

Applying Educational Technology to Higher Education in Vietnam: Opportunities and Challenges

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ABSTRACT

Industry 4.0 is happening at a very fast pace, with many impacts on Vietnamese education, both advantages and disadvantages. Therefore, big programs such as: investing in modern infrastructure, information technology and communication; training people who are dynamic, independent, creative, capable of integrating well to start their businesses are becoming urgent requirements to develop countries. In particular, training labor force to meet the requirements of development and integration of the society is at the heart of development strategies that every country must pay attention to. Therefore, higher education is more and more focused and improved in Vietnam these days. This paper discusses educational technology that has been applied in Dong Nai Technology University (DNTU), which is known as one of prestigious universities in the south of Vietnam. It is expected that innovations in educational technology would facilitate students to develop themselves and make a great contribution of human resources to the society although those innovations have brought opportunities and challenges to Vietnamese universities in general and to DNTU in particular. The authors also propose recommendations to Vietnamese policy makers in terms of higher education.

KEYWORDS: *higher education, DNTU, educational technology, innovation, human resource*

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INTRODUCTION

The industrial revolution 4.0 has set new requirements for the supply and management of human resources of society and for universities themselves. Universities, businesses and managers must be proactive, creative, linked with each other in training and improving skills for learners and graduates. Some studies have shown that in industry 4.0, skill requirements of employees will be challenging, change very quickly, while robots will replace simple, repetitive skills [1, 3]. To survive and develop in industry 4.0 requires employees to foster and enhance diverse skills, to take advantages of skills to better integrate with the region and the world. The biggest advantage of human beings is creativity, flexibility and emotional intelligence, things that robots and machines can never have. By 2025, the necessary skills will change, including: skills to solve complex problems, critical thinking, creativity, human resource management, emotional intelligence, coordination teamwork, decision making, negotiation and flexibility of awareness [2]. Thus, universities must meet the constant change of digital technology, when the gap between virtual and real world is constantly being shortened. At that time, the structure and way of providing knowledge and learning materials are also different from traditional ways. The digital library will completely replace traditional "bookstores" and become a place to create and share knowledge and skills that are extremely diverse, with all subjects in need. These spaces are both a place to provide all kinds of knowledge, skills, and a place

of practice, academic exchange, and skills in the field of higher education. That leads to borderless universities and lecturers, learning takes place anytime, anywhere. In other words, innovations in educational technology play a crucial role in developing training programs in any university in Vietnam. Therefore, the authors wish to discuss innovative changes about educational technology in the context of Dong Nai Technology University (DNTU) and recommend solutions to improve training programs for universities in Vietnam.

THEORETICAL BACKGROUND

Educational technology and the reality of higher education in Vietnam

Overview of technology

The Vietnamese Law on Science and Technology in 2013 defines: "Technology is a set of methods, process skills, tools and means used to transform resources into products" [2]. Technology has an aggregate meaning and involves a number of socially specific phenomena such as knowledge, organization, division of labor, management, etc. According to ESCAP (Economic and Social Commission for Asia and the Pacific), technology consists of four parts: Technical part, Information section, Human part, The organization part [4, 5]. Sociologists consider technology as a social institution that regulates social division of labor, technology and industry structures [7].

Overview of educational technology in Vietnamese universities today

The concept of educational technology is defined in many published documents; however, Professor Ho Ngoc Dai has stated that educational technology is scientific but technically and technologically possible. When you go into practice, you have to technology it. When technology turns out, people think of machines, people resist, but whatever it is, there is a process of formation; and in that process, there is also an "optimal process" [6]. The term educational technology is intended to describe the design of educating learners as a science and implementing them as a technology [2].

Based on the above four elements of technology that ESCAP mentioned above, through actual surveys from the framework program (issued by the Vietnamese Ministry of Education and Training), current teaching methods and equipment available in many Vietnamese universities still mainly follow traditional technology, with limited technical equipment [4]. The ways of organizing classes and managing lecturers are also administrative and rigid. Many strict regulations on lecturer standards, classroom teaching and practice, assessment methods, periodical curriculum have narrowed subjects involved in the re-teaching process in a fixed and inflexible campus, difficult to open with continuous changes from the world around. While society, especially enterprises, where human resources provided by universities are used, is under pressure to comprehensively innovate. The wave of high-speed technological innovation coupled with global trade integration and liberalization will create great competitive pressure on businesses, forcing enterprises to review their business models; to improve methods of providing products and services; constantly innovating to adapt to the continuous changes of the market [3-5].

That situation poses urgent requirements, forcing universities to renew their thinking, improve their abilities, and cooperate closely with business sectors and social forces to adapt to innovative changes. When understanding the new context, it is possible to regulate the changes in training activities accordingly, meeting the diverse needs of society on new human resources [1, 7]. Therefore, training technology innovation is a positive start in innovating thinking and training management at Vietnamese universities today.

Industry 4.0 generates big opportunities and challenges in Vietnamese higher education Opportunities

Vietnam can quickly break through many other countries due to its inheritance of industry 4.0, so it has many advantages compared to developed countries and is not hindered by large scale and inertia [3]. The application of new technologies allows to increase labor productivity, create opportunities to increase income and improve the quality of life for people. It creates the ability to transform production and management systems for domestic enterprises, as well as shortens the potential gap with other countries [6].

Challenges

It is required that Vietnam has proper awareness of the nature and the impact of industry 4.0. It also requires the

ability to think critically and manage integrating elements: technology - non-technology, virtual - reality, people - machines. It also requires to promote basic scientific research, especially physics, biology, computer science and artificial intelligence, breakthrough technologies. This sets a vital requirement for socio-economic development and is a close link between scientific research and production [1, 3].

Description of Dong Nai Technology University (DNTU)

Dong Nai Technology University has been upgraded from a college since 2011. Currently, the university is training 16 undergraduate majors, with 4 sectors: Economics, Technology, Health Science and Languages. The university has met the standards of higher education quality accreditation in January 2018, with a score of 83.6/100, chaired by the Center for Educational Quality Accreditation of Hanoi National University [5]. For the past 2 years, DNTU has actively reviewed, self-assessed and developed a new development strategy.

DNTU's Academic staff

Table 1: Academic Staff Distribution by Qualification

Qualification	Quantity (in person)	Percentage (%)
Professor	01	0.5
Associate Professor	14	6.9
PhD	27	13.3
Master	161	79.3
Total	203	100

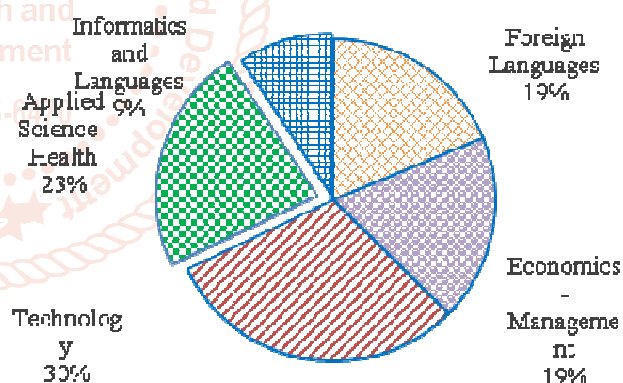


Chart 1: Academic Staff Distribution by Faculty

DNTU's student population

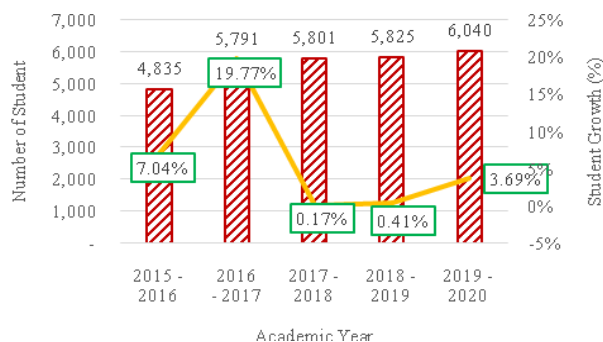


Chart 2: Student Population by Academic Year

Chart 1 and Chart 2 show the reality and potential resource of academic staff and student population to develop DNTU although it is just a young university.

Moreover, the strategic focus of DNTU is to become a place to create creativity, to cultivate the aspiration to become a laborer who can adapt well to new development requirements of learners; and contribute to social development. In order to well implement the development strategy of DNTU, Board of Rector has chosen a breakthrough from changing teaching methods, applied research, with practical contents and linked with the requirements of employers.

DISCUSSION AND RECOMMENDATIONS

Rethinking DNTU's training strategy to innovate educational technology

Under the active support of leaders and lecturers, as well as from the self-efforts, DNTU students have achieved proud achievements recently. Typically, in 2016, DNTU students won the first prize of the "Vietnam Galileo Vietnam Innovator 2016" contest with a humane product "Smart chair for the elderly and disabled". At the 2018 International Rice Bran Oil Science Conference held in Hanoi, DNTU students won the "Silver Prize" with the theme "Optimizing solvent and temperature mixture to extract maximum rice oil with high concentrations of Gamma-oryzanol for lipstick formulations". In 2018, DNTU students were highly rewarded with the "Happy seed" startup idea of IT students in the "My plant - my idea" contest and so on.

Students have also participated in many international cooperation activities with institutions in the world. DNTU becomes an official member of P2A organization (Passage to Asian) which organizes a network of universities and research institutes in the region, helps develop high quality human resources, and creates an exchange program. Participating in P2A, students from countries in Southeast Asia enjoy advanced teaching and learning conditions while being equipped with environmental protection skills, cultural heritage preservation, preserving people's identity, ethnicity, language, religion, law, maintaining independent sovereignty as well as common values in the spirit of unity in diversity of ASEAN countries. From 2017 to 2019, many student delegations of DNTU had a cultural exchange and English study tour in countries such as Singapore, Malaysia, Philippines, Thailand and so on. In addition, Pacific Asia Society (PAS) from Korea has continued to sign the next 3-year MOU on the volunteers from universities across Korea to exchange culture with DNTU students.

With the achievements in training, university activities, business cooperation, international relations, DNTU is ranked 86th in 2016, 90th of 2017 by Webometrics.info. it is over 100 best universities in Vietnam. In October 2018, International Higher Education Ranking System ranked 58/67 the best universities in Vietnam and DNTU is in the top 10 most beautiful universities [4, 5]. Since then, DNTU has initially implemented educational technology innovations, including some of the solutions that will be presented below.

Solutions to apply educational technology at DNTU in order to improve training effectiveness and successful integration in the era of industrial revolution 4.0

Closely connecting with businesses in training, increasing the amount of internship at enterprises, supporting entrepreneurship in students.

DNTU takes the satisfaction of enterprises on training "products" as the primary goal in the development of the university. Therefore, DNTU is constantly promoting relationships and collaboration with businesses, not only to create job opportunities for students after graduation, but also businesses themselves as a subject to participate in the training process, which provides vocational-knowledge skills in practice for students. Accordingly, the period of training outside the school accounts for 1.5 years, with about 30-50% of the total credits. When DNTU associates with enterprises with training, the credits are completed through practice, students will be immersed in business activities right from the school chairs. Hence, students are eager to study and start their own business. In order to encourage the spirit of research, creativity and start-up, the university has built a start-up nursery as an open space, 4000 m² wide, fully equipped to organize learning, discussion and activities to perform and simulate experiments. DNTU Rector decided to establish a Study Encouragement and Start-up Fund, with an initial balance of over VND 2.5 billion, creating a financial support and investment mechanism to help students promote creativity and talent, develop students' startup ideas.

Upgrading the high-speed information network throughout the school, regularly updating the utility software for teaching and learning.

In order to serve the renewal of teaching and learning technologies, DNTU has upgraded its telecommunication network and covered free Wi-Fi throughout the broadband Internet platform, allowing to receive and send information quickly, in any location. In E-learning environment, the use of informatics software allows modeling lectures and visualization to help learners learn more easily and increase learning excitement. In addition, students are actively enhanced, learners can adjust the course to suit themselves, as well as choose to study with other teachers if it is not appropriate. Regularly updating utility software, IT technicians often support teaching and learning activities. As a result, training methods are diversified (online, alternating between class, offline and online); just having smartphone, learners can learn wherever they can.

Operating a studio to teach online, gradually increasing the time of lecturing with E-learning and increasing the ability to connect with outside experts.

DNTU has built a modern studio to apply information technology to teaching, especially the form of E-learning. The studio has produced lectures to help lecturers teach online, or save videos for teaching offline, even combine with classroom teaching, which is creating a breakthrough in training according to the needs of learners, promote students' self-learning ability. The workshop is equipped with simulation equipment for drive and control technology and training materials including technical documentation, manuals, training software, online learning, videos and images. Students participating in the training program will approach and use training equipment and software that meet industry standards instead of simulated models, thereby, equipping themselves with knowledge and experience to adapt to the environment. Learners are encouraged to take initiative, have new ideas and work in teams. With this feature, each

student is managed and interacted with the instructor to best monitor and follow the learning process of each student. Thereby, students are managed, closely evaluated about the level of diligence and learning outcomes. After each lesson, learners are provided with exercises, learning materials and instruction guides to help learners who are slow learning can review more easily. The level of assessment of learners based on the quality monitoring and management system, students have to go through a quality test every month to assess the learning process of students. Students have to retake the course until they pass this quality assessment.

Promoting lecturers training to ensure good operation of new educational technology

In terms of online teaching (E-learning), the role of lecturers is even more important, as they need to inspire and guide research for learners. In the new context, lifelong learning is not only a motto but must be applied first to lecturers so that they can fulfill their functions. The ability to interact with lecturers of the E-learning model is also promoted, lecturers can continuously connect with colleagues, learners and parents throughout the course. Forming a team of homeroom teachers E-learning (Cyber Teacher), who always play an important role in monitoring and evaluating students is necessary. They are the ones who know the students' learning process best and can take necessary measures to enhance the quality of E-learning for learners. Personnel for this team are carefully selected both in terms of expertise and psychological ability of learners, because in addition to the task of monitoring management, homeroom teachers must also be willing to advise students on non-professional issues such as career guidance, learning methods and what students want to share about life. DNTU has focused on improving professional skills, information technology, foreign languages and management skills for all lecturers. DNTU has 10 foreign lecturers directly teaching English as a foreign language. Along with organizing lecturers to attend seminars abroad, DNTU regularly organizes seminars at national and international levels that use English to exchange academics, thereby improving knowledge and skills for lecturers.

Recommendations

In order to innovate educational technology successfully in Vietnamese universities, some recommendations about state management are proposed, especially are suggested to the Vietnamese Ministry of Education and Training as follows:

Firstly, soon implementing the Law on Higher Education, enhancing autonomy, especially academic autonomy for universities. In the new context, there are many very specific things that must carry out and need to be regulated in the Education Law. The essential factor is that the university's "training products" must be people who are self-motivated, creative, independent and adaptable. Along with that is the need to know how to use, promote, preserve and attract talents and grey matter. These are strategic issues that belong to the policy that the State in every country needs. Therefore, university autonomy will soon be implemented which will allow schools to actively implement the program, strongly innovate the way of

management, especially the way of organizing teaching and learning, access to the fastest progress effectively.

Secondly, it is necessary to change the framework of undergraduate and postgraduate training programs soon, innovate teaching methodology of faculty members. The industry 4.0 has brought challenges in the field of human resource training in general and higher education in particular. Therefore, the Ministry of Education and Training should soon change the framework of higher education programs, especially application-oriented programs. Training institutions must constantly innovate in implementing training programs to integrate into the customer network. In particular, university leaders must dare to think, dare to do, dare to change and innovate in their network system to train learners to meet the needs of the labor market. We are actively building a learning society, where every citizen has the opportunity to learn, towards: learning anything, anytime, anywhere and lifelong learning. Therefore, it is necessary to innovate how to implement the program and E-learning should have a key role in creating a virtual learning environment, gradually replacing traditional forms with feasible contents.

Thirdly, promoting exchanges and cooperation between Vietnamese universities and enterprises in the world; increasing the ability of international integration for higher education in Vietnam. In order to improve the quality of higher education in the new context, it is necessary to consider training as an international integration environment where the basic characteristics of cooperation are competitive, which is the movement of labor attributed in international treaties, leading to competition for talents among nations. The Ministry of Education and Training needs to encourage and support universities to actively cooperate with strong partners in the world to raise the level of their universities in all aspects. Currently, Vietnam has joined Asia E-learning Network (Asia E-learning Network - AEN, www.asia-elearning.net) with the participation of the Ministry of Education & Training, Ministry of Science and Technology, University of Science and Technology, Ministry of Posts and Telecommunications [2, 5]. However, compared to other countries in the world, E-learning in Vietnam is only in the early stages and there is still a lot of work to do to keep up with other countries. In order to meet the increasing needs of learners, it is necessary to encourage E-learning implementers to connect with each other, establishing a common lecture database store. Users after registering a fixed account on the website can download unlimited lectures of many prestigious lecturers along with a rich and suitable exam bank.

CONCLUSION

The fourth industrial revolution has forced us to change. Universities must innovate themselves very strongly and boldly to keep up with the common trend of the era. Universities need to engage with businesses, or create businesses themselves, such as startups, nurseries, which connect students, faculty members, who have ideas with businesses to create products, moving from ideas to products, to invest in top-notch research. It is necessary to consider scientific research as a real motivation for students and motivate many students who are passionate

about research and support, even when they have graduated. To do this, firstly need to innovate teaching technology, but teaching online is a highly effective direction. DNTU, though young, but with the right awareness of the direction and determination to innovate, has chosen to change educational technology to make a breakthrough. The investment in developing resources at DNTU, especially human resources is always considered a focus and initially has good results.

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