

The Development of Educational Technology In The Realm of Islamic Boarding School Learning

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Abstract: *Madrasah and pondok pesantren as institution of Islamic education a lot of using the conventional system. While this time, they are required to be ready confront the opportunities and challenge of industry era 4.0 in education. Therefore, needed efforts right and antisipative to minimize negative effects about institution of islamic education. This article are write to know efforts right done of madrasah and pondok pesantren in the address as well as harness the opportunities and challenge of industry era 4.0 by applying descriptive qualitative method and doing research to some references and literatures for researching data are needed. The result is the opportunities industry revolution 4.0 is the advances in technology that generates innovation that facilitate the learning process in the classroom and activities that took place in islamic educational institution, while the challenge is the rise of disruptive innovation who had managed to shift lifestyle and mindset of world people, like using e-book for replacing function of book. As for the deal is: 1) modify curriculum and learning according needs and technological developments; 2) increase in the ability and skill of students for competitive output; 3)strengthen the value of culture and the character of national anthemis integrated. These things are expected to keep the existance of madrasah and pondok pesantren in order to produce output competitive in the era of industry revolution 4.0.*

Keyword: *Madrasah; pondok pesantren; technology.*

Abstrak: *Madrasah dan pondok pesantren sebagai lembaga Pendidikan berbasis Islam banyak menggunakan sistem konvensional. Sedangkan saat ini mereka dituntut agar siap menghadapi peluang dan tantangan dari revolusi industri 4.0 pada bidang pendidikan. Oleh karena itu, diperlukannya upaya yang tepat dan antisipatif agar meminimalisir dampak negatif terhadap lembaga pendidikan Islam. Artikel ini ditulis agar mengetahui upaya yang tepat dilakukan madrasah dan pondok pesantren dalam menyikapi serta memanfaatkan peluang dan tantangan era revolusi industri 4.0 dengan menerapkan metode deskriptif kualitatif dan mengkaji beberapa referensi serta literatur untuk memperoleh data kajian yang diperlukan. Hasil penulisan adalah peluang revolusi*

industri 4.0 adalah kemajuan teknologi yang menghasilkan inovasi sehingga mempermudah proses pembelajaran di kelas dan aktivitas yang berlangsung di lembaga pendidikan, sedangkan tantangannya adalah munculnya “disruptive innovation” yang telah berhasil menggeser gaya hidup dan pola pikir masyarakat dunia, seperti penggunaan e-book menggantikan fungsi buku. Adapun cara dalam menghadapinya adalah: 1) memodifikasi kurikulum dan pembelajaran sesuai dengan kebutuhan masyarakat dan perkembangan teknologi; 2) peningkatan kemampuan dan keterampilan siswa untuk output yang kompetitif; 3) penguatan nilai budaya dan karakter kebangsaan secara terintegrasi. Hal-hal tersebut diharapkan mampu menjaga eksistensi madrasah dan pondok pesantren agar menghasilkan output yang kompetitif di era revolusi industri 4.0.

Kata Kunci: Madrasah; Pondok Pesantren; Teknologi.

INTRODUCTION

The industrial revolution 4.0 is a concept that was first introduced by Prof. Klaus Schwab, a German economist. The essence of the industrial revolution 4.0 is merging physical and digital technology through analytics, artificial intelligence, cognitive technology and the Internet of Things (IoT) to create an interconnected and capable digital enterprise produce more informed decisions. However, currently the industrial revolution 4.0 is changing the sectors of people's lives, What's worse is changing society itself. The era of the industrial revolution 4.0 is changing concept of work, job structure, and competencies required by the world of work.

This era has also changed the way of looking at education whose forms of change are not only just a way of teaching, but much more essential, namely a change in the perspective of the concept of education itself. Madrasahs and Islamic boarding schools as Islamic-based educational institutions in Indonesia. Indonesia participates in feeling the impact of the 4.0 industrial revolution era which requires them to be ready to face the opportunities and challenges of the industrial revolution. On the other hand, there are still many madrasahs and Islamic boarding schools that still apply the system conventional, both in the learning process as well as in the management and administration that causes students to experience "technical gaps" which have an impact on difficulties in dealing with individual competition, especially in the world of work. Therefore, there is a need for appropriate efforts conducted by madrasahs and Islamic boarding schools in responding to and taking advantage of opportunities and the challenges of the industrial revolution 4.0 era also anticipate the impacts that will occur for Islamic educational institutions so that madrasahs and Islamic boarding schools become Islamic educational institutions superior, competitive and civilized Islamic education.

The distinctive nature of Indonesia/the ingenuity of pesantren contrasts with the practice other education generally causes pesantren to display unique and exotic character. In the current era of globalization, Islamic boarding schools required to quickly

accelerate in various aspects, as a logical consequence from the application of high-tech (high-tech), causing the Indonesian people to led to a very fast and massive pattern of interaction with countries others in the world. In this phase of the information society, pesantren are increasingly facing challenges that are not light and more complex than the times previously. For that we need a breakthrough to start introduce and apply information and communication technology in Islamic boarding schools and madrasas through various appropriate methods. Because of that it is necessary to use the use of information technology/Information Technology can be applied in pesantren as an educational institution in the community that can provide opportunities for the progress of the Indonesian nation.

METHOD

This article applies the method qualitative descriptive and reviewing several references and literature to obtain data the study to be presented. The research data was obtained from various reference books, journals, and also some research results related to the research discussion. The data obtained were then analyzed to obtain a discussion and research conclusions.

ISLAMIC BOARDING SCHOOLS AS EDUCATIONAL INSTITUTIONS IN INDONESIA

Pesantren is identical to Javenese santri place or seminary for students of theology on the islands of Java and Madura. This means that pesantren is a place for seminars theology for students on the islands of Java and Madura. While the students said, who added with the prefix "pe" in front and the suffix "an" so that it becomes Pesantren is interpreted as a place where students live to attend lessons Islam. Etymologically the word pesantren comes from the word pe-santri, namely "place of santri".¹

In the 1970s, many pesantren implemented the Three Ministerial Decree, but still maintain their traditional teaching system and curriculum. Some pesantren also do not adjust their curriculum and teaching system with the government curriculum pattern, but make their own curriculum in accordance with the objectives which the pesantren is trying to achieve. This shows that Islamic boarding schools participate in and keep up with the times and government regulations, although not directly comprehensive in its adjustment to government regulations. Islamic boarding school as educational institutions that have strong (indigenous) roots in the Muslim community Indonesia, which in its journey is able to maintain and maintain sustainability himself (survival system) and has a multi-aspect education model. Therefore, Islamic boarding schools play an important role in achieving educational goals nationally though in a different way, namely to produce

¹ Ziemek Manfred. (1983). *Pesantren Dalam Perubahan Sosial*. Jakarta: Perhimpunan Pengembangan Pesantren dan Masyarakat (P3M).

Muslim scholars who 'alim and have a strong Islamic character, so that it gives its own color to the goal National Education.

INDUSTRIAL REVOLUTION 4.0: OPPORTUNITIES AND CHALLENGES FOR THE WORLD OF EDUCATION

The industrial revolution is simply defined as a major and radical change to the way humans produce goods that has happened three times and now we are facing the fourth industrial revolution. The concept of the industrial revolution 4.0 was first recognized the public at the Hannover Messe industrial exhibition in the City of Hannover, Germany in 2011. Industry 4.0 is an industry that combines automation technology with cyber technology which is a continuation of industry 3.0 which adds instruments connectivity to obtain and process data, automatic network devices, internet for everything (IoT), big data analytics, cloud computing and cyber security. Device The connectivity is connected to industrial physical devices with the aim of receive and send data according to the specified command, either manually or automatically based on artificial intelligence. Industry 4.0 that relies on the internet also has several benefits, in outline major include:

1. Optimizing the production process;
2. Adjusting the times and the needs of the community;
3. Encourage education and research.

At present, the fourth industrial revolution (4.0) is changing aspects of people's lives, isn't it? except for education. Because the industrial revolution 4.0 brings opportunities and challenges One of the problems faced by society, one of which is the emergence of the phenomenon of disruptive innovation. In simple terms, disruptive innovation is defined as a phenomenon disruption of old industry players (incumbent) by new industry players due to the convenience of information technology, among examples is the decline in the income of artisans motorcycle taxis and taxi companies. Another example is the use of electronics book or abbreviated as e-book has shifted the function of conventional books as material reading to find information, refer as reference material, and media boost the economy through its sales. As a challenge for industry 4.0, this phenomenon also makes a shift in human functions that are replaced by machines in doing daily activities. An example of this is the check-in process at the airport being taken over by sophisticated machines that can answer the needs of passengers, such as moving machines passport and visa checker, boarding pass and luggage tag printer.

Another challenge is industry 4.0 according to innovation to improve consumption and people's incomes that have negative and positive impacts that together. In addition, the crucial thing that is the toughest challenge in facing the revolution Industry 4.0 is the inability of some people to quickly adapt to the rate of technological development. Even though this is also an opportunity because The development of technology certainly makes it easier for people's lives, such as the use of the internet in the installment payment process. Especially in the realm education, sophisticated technology is needed in the learning process and process school management. This is because of the demands and needs of students and residents other schools as a form of adjustment to the times so that

indicates that the school is progressing. However, not all people can and understand how to use it. Especially for the previous generation and society the lower class who lack knowledge and skills in the use of technology advanced. This is what really needs to be considered about how to prepare the community capable of adapting to existing technology in the era of the industrial revolution 4.0. It is education that takes an important role in teaching, educating and training the younger generation and other community groups so that they are ready to face the opportunities and challenges of this era. Therefore, there is a need for efforts from educational institutions, especially Islamic-based educational institutions to face the era of the industrial revolution 4.0.

EFFORTS IN FACING THE INDUSTRIAL REVOLUTION 4.0

According to Aris Adi Laksono, to answer the era of disruption (industrial revolution 4.0) there are five things that need to be applied by madrasas and Islamic boarding schools in dealing with industrial revolution 4.0 with the steps as described by Jeffrey H Dyer, Hal B Gregersen and Clyton M Christensen in 2013 in the book *The Innoeagor'z DNA*, namely associating (able to connect fields of science), questioning (able to ask), observing (able to observe), experimenting (capable of doing and trying new things), and networking (capable of social interaction). He added Islamic boarding schools and madrasas must adhere to the rules of *al-mnhafadhah 'ala al-qadim ash-shalih wa al-ahdzu bi al-jadid alashlah*, namely maintaining Islamic religious traditions by firm in preserving its myriad of treasures and using methods, managerial, and good modern learning.

PESANTREN IN THE ERA OF TECHNOLOGY AND INFORMATION

In this 21st century, the nations of the world are competing develop strategic technologies. Impact of technology development This causes economic competition on the one hand to become increasingly sharp and on the other hand is expanding. This situation is a result of the fast the development of information and transportation technology which causes more it is easy for countries to access business, industry and technology. The development of increasingly sophisticated technology and the flow of capital the faster it spins and expands allowing many people to have, buy and use it, although still not able to master or develop the technology themselves. Opportunity to take advantage of mastering technology and business can also be achieved by developing countries including Indonesia. Since the 1980s, technological advances and The rapid industrial growth in various fields has had an impact and dramatically change our conceptual understanding of distance, time, culture, lifestyle and behavior.

Due to the increasing interaction between nations, access to new values, especially cultural values from outside Indonesian society the greater it is. The national economy is increasingly opening up to the development of the world economy and now in the third millennium era, its impact especially in an increasingly competitive life. Temporary Indonesia's natural resources are very limited and human resources are not yet competitive. The monetary crisis that hit Indonesia and several countries another, the so-

called Asian crisis even now Europe, is also a as a result of economic openness/globalization.

In this new era (information and technology), the Indonesian people have also transform some aspects of social and cultural life as quickly as possible and as basic as possible included in the field of technology. Transformation process from the old era to the new era in such a way has been combined with the process renewal, known as reform. Reform is a form of correction for mistakes in the past so that they can look to a newer future and promising. However, if this nation is not careful in managing change Then there will be big clashes that can damage the values of the nation that have been well-maintained so far unity and oneness. Here the role of religion in underlying life nation and state becomes very important, especially in the context of stemming values that conflict with culture and personality Indonesian nation that has been formed and tested for a long time.

These changes require a different mental attitude strong, high level of participation, productivity, effectiveness and efficiency of all levels of society. This shows that the demands for human resources development that is increasingly qualified and resilient, capable of anticipate changes that occur and overcome their excesses increasingly urgent to fulfill. Fulfillment of qualified human resources impact on the level of speed of accessing and processing information and use technology for the benefit of nation building. Information technology and the internet cannot be separated from the field of communication education, including from pesantren. In America, the internet began to grow from academic environment (Nerds 2.0.1). Similarly, the Internet in Indonesia began grew from an academic environment (UI, ITB and UGM). In the future the internet too can develop in the pesantren environment. The existence of the internet in Islamic boarding schools makes it easier for students to access information and science. Access a number of information and knowledge should not be a taboo anymore for pesantren. Students who have equipped with various knowledge and appreciation of morals should be more prepared to face the negative impacts of the internet than other students in general. The set of Sufism he has should be something like natural filter in warding off negative information from the internet. Libraries are one of the most expensive sources of information price. The existence of the Internet allows pesantren activities to run properly, including in providing assistance in research assignments final among students and female students. Exchange information or ask Answering with experts can be done via the internet either through face book, email, Twitter and blogs.

Information and Communication Technology (ICT) has revolutionized the way of life humans, how to communicate, learn, work, do business becomes very practical, effective and efficient. The information age provides a very large scope to be able to organize all activities through new, innovative, instant, transparent, accurate, timely, better and provide convenience who are more in managing and enjoying life, including in pesantren. One of the benefits felt by pesantren is that there are demands for improvement of the quality and quality of the implementation of learning because it is supported by various facilities, most of which utilize information technology and

communication². Information and Communication Technology (ICT) is present as a form of response to environmental changes outside the world of education, starting social, economic, technological, to political environment, which requires the world education is rethinking how it changes affect it as a social institution and how it should be interact with these changes so as not to be left behind with issues that comes from the outside environment. With the advent of ICT, the spread of information becomes increasingly rapid and may become uncontrollable, if there are no rules that limit the information which ones can and deserve to be accessed by the public, and which information who does not. The rapid spread of this information, has changed the mindset humans as a form of response to the rapid dissemination of information (Mohandas, R. 2003: 25-27). If examined more deeply, to what extent? ICT intervention in the pesantren education sector, there will be a question, namely how exactly ICT has reformed or modernizing pesantren education, so that the quality and quality of pesantren better than conventional education.

There are three important things to think about with regards to modernization in the pesantren education system: (1) how do we learn (how people learn); (2) what we learn (what people learn); (3) when and in where we learn (where and when people learn). According to Resnick, M. (2002). By looking at these three questions and the potential IT can used to modernize the pesantren, it must always be up to date the information they use. In addition, with technology information, pesantren can be assisted in disseminating information regarding the profile, activities and management of Islamic boarding schools in human resource development and education. So that the world of Indonesian education includes the development of Human resources and Islamic boarding school education can be more developed and advanced government through Jardiknas (National Education Network) and ICT Center can open the widest access to information related to education and provide opportunities for all Indonesian children to participate in proper and quality education, and provide empowerment to students in the learning process, by implementing free Student Centered Learning/e-Learning. The IT program in Islamic boarding schools is in line with the Jardiknas program which launched by President Susilo Bambang Yudhoyono in March 2007. This internet-based network is intended to connect 533 centers in 33 provinces, 441 cities/districts, and more than 3,600 high schools, more than 84 universities, and 61 education offices across the country. Until now, internet network has been developed in 10 provinces in Java, West Sumatra, South Kalimantan, Bali and South Sumatra. Network already installed at 25% from all SMA/SMK/Madrasah Aliyah throughout Indonesia. At level universities, certain networks have been built under the name Inherent (Indonesian Higher Education Network). A broad spectrum of problems ranging from educators and students, school rehabilitation, to geographical conditions have indeed encourage the development of ICT-based networks, including in Islamic boarding schools.

² Pannen, P. (2005). *Pemanfaatan ICT dalam Pembelajaran. Presentasi pada Seminar Sun Commitment in Education and Research Industry*. Jakarta: ERCI.

That is information technology, especially computers and the internet become an important part of our lives, including for development boarding school. The role of information technology is very much needed by Islamic boarding schools and Islamic boarding schools can be used as a medium for automation of information and communication in the context of *da'wah bil wisdom wal mauidloh and amar makruf nahyi munkar*. Technology can also facilitate the learning process. Dispel the notion that students and the *pesantren* stutters about technological progress, some respond and anticipate it by responding with the statement that the cyberspace era in the future has become a necessity. After all, boarding school is not a camp that must be sterile or closed from outside access. On In turn, *pesantren* within certain limits will need to be known accountability and transparency of its activities by stakeholders. Thing This is also necessary to maintain public trust in *pesantren*. *Pesantren* institutions from the past until now or in the future coming is still believed to play a positive role in adapting and even changing era. *Pesantren* is a "center of excellence" or the center where it takes place the learning process of future generations to the Islamic sciences with a special method. Here, the *kiai* as the central figure (as teacher, parents, supervisors, education providers and boarding school owners) are willing to sacrifice without demanding anything in return. Islamic boarding schools can be low-cost alternative education, which is able to shape independence of individuals and communities, without depending on allocations APBD/APBN. By itself, the *pesantren* became very autonomous from the unclear outside influences. In terms of ownership of information resources and Islamic communication, *pesantren* have reliable authority. Boarding school has a clear chain of conduct and can be accounted for for its validity.

Pesantren institutions also play a role as a "center of social change", namely: agents or centers of community change. System (input-process-output-feed back) in Islamic boarding schools can be expected to produce high social added value. In *pesantren*, religion, ideology, politics, social, economy, culture, law and defense, even appropriate technology are all studied. Therefore Islamic boarding schools can be expected to be a vehicle for improving human quality by trying to eradicate poverty, ignorance, environmental awareness and custodians of morals or commendable morals that are already rare as a result of the influence negative times. *Pesantren* not only train individual piety but also social so that systemically it can provide a multiplier effect and competitive advantage. Indonesian human resources should always be renewable so that the Indonesian people are ready to become civil society, *baldatun thoyyibatun wa robbun ghofr*.

One of the solutions for educational institutions is *madrasas* and Islamic schools Islamic boarding school, namely the use of big data which is used by a teacher can research and analyze the ability of students easily. Government Indonesia through the Minister of Education and Culture revised the curriculum by adding five competencies that are assessed as capital to be able to To compete in the industrial revolution 4.0 era, the five competencies are:

1. Critical thinking skills;
2. Have creativity and innovative abilities;
3. Good communication skills and abilities;
4. Cooperation ability;
5. Have high self-confidence.

Thus, it is clear that the perpetrators of Islamic education are, of course, good for them formal institutions such as madrasas and Islamic religious-based institutions such as Islamic boarding schools to be swift in adapting to existing developments by reforming the institution, increasing the capability and ability and professionalism of teachers as educators, dynamic curriculum, reliable facilities and infrastructure, and cutting-edge learning technology to be ready to face the 4.0 revolution era.

Improving students' abilities and skills is very necessary for facing the era of the industrial revolution 4.0, because industry 4.0 requires resources superior and skilled human beings according to the needs of the business world and industry, one of the the form of its business is to provide vocational education and training to hone hard student skills. Because in addition to improving abilities and skills, education and vocational training is also expected to be able to solve the problem of unemployment. Vocational education and training is important because of the hope that training, apprenticeship system, certification and cooperation with the business world, the graduates will be have competence and are ready to work in the industrial world.

CONCULSION

Education in pesantren, judging from its history, has experienced many things changes, especially in terms of producing good scientists/ulama in terms of religion as well as general knowledge. The development of the times and technological advances information turns out to be able to slowly change the paradigm of pesantren which are now much more sensitive to changes and developments in science. In the policy aspect, certain articles show that there is a defense to the pesantren education system in the context of national education (UU National Education System No. 20 of 2003). In carrying out its role, Islamic boarding schools seek to advance science, information technology and communication. All are used to support the smooth management process pesantren and improving the positive image of the institution. Even though technology Information in cyberspace is very risky when not managed properly but it is very much needed by pesantren. Everything depends on human attitude as the culprit. Information technology is a means or wash based on its purpose created to create the benefit of religion, reason, life, property and future generations. This new vision, can strongly inspired the existence of Islamic boarding schools in Indonesia in print a generation that is smart and responsive to scientific advances and world civilization. Pesantren is a very complex educational institution both in the context of science, social, culture, nation and the universe.

Islamic boarding schools are Islamic educational institutions that participate in an effort to achieve the goals of Indonesia's national education with a strong Islamic

character strong. Islamic boarding schools are required to be ready to face opportunities and the challenges of the industrial revolution 4.0 which emphasizes the use of cyber technology with a significant impact on people's lives, such as a shift in function humans are replaced by machines in carrying out daily activities. This matter lead to narrowing of job opportunities and increase the unemployment rate in Indonesia. This matter needs to be considered because it demands Islamic educational institutions like a boarding school to think harder to be on the side take into account their existence as an Islamic-based educational institution, but also think about how the output they produce can be ready to face challenges and take advantage of industry 4.0 opportunities.

Efforts that can be made by Islamic boarding schools in dealing with Industry 4.0 is modifying curriculum and learning according to needs society and technological developments; improvement of students' abilities and skills for competitive output; strengthening of cultural values and national character integrated. These things are expected to be able to maintain the existence of Islamic boarding schools in order to produce competitive output in the era of the industrial revolution 4.0.

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