

THE IMPACT OF INDUSTRIAL REVOLUTION 4.0 ON TRAINING AT UNIVERSITIES: A CASE STUDY AT THE NATIONAL ECONOMICS UNIVERSITY, VIETNAM

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Abstract

Along with the rapid development of the industrial revolution 4.0, information and communication technologies are increasingly being applied widely in different fields of the economy. Digital technology affects every person and organization including businesses, educational institutions, and society as a whole. Enterprises invest in high technology to make business more flexibly and will eliminate unskilled jobs and increase the need for people who are capable of researching, creating, mastering machines and performing jobs that require complex thinking that robots or artificial intelligence cannot do. Universities have the mission to provide such kind of high-quality human resources for the whole society and also apply digital technology in its training activities. Online training is an advanced, comprehensive training method, capable of connecting and sharing knowledge very effectively but at lower cost and ensuring training progress even when the environment is highly volatile. The advent of online training has marked a major turning point in the application of information and communication technology to the field of education and training. Especially, the shocking covid-19 pandemic has pushed urgently universities around the world to shift from offline to online teaching that accelerates the digitization in universities. Higher education in Vietnam is not out of that trend. With the direction of the Vietnam Government, specifically the Ministry of Education and Training, universities across the country have been developing and improving online teaching and learning to adapt to the rapidly changing environment when the need for lifelong learning meets the increasing needs of the knowledge economy and to adapt to the Covid-19 pandemic, which affects offline training. This paper is based on secondary and primary data about the impact of the IR 4.0 on digitization of university training in the world, the situation in Vietnam and the reality at the NEU – one of the pivotal universities in Vietnam, thereby propose several recommendations to stakeholders to promote the development of 4.0 technology application in university training in the coming time to meet the learning needs of students at anytime and anywhere. That helps the universities ensure accountability to outcome standards in a highly volatile environment and is more integrated with global education.

Key words: *impact, industrial revolution 4.0 (IR 4.0), offline training, online training.*

1. Introduction

Industrial revolution 4.0 - the era of integration and explosive technology, providing a huge amount of information, fast transmission speed has a strong impact on changing training methods in the world, especially education and training at universities. Instead of providing one-way knowledge, universities in Vietnam are gradually making full use of 4.0 methods in order to arouse student's spirit of proactive learning, the ability to deepen research, enhance their self-study skills and respond quickly to the changing environment. In which, e-learning is a technology solution chosen by many universities. Since the beginning of 2020, there has been a worldwide upheaval due to the widespread Covid -19 which is difficult to be controlled despite the cooperation of WHO and countries around the world, having a great impact on all sectors including education - training. In the context of a highly complicated epidemic in many countries, universities have chosen online teaching as one of the optimal solutions to maintain and continue to develop their activities. E-learning is one of the online training methods using an Internet connection to serve learning. Through the e-learning system, students can not only receive lectures but also interact with others on the online training system without face-to-face communication. When applying technology to teaching, students can experience more new forms of learning, access to technology to have a new view of learning and problems of time and distance are also solved; lecturers can share a variety of new, rich and diverse knowledge to make the online lessons much lively. However, online training comes with some limitations such as technology, control of geometry and difficulty in imparting knowledge to students due to the lack of direct interaction. This paper is based on statistical data, survey and practical experiences of authors at the NEU, will provide a general picture of the impact of IR 4.0 on training at universities around the world, as well as in Vietnam generally and at NEU particularly, then propose some recommendations for stakeholders to exploit advantages and overcome difficulties in order to improve the training quality when applying 4.0 technology in the university training process.

2. Method

The research is based on both primary and secondary data. Secondary data was taken from articles and scientific studies related to the impact of the industrial revolution 4.0 on university training around the world and in Vietnam. Primary data was collected through a survey on lifelong learning of 320 students in different universities in Hanoi during the period from February 2020 to March 2020 (through sending link of Google forms widely to social networks for students), along with observations and practical experience in training at NEU of the authors. Based on these data, the authors have synthesized, analyzed and compared quantitatively and qualitatively to point out the concerned issues about the 4th revolution impact on human resource training at universities. Then the paper draws some recommendations to boost the application of IT in training to keep up with the 4th industrial

revolution, develop students' self-study capability, and respond as quickly as possible to volatile environment in order to ensure the training process in accordance with the commitment to the society on output standards through combining offline and online training via the internet, on television; strengthen the relationship between the school and family in organizing and supporting students' learning; Adjusting teaching content is considered to be important tasks and solutions.

3. Results

3.1. Industrial Revolution 4.0

Countries around the world are witnessing a technological revolution, commonly known as the Industrial Revolution 4.0. According to Hyoung Seok Kang et al. (2016), the concept of IR 4.0 was derived from the term "Industrie 4.0", first introduced at the Hannover Technology Fair 2011 and stated in an official report of the German government in 2013. IR 4.0 refers to a very new production model with a convergence of advanced information and communication technology (ICT) and production technologies to realize smart manufacturing, not only in some processes and factories, but to other business or supply chain. Cutting edge technologies in different fields are applied: internet of things, service internet, and virtual reality cyberspace systems must be set up to integrate existing complex systems that require various information and communication technologies, simulation technologies, modeling, big data, cloud computing, sensors, intelligent energy.

Klaus Schwab (2016) explained the difference between IR 4.0 and the previous ones as: "The First IR used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and IT to automate production. The Fourth one is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."

Thus, while the 3rd IR is associated with the information age and a transition from an industry-based economy to an economy based on computerization, the IR 4.0 marks a distinct era - digital technology era – where there is a convergence of all advanced technologies related to cyber-physical system, internet of things, and internet of services. The digitalization of information and communication processes has led to an explosion of information “Big Data” and has driven the computerization of production, service delivery, and even the private sphere. Advances in areas such as machine learning, artificial intelligence, and mobile robotics as well as the increasing usability of big data will further facilitate a computerization of the economy.

IR 4.0 is expected to affect all industries, sectors and the entire economy. IR 4.0 is disrupting most traditional manufacturing platforms in every country and making big change in a non-linear way at an unprecedented rate. Smart manufacturing happens when

innovations in digital technology are deployed in workplace as machines will be connected to interact with each other and with people on a single cyberspace. The smart factory control system gives us the ability to visualize the entire production chain, even makes decisions autonomously (*iontech.vn, 2021*). IR 4.0 also applies biotechnology to make leaps in agriculture, fisheries, medicine, food processing, environmental protection, renewable energy, chemistry and materials. It is rapidly advancing technology through increased use of mobile communication and internet connection, big data, artificial intelligence, robotics, autonomous vehicles, 3D printing, nanotechnology and biotechnology, computing technology v.v. Digital technology is strongly affecting people's lives, work, communication and learning relationships. It affects every person and organization including businesses, educational institutions, and society as a whole.

3.2. Trends of IR 4.0, digitization and their potential impact on society and labor market

From the beginning of the 21st century, IR 4.0 took place firstly in the US, in developed European countries and more recently in the Asia Pacific region. Digitization can refer to anything from IT modernization to digital optimization, such as putting services online or legacy modernization for public sector or the invention of new digital business models. IR 4.0 in general and digitization in particular are foreseen to be associated with the widespread development of technology and the internet as well as big changes in society and in the labor market in the future.

Firstly, the revolution rapidly increases the access to ICT and global connectivity while having a major impact on wages and labor productivity in labor market and in the workplace (*Human Development Report, 2015*). IR 4.0 is and will make drastic changes in the entire production, management and administration system and thus bring both opportunities and great challenges to human resources. Strong developments of digital technology greatly affect businesses. Enterprises need to be proactive and change the way of management, leadership as well as in production activities. Traditional methods need to be replaced by innovative methods in managing comprehensively the production process to gain the best benefits. Digitization will drive the progress of the technical equipment of an economy. It potentially increases productivity without using much labor services. Enterprises are actively transforming the number of operating, sales and production models to provide products and services to quickly catch up with new trends. Many business models based on new technology have been born, making full use of AI, IoT, Big Data, Blockchain,... Enterprises invest in high technology to make business more flexibly, do not depend too much on human power as well as save time and operating costs significantly. Of course, enterprises must have high quality and suitable labor force to efficiently use machines and equipment, adapt to new management methods and take full advantage of the benefits of technology. However, automation replaces manual labor in the economy means

that robots could replace people in different fields. In that case, millions of workers around the world could fall into disrepair if they do not quickly adapt to the change.

Secondly, IR 4.0 will eliminate unskilled jobs and increase the need for high quality human resources, capable of researching, creating, mastering machines and performing jobs that require complex thinking that robots or artificial intelligence cannot do. That is why the requirement for high quality human resources is getting more attention.

The World Economic Forum (*WEF, 2016*) has been interested in how the workforce needed to be prepared for the IR 4.0. The Future of Jobs report 2016 showed that the most important employees' competences in 2015 were problem solving, teamwork, people management, critical thinking, negotiation, quality control, service orientation, judgment and decision-making, active and creative listening. This report predicted the 10 most important competencies that employees need in 2020: solving complex problems, critical thinking, creativity, human management, teamwork, emotional intelligence, judgment and decision-making, service-oriented, negotiating, and cognitive flexibility. According to WEF's Future of Jobs Report (2020), businesses believe that by 2025, critical thinking and complex problem solving are still the top competencies, but the ability to manage themselves as master learning, mobility, resilience, stress relief and flexibility are new requirements emerging from 2020.

According to ILO (2018), possessing the right skills to strengthen the capacity to adapt to the needs of the labor market and accelerate the process of technology improvement is extremely important. Training, skill diversification, retraining, lifelong learning play an important role both inside and outside of work. Education and training systems must be prepared to develop skills for the future human resources of the economy. In particular, there is a need for coordination between policy makers, businesses and training institutions to ensure sufficient supply and demand in the labor market.

3.3. Training at universities in the technology era: digitization and lifelong learning in emphasis

Together with businesses and the Government, universities have a very important role in providing high-quality human resources for the whole society in the context of IR 4.0.

According to Professor Maria Clavet, Aalto University, the education system can have two approaches to the IR 4.0: training “change-followers” or training “change-makers”. Change-followers are those who have the right skills to adapt to changing workplace and to learn to keep pace with technological developments. Change-makers are people who are not only knowledgeable about the world of technology, but can also make decisions regarding usability, sustainability, safety and ethics in the world of technology. Digitization, robotization, artificial intelligence and the internet are all increasing levels of immaterial

labor. The economy today is built on the basis of production, distribution and use of knowledge and information, which means that economic development no longer relies heavily on natural resources but on knowledge, on science and technology. Therefore, in addition to knowledge, students need to equip and enrich soft skills, unique human abilities such as sharing ideas, critical thinking, empathy (*universitiesofthefuture.eu, 2020*).

According to Hai-woong Park (2018), the pioneering universities in the industrial revolution 4.0 are innovating its training in the following directions: (i) reforming the formal training program towards combining theory and practice, pay attention to developing new competencies for students with a focus on problem solving and lifelong learning because learning new skills and adapting to different situations are required in the technology age, (ii) conducting live and online lifelong learning activities for faculty and professionals; (iii) strengthening the cooperation with business organizations to improve training capacity and business support.

Higher education institutions in the world, especially developed countries, have been applying digital technology to research, training and administrative management activities (digital transformation) for decades, but unequally and slowly, until Covid-19 pandemic occurs.

The role of universities in the technology era is not only to provide knowledge to the elites of society but also to add a larger economic and social role, which is to enhance knowledge creation and create innovations in the knowledge economy to meet the lifelong learning needs of society. In addition to traditional training programs, universities also have diversified training methods to expand their influence, provide mass training programs to disseminate knowledge to all levels. Online training is a solution for universities to achieve these goals, helping to increase revenue and strengthen position in the field of training both at home and abroad.

In the late 20th century, the development of the Internet marked the emergence of online training as a form of distance learning where the resources were mainly distributed over computer networks. Initially, only video lectures are recorded from traditional classes, later developed into downloadable resources for users. Today, through the Web, teachers can give instructions online (images, sound, presentation tools) to learners everywhere. The online training system, including a learning management system (LMS) and a learning content management system (LCMS), allows the full implementation of training activities with the advantage that learners can learn every time and everywhere, save travel costs and study time.

By the early 2000s, universities in a number countries which have developed education systems began to promote online training, exploit the MOOCs (mass open online courses) to reach many students, cut down staff and training costs as well and plan to replace

conventional traditional courses. According to the statistics of the American Society for Training and Development (ASTD) by 2004, about 90% of the US universities and colleges had built online training models. According to Cyber Universities, currently nearly 90% of universities in Singapore use online training method.

Covid-19 pandemic is the shock that accelerates the digitization in universities. The pandemic has profoundly impacted every aspect of life and hindered higher education. The urgent shift from offline to online teaching has been forced by teachers and students around the world. The influx of international students and researchers is strongly blocked. The decline or rupture of family finances has made more difficult for students therefore governments of many countries have to provide emergency financial aid to students or for graduates to defer loan payments. Many higher education institutions are negatively affected by their budgets and have to cut faculty and staff. New graduates find that economic activity and employment in some economic areas have decreased (with a few areas increased), affecting career plan, forcing some to have new skills, new certificates and new qualifications. However, digitization has some “side effects”: risks in the privacy of learners' personal information, in academic evaluation; loss of important outside classroom experiences such as learning from friends, hands-on learning opportunities; increasing inequality due to differences in access to digital technologies; the difference in the capacity of faculty and students to make the most of the potential of digitalization. Policy makers increasingly recognize that realizing the potential of digitalization of university training will require further review and issuance of relevant policies, including funding for faculty and students, and ways of supporting and encouraging faculty motivation, monitoring and quality assurance, and learning accreditation and recognition. Some countries have policies to officially recognize education in national education digitization strategies.

Over time, Covid-19 pandemic would decrease or disappear. Economic activities will recover, making budgets for schools and families less tight and recruitment will be able to recover. Enrollment of international students may return to historical levels even though majors may change. However, a number of hindering influences are renewing higher education systems and could lead to a long-term change in the way they operate. One long-term impact is the deeper digitization. After the pandemic, it is possible that universities will use more digital technology to provide and manage training programs to quickly adapt to changing environments. The digitization of higher education has many better promises, including expanding access for non-traditional learners, reducing teaching costs, expanding teaching, increasing self-adaptation and personalization. This opens up opportunities for technology businesses to promote innovation.

3.4. Digitization of higher education in Vietnam and case study at the NEU

Not out of the trend, according to ILO (2018), Vietnam is also witnessing the impact

of the industrial revolution 4.0 with the innovation and application of technology in the workplace at a faster speed than ever before in different professions. This process will be stronger in the coming time because on June 3, 2020, former Prime Minister Nguyen Xuan Phuc signed Decision No.749 approving the "National Digital Transformation Program to 2025, with a vision to year 2030". Under this program, Vietnam is pioneering in testing new technologies and models, fundamentally and comprehensively innovating the management and administration activities of the Government, the production and business activities of enterprises as well as the way people live and work, developing a safe, humane and widespread digital environment. The program has a dual goal of developing digital government, digital economy, digital society, and forming Vietnamese digital technology businesses with global capacity (*Vietnamnet, 2021*).

The Government prioritizes eight areas of digital transformation: health, education, finance - banking, agriculture, transportation and logistics, energy, natural resources and environment, and manufacturing. The program has determined the digitization of education as follows: "To develop the platform supporting distance training, thoroughly applying digital technology in management, teaching and learning; digitizing documents and textbooks; building a platform for sharing teaching and learning resources in both offline and online forms; to develop technology for education towards individualized training. To ensure that 100% of educational institutions implement distance teaching and learning, in which online learning accounts for 20% of program content at minimum. To apply digital technology in delivering homework and checking students' preparation before going to class... To promote social digital transformation, focusing on skill transfer, offering mass open - online courses, and cooperating with large organizations and enterprises in the world to train, improve knowledge and skills in digital technology, digital transformation, and digital culture. To prepare human resources for digital transformation to develop digital society with no one left behind." (*Prime Minister, 2020*).

Up to now, there are many universities approaching online training in Vietnam. Depending on the application of information and communication technology in training, the level of investment in e-learning materials and training purposes, the implementation of e-learning in each training institution is different. However, in 2020, when the Covid-19 happened, many universities were forced to close. This is also the reason for the popularity of teaching and learning on online platforms. Nearly 50% of universities in Vietnam have organized online teaching during the epidemic season. Online teaching applications such as Zoom, Microsoft Teams, and Google Classroom,... are also becoming more and more popular and used by many teachers and schools. Blended-learning is used even in the controlled translation phase. The development of online training models in Vietnam has even been recognized by reputable organizations around the world. According to the Organization for Economic Co-operation and Development (OECD), online training in Vietnam has more

positive points than other countries and territories (*Vietnamnet, 2021*).

Foreseeing that trend, the NEU, in addition to developing traditional distance learning programs, has provided online training model NEU-EDUTOP led by Distance Training Center. This program is the cooperation of 2 units of NEU and EDUTOP 64 Investment and Training Development Joint Stock Company from 2012 to 2019; developed and sponsored by Microsoft, Qualcomm, Hewlett Packard, USAID, World Bank Infodev and Vietnam Foundation, with diverse, rich and up-to-date learning materials with practical requirements. In addition to printed books in the traditional form of learning, e-learning students are provided (free of charge) on the system of supporting materials for the following self-study process: Study plan of the subject class; course guide (text); electronic textbooks (e-book); multimedia lecture (audio, video, slides); Online multiple choice question bank (for self-practice test at least 10 times for a test, test questions and group instruction (submit member assessment file and test content file according to schedule, sample exam questions for pre-exam practice; case studies/open discussion topics on the subject discussion forum (undertaken by business lecturers) and the H2472 system for answering questions when problems arise to train specialties: Economics and Business Law, Business English, Banking, Economic Management, Tourism Administration, Business Administration. The training program is designed according to the model (Trainee - Image - Efficiency - Activity), and at the same time applying training combining online and offline coordinated by professional and business lecturers. According to the design of the program, the duration of each course (subject) lasts for 9 weeks through theoretical learning on multimedia materials, online inquiry, online homework and offline final exam; ensure the quality of the outcome and the objectivity in assessing the quality of learning.

By 2018, the NEU has designed its own NEU e-learning training software and start to apply it, enrolling from 2019, not only for students who register to distance program but also for full-time students who can choose a number of e-learning subjects if necessary. That could help full-time students study faster and save money on studying while ensuring output standards as committed. This can be realized when the information infrastructure (training content, courseware), software infrastructure (LMS and CAS) and communication and network infrastructure of the university are invested suitably in continuously upgrading and modernizing over time.

Since 2020, in response to the Covid-19, improving adaptability to environmental changes, the NEU has issued official letter No.99/TB-DHKTQD on using the LMS. Accordingly, the LMS is used as an auxiliary tool, creating an effective communication environment between lecturers and students, and among students. The LMS helps teachers increase interaction, create excitement for students; they must be able to work independently with a high sense of self-awareness. Teachers can create weekly lessons, put materials in different format on the system, put essay tests, quizzes ... for students to self-study, self-test

and self-evaluate. Teachers can also use the LMS take attendance or evaluate the active participation of students in discussions and give them timely feedback. Learners get used to making a plan that is suitable for self-directed and well implemented learning plan. During the epidemic, training through LMS and other online software (MS-teams, Skype for business, zoom) could be combined to ensure that students' learning is not interrupted and follow progress with accountability to society. Despite the fact that online training is not as effective as offline one (because the control cannot be tight and it directly depends on learners' sense of self-consciousness), in general, progress and quality are ensured at the expected level in violate environment.

At NEU, the application of IT is also used for exam purposes such as performing multiple-choice tests on computers, widely applied from the academic year 2019 - 2020 for general subjects with the high number of students taking the exam at the same time. Many students can take the final exam on the pre-designed software, helping the university save a lot of time and money for exam questions, print copies and mark exams. Students' results will be known as soon as the test is submitted by the candidate according to the specified time.

Moreover, the NEU's e-library project supported by the World Bank has gradually come into operation, creating links with major publishers in the world, help students access and search information quickly, promoting students' self-study and information retrieval in both academic and scientific research.

3.5. A glance at Vietnamese students' adaptability to digitization and lifelong learning

In the context of global integration and the digital age, today's students have to live, study and work in a more complex, unpredictable and more competitive environment, so their career paths will be risky, more roaming and less continuous. Students need to have an effective way of learning to update their new knowledge, successful transition from school to the world of work, and have to adapt and mature on a par with young people in the world. They not only receive knowledge once for all, but need to learn how to continuously improve the knowledge throughout their lives to develop and assert themselves, to connect and contribute to the development of the community actively. That means they need lifelong learning skills and know how to apply digital technology in learning effectively. Survey results on lifelong learning and online learning (online or e-learning) of 320 university students in Hanoi from February 2020 to March 2020 shows some aspects of Vietnamese students' adaptability.

In terms of lifelong learning, in addition to formal learning at university, students are currently focusing the most on self-study, reading and part-time jobs; followed by club membership and taking online and offline short (extra) courses outside university (*Figure*

1). A special point is that online learning is an important learning channel for students today.

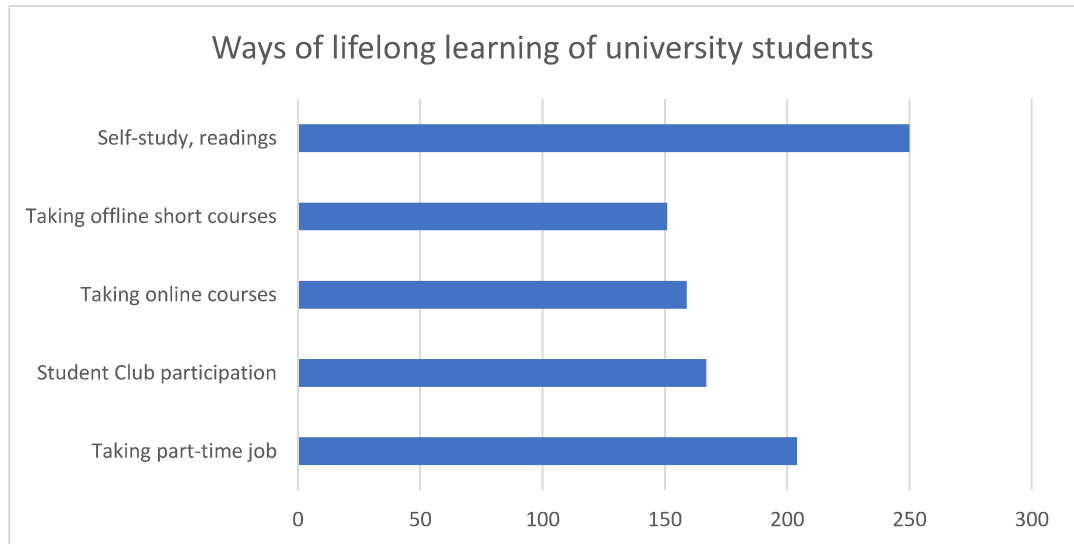


Figure 1. Ways of lifelong learning of university students

Source: survey of the authors, 2020

Out of 320 students who answered the question "Which channels are you learning (other than university)?", only 9.5% chose the face-to-face study, 8% chose to study online, and 85.9% study both face-to-face and online (so-called blended learning) (Figure 2).

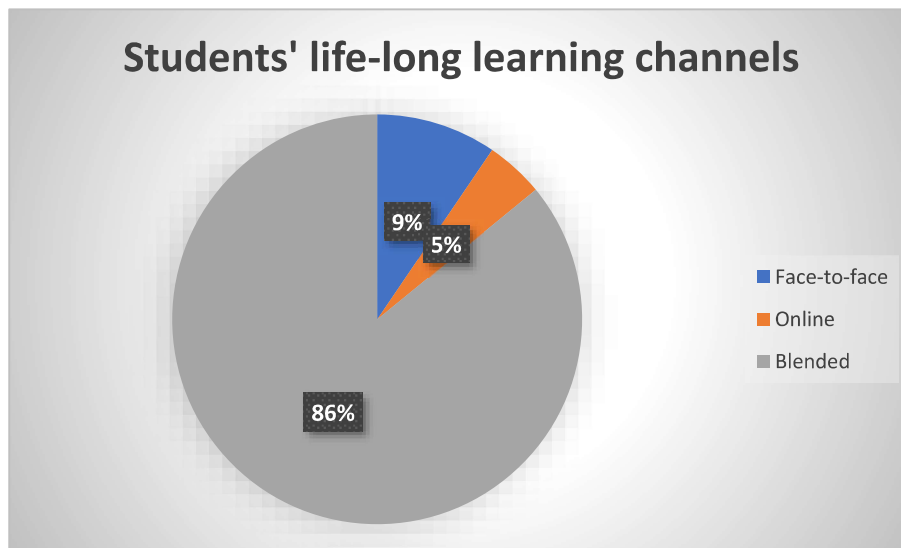


Figure 2: Students' lifelong learning channels

Source: survey of the authors, 2020

Figure 3 shows the students answers to the question "How do you evaluate the effectiveness of online learning?" Up to 164 students out of 320 say that online learning is

effective, accounting for 51.3%. In addition, 16 students, accounting for 5% of the total number of respondents, found that online learning was extremely effective. Only 7 students rated it extremely ineffective and 14 students rated it ineffective. The rest give a neutral opinion, accounting for 37.2%. Thus, more than half of the students found that online learning was more or less effective. In terms of interests, more than half (52.5%) of students liked the method of online learning, 28% of students did not (Figure 4).

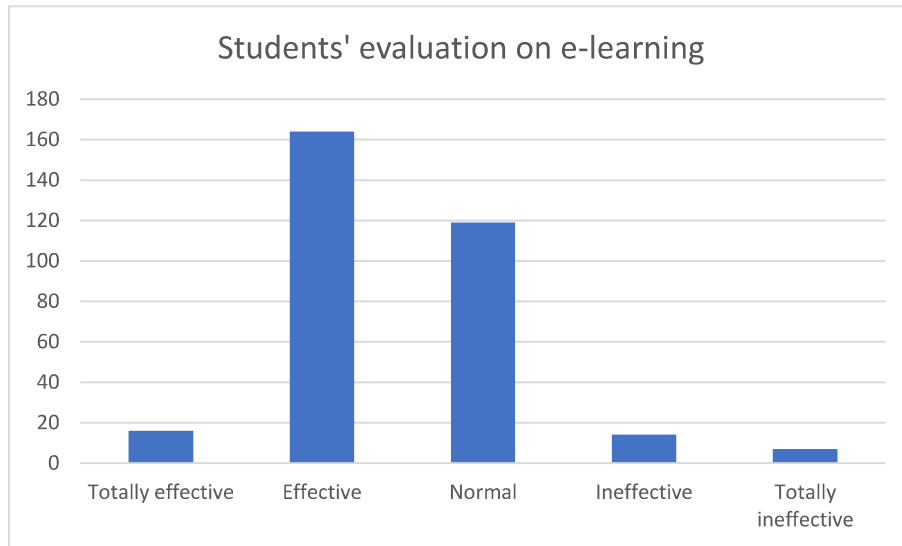


Figure 3: Students' evaluation on online learning

Source: survey of the authors, 2020

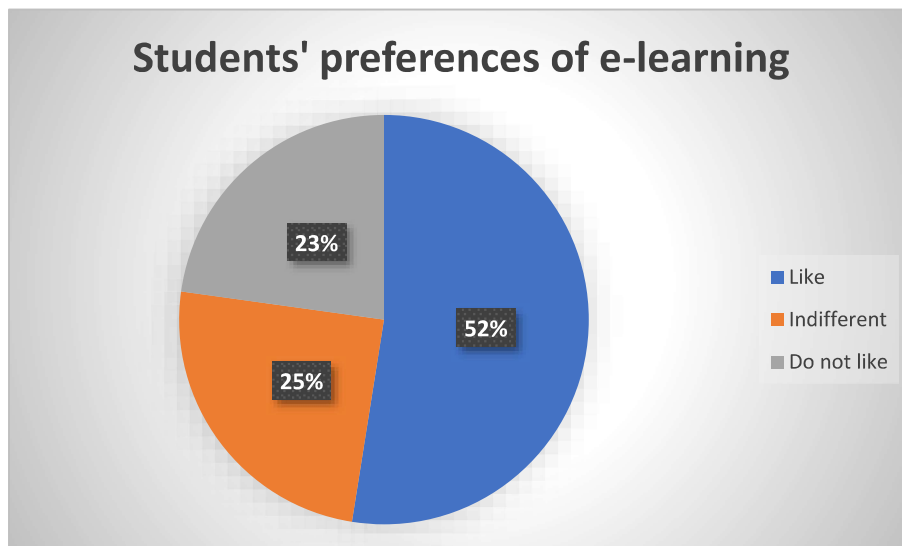


Figure 4. Students' preferences of online learning

Source: survey of the authors, 2020

Some of the benefits of online learning for lifelong learning highlighted by students in the survey are:

- In terms of time: online learning helps students to be more active, student can study anytime, anywhere, can focus on studying without being affected by the crowded environment.

- In terms of costs: students can save travel costs. Online learning supports students to review lectures, reduce the cost of re-study. Moreover, online courses also have a much lower fee than offline courses.

- In terms of learning content: students can actively register for courses with content they want to learn. Online courses are diversified. Then, students can easily exchange and impart knowledge on demand with teachers and learners without face-to-face communication.

- In terms of self-development: self-study will help students remember the lesson more easily, boost ability to self-explore and develop themselves, motivates students to self-study and to think independently.

The reasons for students who do not like online learning mentioned in the survey are only objective factors such as unstable internet quality, inappropriate characteristics of some disciplines that require a lot of practice, such as engineering, students are not given detailed answers about the problems of making projects due to the difficulty in communicating and interacting with teachers.

From the above analysis, it shows that Vietnamese students' readiness to learn online in the era of digital technology is not a challenge or an obstacle to the digitization of higher education, the problem is to what level digitization comes and communication work to change the perception of real communication habits with the support of communication devices.

4. Discussion and Conclusion

IR 4.0 is continuously grown to new heights. We may not fully understand all the necessary skills, but many businesses have applied new technologies to exploit their potentials for development. Universities need to work closely with businesses, government agencies, and student/ex-student associations to update skills and competency needs. Universities need to renew their training programs and apply ICT to training. On the other hand, universities, lecturers and students also need to be proactive. Instead of assuming that just one training program or a single specialist is enough to provide all skills needed for IR 4.0, we need lifelong learning and the collaboration of different institutions and different experts in the same field to contribute the added value to society.

In order to improve the efficiency of applying the benefits of IR 4.0 in the field of higher education, universities in general and NEU in particular need to pay attention to the following aspects:

Firstly, it is necessary to invest in upgrading online training software with modern technology in the world in order to increase the security and authenticity of the program as well as to increase the accessibility of the program especially for students in remote areas with weak infrastructure network. Investing in infrastructure for online training requires both time and financial resources, so universities need a roadmap to ensure investment in the right direction, along with the training process, does not affect learners who are and will study the program.

Secondly, attention should be paid on the compilation, review and upgrade of program's materials provided via e-learning, LMS in particular, to ensure that the teaching is linked to reality and stimulates students to actively participate in discussion and forums, to enhance interactions in order to promote students' creativity and knowledge acquisition. A special attention need to be put on copyright protection measures so that lecturers are ready to share all the possible materials to help students increase their chances of multi-dimensional information access in all learning circumstances. In reality, students are still limited to participate in discussion forums, but if they participate, they are sometimes just formal to ensure attendance, so the students' discussions can be taken superficially, not highly creative yet. In order to improve the effectiveness of online forums, to assert the role of interaction in course assessment and student outcomes, program design needs to emphasize the role of interaction in assessment of study results. Furthermore, in order to bring the content of the courses closer to practical needs, cooperation with organizations/businesses should be strengthened in the following two directions: (1) Designing online training programs with the closer connection between the University and the organization/business to provide learners with the knowledge and skills that businesses need, contributing to making the labor supply closer to the demand in labor market. (2) Designing online training programs with close connection between the University and enterprises according to the orders of enterprises wishing to learn through e-learning but not yet capable enough to perform by themselves (This is a potential training market, when employees need to improve their professional knowledge but do not have enough time to participate in concentrated courses).

Thirdly, the university needs to pay more attention to periodic refresher courses for lecturers participating in the program in order to update training technology and manipulate quickly, promptly meet the needs of program learners to enhance the dynamism and rapid adaptability of trainers to training that combines online and offline training. In addition, the IT department should periodically send links to guide both students and lecturers on how to access the system and note points for learners to increase their awareness and responsibility

of online training program confidentiality.

Finally, the university needs to concentrate on communication strategies for e-learning and LMS programs more effectively in order to increase the attractiveness of the program not only within the country but also taking into account the trend of exporting program to regional and international markets. The university also needs to consider cooperating with prestigious universities around the world to design and provide MOOCs to provide basic knowledge for those in need of lifelong learning. This is a good opportunity to promote access to the e-learning training market in the world, to attract international students, consolidating the university's position in the training field and to achieve development goals set out in the new situation. Regular communication will boost both students and lecturers to gradually change face-to-face communication to communicating through the media quickly and easily. As a result, they adapt to changing environment more easily.

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