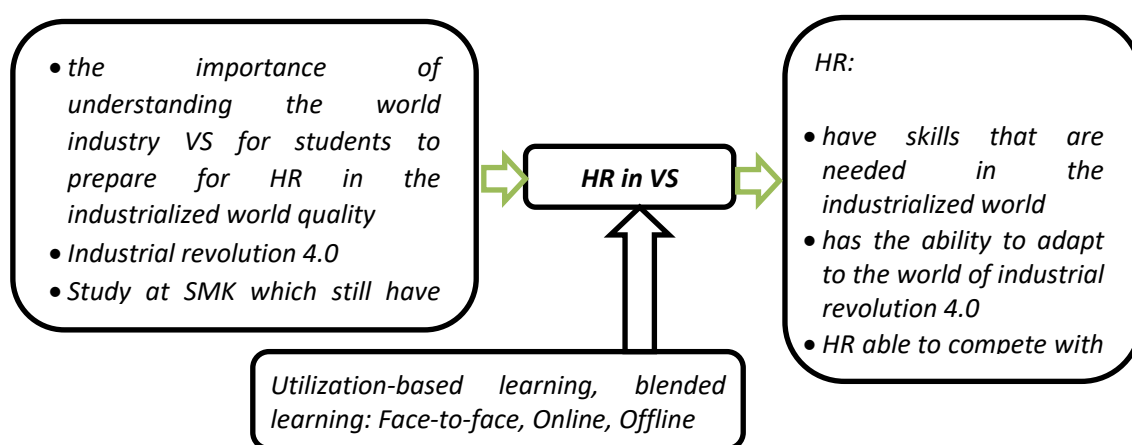

Figure 2. Blended learning-based learning in VS to prepare students in the industrialized world

CONCLUSION

The industrialized world 4.0 requires human resources qualified and able to compete in the industrialized world. Qualified HR obtained through the process of learning good time school age. One of the establishments of education in Indonesia who set out the skills in the industrial world was a VS. The right learning patterns need to be well designed to produce qualified human resources and be able to compete with HR in other countries.

Need for the utilization of information and communications technology in learning activities in VS. The development of technology can be utilized to maximize the learning process so that the message in the form of the industrialized world in science VS. can run well. One way is learning at school-based blended learning by doing learning face-to-face, online and offline. In implementing blended learning-based learning to enhance the skills and abilities of students VS the need to pay attention to some things namely teaching resources, technological resources, the ability of students and corporate partners of the school.

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