INNOVATION OF HIGHER EDUCATION AND TRAINING TO MEET THE REQUIREMENTS OF THE FOURTH INDUSTRIAL REVOLUTION

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ABSTRACT

In the current period, the rapid development of the fourth industrial revolution has affected all fields of social life. Education is not out of that trend. In recent years, the education sector has made a profound change. Science and technology have gradually penetrated strongly not only in management but also in teaching and learning methods. In addition, it is recognized that there has been a shift in the role between teachers and learners in the training process. In that context, many opportunities and challenges have been placed on education and training in general and higher education in particular. In the article, the authors focus on opportunities, challenges and solutions to higher education and training to meet the requirements of the fourth industrial revolution.

Keyword: Fourth industrial revolution, higher education and training, education and training innovation.

1. STATEMENT OF THE PROBLEM

The development of science and technology, especially the fourth industrial revolution, has strongly penetrated into all fields of social life and impacted many professions, including education and training. As the industry that provides and determines the quality of human resources for the country, education and training are also deeply influenced by this revolution. Therefore, in addition to the proactive policies to anticipate the achievements of the fourth revolution, the innovation of education and training in this context is an urgent issue.

2. CONTENT

2.1. The impacts of the fourth industrial revolution on education and training

On January 20, 2016, the 46th World Economic Forum officially took place in Davos-Klosters with the theme “The Fourth Industrial Revolution”. It attracted representatives of 40 countries and more than 2,500 guests from more than 100 countries, including US Vice President Joe Biden, British Prime Minister David Cameron, Bill Gates, CEO of Microsoft Satya Nadella, Chairman of Alibaba Jack Ma. The concept of the fourth Industrial Revolution or Industry 4.0 has been clarified at this forum.

The term “Industrie 4.0” originates from a project in the German Government High-Tech Strategy, which encourages the computerization in production. The term was first used in 2011 at Hannover Fair - The World’s Leading Fair of Technology and Industry. This is the largest and most important industry event, held annually by Deutsche Messe AG. (Germany). This concept was first mentioned in the High-Tech Strategic Action Plan approved by the German Government in 2012. On April 8, 2013 at Hannover Fair, the final report of the Industry 4.0 working group was presented. That is the name of the wave of production changes taking place in Germany. In other countries, it is called “IP industry”, “smart production” or “digital production”. Although the name is different, the idea is one: future production brings the technology and machines close together.

According to Klaus Schwab, President of the World Economic Forum, Industry 4.0 (Industrie 4.0 in German) or the Fourth Revolution is a term encompassing a wide range of modern automation technologies, data exchange and manufacturing. The fourth industrial revolution is defined as “a term for the technologies and concepts of the organization in the value chain” associated with physical systems in virtual spaces, Internet of things (IoT) and Internet of services (IoS). The
fourth revolution is based on digital technology and integrating all intelligent technologies to optimize processes and production methods, emphasizing the technologies that are and will have the greatest impact, namely 3D printing, biotechnology, new material technology, automation technology, robotics ... [see 3, page 9].

In this situation, education and training is one of the industries that require profound changes to improve accessibility to the fourth industrial revolution. Directive No. 16 / CT - TT dated May 4, 2017 of the Prime Minister on strengthening capacity to access the fourth industrial revolution has set out a number of requirements for the education and training sector such as “strongly change education and vocational training policies, contents and methods in order to create human resources which are capable of receiving new production technology trends. It is necessary to focus on promoting training science, technology, engineering, STEM, foreign languages, informatics in general education programs, promoting university autonomy, vocational training, piloting regulations on vocational training for a number of specific majors, turning the challenge of population into an advantage of international integration and labor division”.

According to Deputy Prime Minister of Vietnam Vu Duc Dam, the fourth revolution and the digital era not only help increase labor productivity and economic growth, but also open a horizon of connection between people and people. The fourth revolution will bring not only new occupations, new jobs, but also new modes of supply and organization of labor. The current issue is that there is a need to change fundamentally, not only in terms of vocational training or education at university level, but also from different levels of education with special requirements of consciousness and skills of a global citizen.

Thus, the fourth industrial revolution really puts the education and training sector in the face of fast emerging challenges, especially higher education which is directly related to the quality of human resources of a country. Therefore, training and research activities which are mainly still traditional methods will face drastic changes in both thinking, knowledge structure, skills and methods. With the rapid change of technology, education is required to give learners both new knowledge and skills to think and adapt to challenges and new requirements that traditional teaching cannot fulfill.

2.2. Opportunities and challenges to higher education and training

2.2.1. Opportunities of the fourth industrial revolution for higher education and training

The fourth industrial revolution promises to change both the training objectives, the traditional training model by completely transmitting and training new knowledge. The development of information technology, digital, networked systems and metadata will be the best tools and means to change the way of teaching. Some common limitations of traditional classes such as high costs and limited space will be replaced by online classes. The quality of online training will likely be controlled with tools that are the fruits of the fourth industrial revolution such as sensors and cyberspace connections. In addition, the learning space will also be more diverse. Instead of traditional laboratories as before, learners can experience learning in virtual space through software and network systems that learners can interact under real world conditions.

Furthermore, the large database is forecasted to be an endless source of data to learn and experience in analyzing, identifying trends or forecasting business at a high level of accuracy. Digital learning resources in terms of real and virtual space connections will be extremely rich. Library space is no longer local specific conditions, through which learners can exploit anywhere easily. At the same time, learners can approach knowledge in a richer, more diverse and proactive way.

The curriculum is designed to be diversified, flexible, specific and better meet the needs of learners. The fourth industrial revolution will make training institutions and businesses stick together, build training programs and output standards when there is a link between schools and businesses. Diverse internships can help learners get early access to the working environment and integrate with the actual working environment.

2.2.2. Challenges of the fourth industrial revolution to higher education and training

In addition to the opportunities of the fourth revolution for education and training, especially
higher education, there are many challenges that are posed to the education and training sector.

Firstly, grasping knowledge about the new information technology which is the connection between the real world and the virtual world through the internet system is an extremely important factor in the process of management, teaching and learning. Therefore, this requires universities to not only prepare and apply the latest achievements in scientific and technological developments but also proactively train specialists, equip learners with all relevant knowledge and skills to meet social needs.

Secondly, the current training program is not flexible enough, the content is not suitable with the needs and trends of the labor market in the fourth industrial revolution. In this context, universities should carry out training activities in two directions. On the one hand, their training must meet the social orientation. On the other hand, their training needs to provide human resources to meet the new requirements of the labor market. With this era of rapid technological knowledge developments, self-study methods and lifelong learning are more important than knowledge in the training program. It can be said that the fourth industrial revolution will put great pressure on training activities and training program development on updating and renewing program content to meet the requirements of the employers and the labor market.

Thirdly, the fourth industry has in fact made huge changes in the supply and demand of the workforce not only at a national level but all over the world. This is a big challenge for the current higher education and training. In the knowledge economy, high automation and creativity has created a redundancy trend in workforce. Therefore, it requires workers to quickly adapt to the change of production, otherwise they will be redundant and unemployed. According to forecasts of researchers, with digitalization technology accompanied by high automation by artificial intelligence, Internet connecting things, and robots, nano technology will replace 9/10 of the number of employees currently in developed countries. That means only 1/10 of the chance of not being unemployed. A UK forecast study shows that, within the next 10 to 20 years, the US and UK labor markets will have about 95 million traditional jobs losing their jobs, or 50% of the workforce of the two countries. In the ASEAN region, the formation of the ASEAN Economic Community (AEC) has created the advantages of creating job opportunities for the members. However, the other shortcoming is that the skilled and highly skilled workforce has been shifting most strongly into the Singapore market, followed by Malaysia and Thailand. This increases the competitive pressure on human resources in less developed countries.

Fourthly, how program content is conveyed to learners is also one of the challenges for higher education institutions. The fourth industrial revolution requires training methods to change with the strong application of information technology, digital technology and network systems. Online training, virtual classes, simulation, digitizing lectures ... will be a popular trend in the future. This will probably put great pressure on training institutions in preparing resources for teaching organizations.

Finally, in addition to the challenges on facilities and training programs in the context of the fourth industrial revolution, the teaching staff are also required to improve teaching quality. Teachers have to proactively equip themselves with a wide and deep knowledge base of both professional knowledge and interdisciplinary knowledge to meet the new requirements. Along with that, it is necessary to proficiently use modern teaching facilities to support the research and teaching process.

2.3. Several solutions to innovate education management towards meeting the requirements of the fourth industrial revolution

It is very important to proactively seize the opportunities of the fourth industrial revolution, especially for Vietnam. As the key human resource training institutions for the country, colleges and universities are not out of this general trend. In order to quickly approach the fourth industrial revolution trend, administrators of education and training will play a key role in formulating strategies, general development mechanisms, and forecasting trends in the development of the fourth industrial revolution. Along with that, the Government and concerned ministries and branches need to have orientations and strategies for developing information technology infrastructure to meet the requirements of this revolution.
In order to maximize the quality of training to meet the requirements of the new era, the authors boldly propose a few solutions to develop higher education and training to meet the requirements of the fourth industrial revolution:

Firstly, school facilities are renovated and modern information technology is applied in management, teaching and scientific research. It is necessary to build a modern and unified information technology infrastructure in the entire training system. At the same time, electronic libraries and multimedia classrooms are upgraded to meet the learning and research needs of students. The fourth industrial revolution is based on the basis of the development of information technology, smart devices and large databases. Therefore, in order to grasp, learn and apply the results of this revolution, it is necessary to have innovation in facilities that are considered as means for more effective management, teaching and learning activities.

Secondly, educational institutions must pay close attention to some training areas such as information technology, network administration, data exploitation, security and new materials technology. Accordingly, training institutions need to design flexible training programs to update knowledge and develop the skills needed for the fourth industrial revolution. At the same time, university training programs in the new context should focus on bringing necessary knowledge so that learners can adapt to the rapid change of technology and form skills to work effectively in highly interconnected environments.

Thirdly, the construction of training curriculum framework and output standards for the program is an essential requirement in higher. It can be said that the proactive cooperation with enterprises in training is extremely important. Today, the combination of knowledge and practice for students is no longer unfamiliar. The cooperation between universities and businesses in the training process helps students have opportunities for career improvement while they are still studying so that they can integrate with real work environment quickly after graduation.

Fourthly, universities must focus on training new skills required for learners, such as creativity skills, system thinking skills, problem-solving skills, teamwork skills... At the same time, training institutions also aim to train not only in-depth knowledge in a field or a profession but also towards interdisciplinary work since there is a shift in career and a change in technology in the context of the fourth industrial revolution.

Fifthly, the innovation of teaching methods is considered an indispensable task to meet the requirements of the fourth industrial revolution. Developing technology at low cost is a favorable condition for universities to invest in facilities, modern teaching tools and facilities. Besides traditional teaching methods such as direct teaching to learners, universities need to use many different forms such as online training and virtual environments for learners and teachers to have easy interaction. Easy and convenient organization, practice of virtual laboratories, simulation rooms... Along with that, computer systems and big data are exploited to organize teaching in the most effective way.

Finally, international cooperation with higher education institutions must be strengthened in the field of training and retraining to improve the quality of human resources. The cooperation is aimed at the exchange of expertise and training programs but also towards the learning and application of modern technology and advanced methods into the training process. At the same time, international cooperation between domestic and foreign training institutions must be promoted to achieve the highest efficiency in the education and training of high-quality human resources.

3. CONCLUSION

Thus, it can be seen that the fourth industrial revolution has formed and strongly developed. It promises to create an explosive change in all fields of social life and opens up a new era with human progress. This boom brings positive values such as the emergence of many new industries and business fields, higher productivity and efficiency of the economy, increase in people’s living standards and quality of life. However, the fourth industrial revolution also brings many challenges to society, such as changes in labor markets, jobs, safety and security of personal information, ethics and new lifestyle. The fourth industrial revolution promises to bring the education sector to a new level. However, the challenge of this revolution to education and training, especially higher education and training, is greater. Therefore, it requires reforms in the policies of the
government. At the same time, the managers of training institutions need a change in awareness and management mechanism to create high quality human resources to meet the development needs of society in the new era.

LIST OF REFERENCES


