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ORIENTATION OF HUMAN RESOURCE TRAINING IN THE 4TH INDUSTRIAL REVOLUTION

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Abstract:
Developing training programs in association with output standards approaching the CDIO model is an appropriate direction towards improving and enhancing the quality of education, meeting the human resource requirements expected by society. It can be said that the adjustment of the training program meets the output standards, focusing on the content groups of knowledge and arguments; professional skills and qualities; Practical application ability of students in the current context is extremely necessary. This is designed to solve long-standing problems such as a chronic disease in society, and to help find the optimal answer to the double problem: Universities do not have to worry about jobs for good students. Enterprises and enterprises can recruit human resources to meet their needs and job positions. This study provides specific results based on empirical investigation, qualitative and quantitative analysis in order to achieve the following main objectives: Firstly, the research evaluates the general situation of the public sector. training activities and the employability of current students. Secondly, the study proposes a new approach in building training programs associated with CDIO-oriented output standards. Third, implement a CDIO-oriented output standard design in line with employer expectations in the current development context. Simultaneously, test surveys and get opinions of experts and employers to adjust the proposed model accordingly. This study focuses on surveying the development of CDIO-oriented training programs at the Department of Economic Informatics of the Faculty of Economic Information Systems, University of Information and Communication Technology, Vietnam. Implementation time from 2021 onwards to meet the needs of society in the context of the fourth industrial revolution. The study also recommends a number of solutions to improve and enhance the quality of training, directing activities to focus on learners, and adding knowledge content suitable to the context of digital transformation. That helps learners have access to new knowledge, helping them adapt to the development of today's digital businesses. The results of the study assessed the impact of Industry 4.0 on the demand for human resources to develop economic sectors. Through the analysis and assessment of the current situation of human resource training needs and activities in the 4.0 industrial revolution, in order to recommend solutions for developing training activities to meet the human resource needs of various economic sectors.

Key words: Digital enterprises, CDIO, social needs, high quality human resources, quality training, digital human resources.

JEL classification: M510, M53, A12; M12

1. INTRODUCTION

It can be affirmed that quality is a decisive factor to the reputation, brand and development of training institutions. The mismatch between the two stages of training and recruitment has created a gap and a big barrier in the relationship between the "two houses": the school and the employer. The implementation of improving and enhancing the quality of education on the basis of approaching the CDIO-oriented training model will help narrow the training gap between schools and employers. The training philosophy combines book theory with actual working in businesses to help make the most of time but still attract learners' active participation in a variety of thinking and problem-solving activities (Alcorta, L. and Peres, W., 1998). The establishment of many universities and colleges in recent times, accompanied by a lack of control in the admissions process, has led to the phenomenon of incompatibility and imbalance between training and employment. The biggest consequence is the increase in unemployment rate and underemployment of students after graduation. This directly affects the ability and opportunity of students to find jobs in accordance with their trained expertise upon graduation (Etzkowitz, H., 2003).

The fourth industrial revolution has a strong impact on many fields, with the emergence of robots with artificial intelligence bringing many applications in society. The three main pillars are Digital, biotechnology; New generation robots will be the foundation for the economy to strongly transform from a resource-based model, low-cost labor to a knowledge-based economy. Therefore, the labor market will be seriously affected by labor supply and demand as well as labor structure. In some fields, with the appearance of Robots, the number of employees needed will be only 1/10 of what it is today (Forsyth, J., & Cowap, L., 2017). Thus, the remaining 9/10 human resources will have to change jobs or become unemployed. Thanks to AI technology, robots work smarter, have the ability to memorize and learn infinitely. The advantage of working 24/24, without salary, tax, insurance ... of robots is also threatening the correlation in the use of real people or robots. Robots with endless learning resources can perform well in lectures in some subjects and can completely replace traditional classroom teachers. Jobs in fields such as legal advice, accounting and tax advice could also be completely replaced by intelligent robots. Therefore, the problem for universities is to orient their training to meet the industry requirements of the Fourth Industrial Revolution (Bejinaru, R., 2019).

The development of CDIO output standards aims to guide the design of program frameworks, methods and training plans in accordance with expected goals and comprehensive development of learners. That is even more important when the digital transformation landscape is having a strong impact on society as a whole. Therefore, in order to realize digital transformation goals in fields and industries, it is necessary to train human resources capable of understanding and able to operate digital technologies. This is completely consistent with the development trend of digital businesses. This is also an important factor, ensuring students have the desired job right after graduation.

The CDIO (Conceive - Design - Implement - Operate) model originated from MIT Institute of Technology (USA). This is a solution to help improve training quality, meet social requirements on the basis of determining output standards, thereby orienting the design of training programs and plans. The CDIO-oriented integration model helps orient different sectors in the formation of knowledge, skills as well as professional skills and communication in a cross-cultural environment. From there, helping learners to develop comprehensively skills, creatively apply specialized knowledge to real life and career. Therefore, this is considered a solution to help improve the quality of training, in order to equip the necessary knowledge, skills and thinking to adapt to the practical context and meet social requirements, enterprise (Hang, N. T., & Huan, N. V., 2020).

Although there are many outstanding advantages, but CDIO is not a universal solution that can be applied equally in all training professions. Schools need to base themselves on the core competencies of each industry to form appropriate output standards to guide the development and organization of training programs.

2. LITERATURE REVIEW

CDIO is an open model that provides process-specific guidelines and guidelines for developing, organizing, and evaluating training programs. The practice of universities around the world has proven that the application of the CDIO approach is based on the principle of combining textbook teaching with the needs of employers and employers in enterprises. Therefore, the product of the training process following the CDIO model approach will be the link between the two stages of training and the employer, thereby helping to narrow the gap between the school and the employer.

In order to improve the quality of university teaching and improve the quality of human resources to meet the requirements of employers, it is necessary to develop really appropriate training contents. From the end of the 18th century, the beginning of the 19th century, Rothwell, WJ & Lindholm, JE (1999) in the study "Competency identification modeling and assessment in the USA" on determining the competency model and assessment in the United States confirmed it. clearly the necessary requirements to develop training contents that are really suitable for the

development of society. According to him, the strong development of science and technology has made it necessary to train highly qualified and capable workers to operate modern machines, tools and technologies. That is to increase the productivity and labor efficiency of the enterprise.

At the same time, Shirley Fletcher (1997) also mentioned the issue of human resource training associated with expected output standards through the design of training program content. In the study Designing Competence - Based Training on capacity design of training institutions, the author gave scientific arguments for building standards in training. At the same time, providing techniques for analyzing learners' needs, building specific modules in the training program based on expected output standards. Later, Glenn M., Mary Jo Blahna (2005) analyzed and evaluated the social context. Stemming from the need for a shortage of high-quality human resources while the unemployment rate is quite common, Glenn M., Mary Jo Blahna proposed a solution to improve the quality of human resources to meet the requirements of reality. He proposed a model of 3 factors constituting the employee's personality based on the competence (Human Resources Competency) that fully meets the Knowledge (Knowledge), Skills (Skills) and Attitudes (Traits). In 2009, Edward. F. Crawle provides a CIDO approach with logic from idea to design, implementation and operation in building training programs for the engineering sector. According to this model, after graduation, learners will accumulate the knowledge, skills, qualities, attitudes and professional competencies in line with the actual expectations that society is setting.

On the basis of inheritance and approach to Edward's point of view. F. Crawle, a group of authors at Vietnam National University, Ho Chi Minh City (2010) conducted a study to develop training programs based on converting CDIO visions into training objectives. The development of training programs associates training objectives with CDIO-oriented output standards. In order to calibrate the training program, the authors also conducted a survey of training programs with similar assessment standards according to Edward's CDIO approach. F. Crawle. Research group Nguyen Huu Loc et al (2014) also analyzed in detail the CDIO approach in building and developing training programs for engineering and technology sectors. It can be said that this is a relatively methodical training process, going from model theory to practice on the basis of creating human resource products that meet the expected output standards.

Old Testament & Ancient Near Eastern Studies Authors Group, n.d. He also affirmed that, in the context of developing a new education system, the system from policies, training programs, lecturers, testing and evaluation methods needs improvement. This is to achieve the outputs expected by employers.

Currently, graduates at many universities do not meet the needs of employers. That has led to many laborers who have not yet found jobs in the right fields of training. This is because training activities have not been consistent with the output standards expected by employers and society. In order to remove the bottleneck in the current training situation at universities, as well as the problem of "excess teachers, shortage of workers", labor shortage in enterprises, it is necessary to well solve the relationship between supply - demand. labor. Universities need to creatively apply the principle of combining the stages of "Training - Researching - Production". The training of human resources is associated with output standards, which means that human resources have full background knowledge, specialized and professional skills, teamwork skills, adapting to the context of digital transformation and changing business environment. The development of enterprises is a suitable and indispensable direction (Hung.NQ, Hang.NT, & Minh ND, 2021).

In order for the output products of universities to meet the needs of human resources involved in the development of digital businesses, it is necessary to associate training activities with solving practical operations at enterprises. Ruth Helyer (2011) affirmed that, in addition to knowledge learned in books, practical experience and experiences at businesses play an important role that universities need to equip students before graduation. Along with providing the core knowledge of the training profession, universities need to focus on training practical and practical knowledge and skills for learners (Hang, N.T., 2021a). Universities need to clearly define human resource training orientations that must meet the requirements of new professions appearing in the context of the industrial revolution 4.0. Learners need to have access to new technologies and new

professions so that after graduation they can adapt to the working environment in enterprises (Nguyen Thi Hang, 2021b).

Empirical studies of the authors Carter, S. and Yeo & A.C.-M. (2017) at HEI University (Malaysia) affirmed that, in the context of digital transformation, learners need to improve their awareness of the knowledge, skills and competencies needed to work in the real world. The knowledge, skill and competency requirements by student learning level and practitioner experience may vary by type of training (Hang, N.T., et al., 2021c). Curriculum development should be geared towards addressing both the capabilities and requirements of the employer. At the same time, it is necessary to develop professional skills, strengthen interdisciplinary cooperation and business cooperation to enhance the experience for learners. These contents have also been mentioned and analyzed in great detail in the research works of Hang, N.T., Huan, N.V. (2020); Hang, N.T., et al. (2021a); Hang, N.T. (2021c).

3. METHODOLOGY

The author uses analytical methods, document research, in-depth interview methods to find out the impact of program-level assessment according to AUN-QA standards on training activities of the University of Information and Communication Technology, Vietnam. The AUN-QA model (Asean University Network - Quality Assurance) is a training model with the goal of quality assurance (Quality Assurance - QA) based on the promulgation of the AUN-QA standard system to contribute to quality assurance. It is conducted in the ASEAN region, making training harmonized, unified and highly competitive in the international arena. The AUN-QA model appeared in the 60s of the 20th century, studied and inherited by Deming, Juran, and Ishikawa. This model directs activities to the customer (i.e. learners) and ensures process-based quality. This activity is formed by the ASEAN University Network (AUN - Asean University Network). This is the ASEAN University Network, established in 1995, including 17 leading universities of 10 ASEAN member countries. One of the main activities of AUN is to build a quality assurance system: (1) AUN's member universities make continuous efforts to strengthen the implementation of the quality assurance system; (2) Carry out the exchange of quality assurance and training programs within the framework of the agreement between the member universities; (3) Planning the formation and development of the quality assurance system of each country and recognized by AUN; (4) Welcoming the implementation of external audits/reviews mutual agreement and use of internationally recognized tools and standards of member universities; and (5) The quality criteria of AUN member universities (teaching, learning, research, application and service implementation) are reflected in the audit tools prepared by AUN.

The method of searching and researching documents was used to learn about the self-assessment report of the University of Information and Communication Technology 2016. Thereby, in order to find out the actual status and level of achievement of the standards and quality assurance standards for the construction and development of training programs. The method of searching and studying documents is also used to determine the satisfaction of stakeholders with the quality of training at the university; seek recommendations from the external audit team on training program development and design. The expert method was used to collect opinions of experts in the field of Education Quality Assurance at training conferences to implement self-assessment according to AUN-QA standards and to share experiences by Organized by Vietnam National University, Ho Chi Minh City.

The survey method is used to get feedback from stakeholders on the output standards through the construction of questionnaires and pilot surveys on 6 participants including: experts, enterprises/employees, managers, administrators at the University of Information and Communication Technology, lecturers, alumni and final year students. The questionnaire was built on the basis of consultation with experts, managers at universities, and professional groups participating in the development and development of training programs. The study selects survey subjects who are representative samples of managers, experts, and lecturers related to the content,

process of building output standards and training programs. To check the reliability of the scale, the analysis method of Cronbach's Alpha index by SPSS software was used through an online survey by google form sent to the survey subjects via email.

4. MAIN RESULTS

4.1. RESULTS OF DEVELOPING TRAINING PROGRAMS ORIENTED IN ASSOCIATION WITH LABOR MARKET NEEDS

The training program of the University of Information and Communication Technology has clear and specific goals, has a reasonable structure, is systematically designed, and meets the requirements of the volume of knowledge and skills. The detailed programs of each module/subject of the subjects of the University of Information and Communication Technology have common and specific goals. The development of educational programs is carried out from groups of subjects at the Departmental level. After the Department has built, the Scientific Council of the University will meet to revise, test and approve. In addition, the University of Information and Communication Technology held a survey of alumni and experts about the training program; Survey opinions of employers about the quality of students after graduation. This is the basis for adjusting training programs to suit social needs.

Table no. 1. List of training programs that have developed output standards at the University of Information and Communication Technology in 2021

Name of training program to build output standards	Faculty in charge	Total number of training programs to develop output standards
Information system	Faculty of Information Technology	8
Computer networks and data transmission		
Information security		
Information technology		
Software Engineering		
Artificial Intelligence and Big Data		
International cooperation Software Engineering industry		
High Quality Information system		
Economic informatics	Faculty of Economic Information Systems	5
Ecommerce		
Digital Marketing		
Archives - Office Administration		
Digital Economy		
Graphic design	Faculty of Multimedia Communication	3
Multimedia communication		
Communication technology		
Biomedical engineering	Faculty of Electronic and Communication Technology	4
Computer Engineering Technology		
Electronic - Telecommunications Engineering Technology		
Intelligent Mechatronics and Robotics Engineering.		
Control and Automation Engineering Technology	Faculty of Electronic and Communication TechnologyFaculty of Automation Technology	3
Electronics and Electrical Engineering Technology		
Automotive Technology and Intelligent Transport Systems		

The design of the training program is conducted according to the principle of Education based on output standards according to a closed process. The structure of the training program includes knowledge blocks: outline; branch; specialized; practice, internship, graduation thesis. Teaching methods, assessment methods are all designed to contribute to the achievement of the output standards of the training program.

The distribution of modules between knowledge blocks in the training program and the teaching process is arranged to match and balance the learning outcomes. The modules for the first and second years of study mainly support the learners in general and basic knowledge, while the modules of the following years help learners to gain specialized knowledge, skills, and attitudes. Practical courses, internships, graduate theses or scientific activities contribute to a high degree in assisting learners to achieve PLOs related to the ability to apply knowledge of Software Engineering to practical, understanding social and business contexts; and communication skills, teamwork, presentation ability.

The training program of the Information and Communication Technology University is developed and adjusted on the basis of the framework program issued by the Vietnam Ministry of Education and Training, which is concretized to suit the mission, Objectives of education and functions and tasks of the school, and associated with the learning needs of learners, demand for human resources of the labor market towards strengthening practice skills and application skills High-tech in practice. In order to meet the needs of the labor market throughout the country in general and the Northern Mountainous Midlands region in particular, the University of Information and Communication Technology has constantly expanded on training and advanced scale education quality. The school has opened a number of new branches and regularly reviewing and adjusting education programs based on international standard reference, feedback from employers, learners after graduation and organizations Education and other organizations, in order to meet the needs of socio-economic development. From 2008 to now, the University of Information and Communication Technology has applied a credit-based training for all regular student courses, and still applies the school training for classes Links in the province outside a flexible way. Currently, the school has 23 training programs.

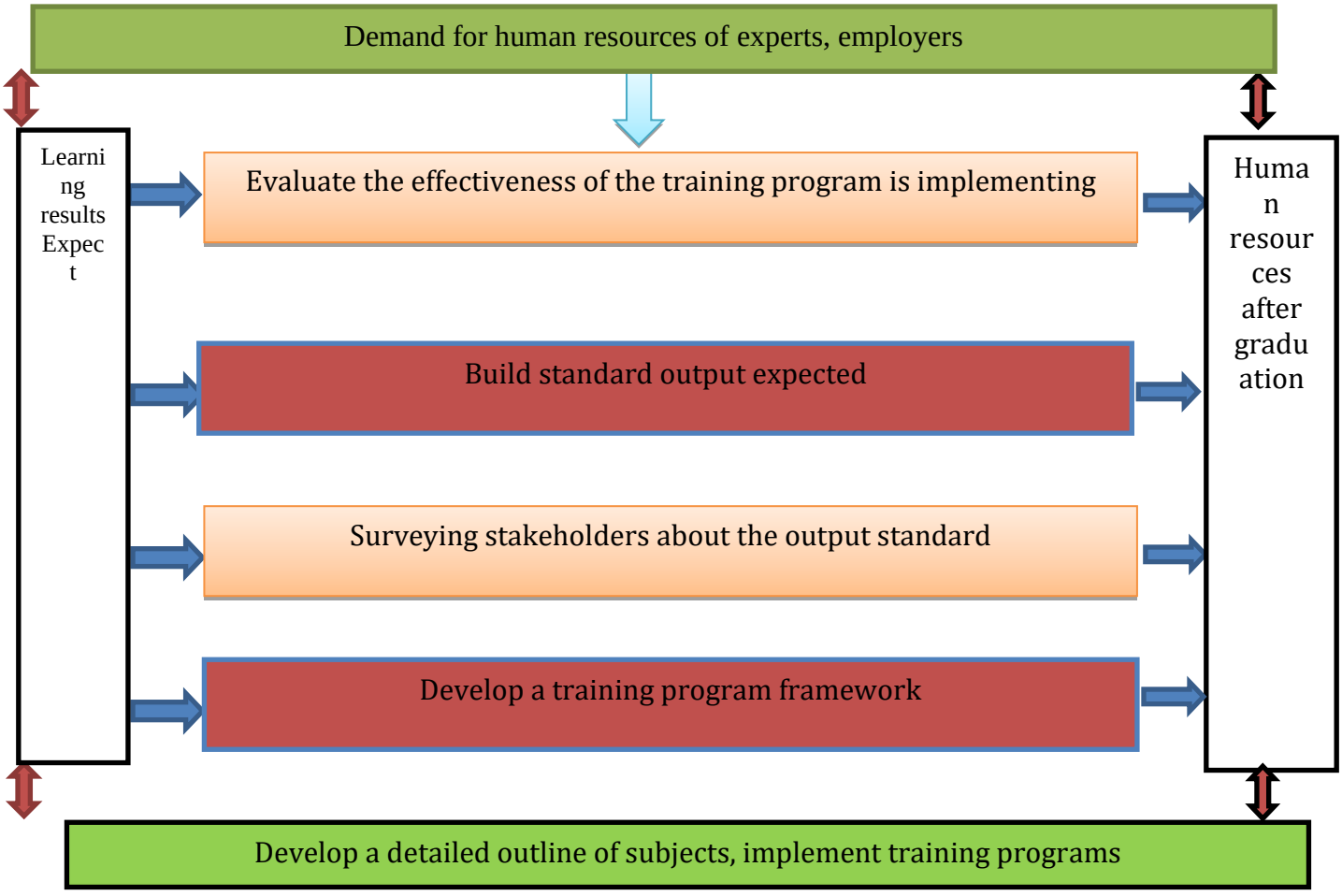

Figure no. 1. Sequence of standard construction plans and adjustment training programs

Source: Author's proposal

The first job that needs to be done in the roadmap for building and developing a training program is to identify the need for human resources, especially high-quality human resources. High-quality human resources are understood as a special part of the workforce, capable of meeting the complex requirements of the job; have a high level of education and technical expertise; good labor skills; ability to quickly adapt, master production technology; have good health and moral character; has the ability to creatively apply trained knowledge and skills to the production process in order to bring about high productivity, quality and efficiency. This is also a part of the workforce with good moral qualities, professional style, discipline, patriotism, national sentiment, will to self-reliance and ethics in the profession. High-quality human resources play a decisive role in the socio-economic development of each country. In the context that the Fourth Industrial Revolution is taking place strongly, universities have focused on building and developing high-quality human resources. This human resource can meet the requirements of industrialization, modernization and development of the digital economy. So the work that needs to be done to get there is geared towards training. The 4th Industrial Revolution, along with the synergistic impact of the Covid-19 pandemic, has created a drastic change in the world of work, the labor market and workers. In Vietnam, one year after the Prime Minister issued Directive No. 01/CT-TTg (January 24, 2020) on promoting the development of digital technology businesses, there are more than 13,000 digital technology enterprises. The total number of digital technology enterprises operating in Vietnam amounts to more than 58,000 enterprises. Most of them are located in Hanoi and some other big cities. The future human resource trend will be towards the same time spent on current jobs by humans and machines. 84% of employers will move to rapidly digitizing work processes. As a result, a large number of companies are also expected to change locations, value chains and workforce sizes as a result of technological factors.

Facing the changing trend of labor market demand, the old training contents and programs are no longer relevant. At organizations and businesses, information technology job positions serving digital transformation have set requirements for fostering and training information technology skills for the workforce. Vietnam's National Digital Transformation Program to 2025, with a vision to 2030, has set the goal of developing digital government, digital economy, and digital society, and forming capable digital enterprises. To realize that goal, human resources are identified as one of the important factors. In order to train human resources with skills in applying information technology in job processing with strong changes in thinking and working style in the digital environment, universities must make adjustments in content of the training program to suit the reality of digital transformation. Learners need to strengthen their practical and practical knowledge, and participate more in internships at enterprises. These training contents will give students the opportunity to learn about the company, help businesses reach and inspire the younger generation.

4.2. RESULTS OF DEVELOPING OUTPUT STANDARDS ORIENTED IN ASSOCIATION WITH LABOR MARKET NEEDS

In order to form the output standards of training programs oriented to meet the requirements of the labor market, the specialized faculties all follow a logical process. Each output standard of a training program is surveyed on 6 stakeholders participating in the training program. Within the framework of this study, the author chooses a case study at the Faculty of Economic Information Systems, University of Information and Communication Technology, and the Training Program of Economic Informatics. Stakeholders surveyed include: experts, businesses/recruiters, managers, lecturers, final year students and alumnin order to develop the output standards, based on the survey on human resource needs and the evaluation of the effectiveness of the ongoing training program, the specialized team of Economic Informatics Department of the Faculty of Economic Information Systems has conducted It is expected to develop output standards for the major in Economic Informatics.

In order to survey the need and need to review and edit the training program specializing in Economic Informatics, the expert team conducted a survey for two subjects, labor recruitment enterprises and experts. The proportion of subjects participating in the training needs survey is as follows.

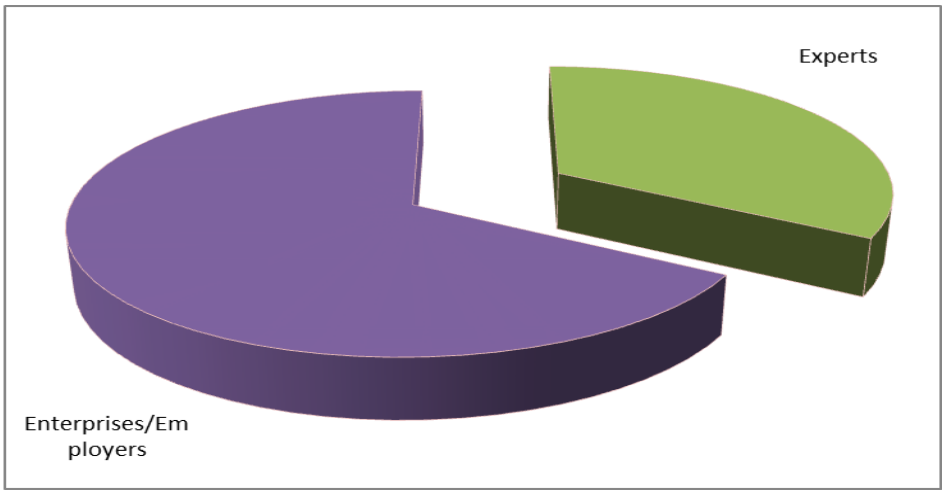

Figure no. 2. Participants in the survey of human resource needs

Source: Processing results from the author's collected data

The reason why we choose consultants and a team of recruitment enterprises to survey the need and needs of human resources is because they are the representatives of an individual or organization that operates and manages the issues related to the relationship between higher education institutions and labor employers. They will be the one to propose and plan the development strategies of the business and orient the contents related to human resource training to meet the needs of society. They will accompany and help individuals and organizations stay on track and achieve certain values, in line with the trends and needs of the labor market and the digital transformation context. Moreover, employers at enterprises will provide more detailed information about the human resource needs that they need to be able to participate in leading them to carry out digital transformation of enterprises.

In order to review and edit the training program specializing in Economic Informatics, we also rely on the survey results on the ongoing training program. This result is annually collected by functional departments of the University of Information and Communication Technology.

Participants providing this information include current students, alumni and employers. Based on the feedbacks of the above subjects, the expert team analyzes the results and then proposes to improve and adjust the ongoing training program to suit the development trend of the society. The fourth industrial revolution has opened up many opportunities for business development. The integration and intersection of digital technology achievements such as Internet of Things (IoT), Cloud Computing, Artificial Intelligence (AI), big data (Big-data) is creating an information society in which information will become the central factor determining the change in both production methods leading to new requirements on productive forces in the field of economic informatics. The survey results of the selected subjects indicated that the knowledge and skills that need to be updated for learners in the current context are knowledge of digital transformation. In addition, learners need to be equipped with skills in applying information technology in job processing and working style in the digital environment. This is the basis for the University of Information and Communication Technology to make adjustments to the content of the training program to suit the reality of digital transformation.

Based on each job position after graduation, learners can take up, as well as the quality and capacity requirements of each corresponding job position. Bachelors of economic informatics need regular training and fostering of 8 groups of knowledge and skills: 1) Political theory; 2) Foreign languages (in which English is a compulsory foreign language); 3) Knowledge and skills in informatics and information technology; 4) Basic knowledge of economics and business

administration; 5) in-depth knowledge on exploiting and applying informatics to build information systems to support managers in forecasting, planning, managing, managing and making optimal decisions, building strategic planning for organizational development; 6) consulting skills in the field of administration and management in enterprises; 7) implementing investment projects to develop and apply information technology to management and administration; 8) Effectively operate and exploit modern technology systems in corporate governance and economic management.

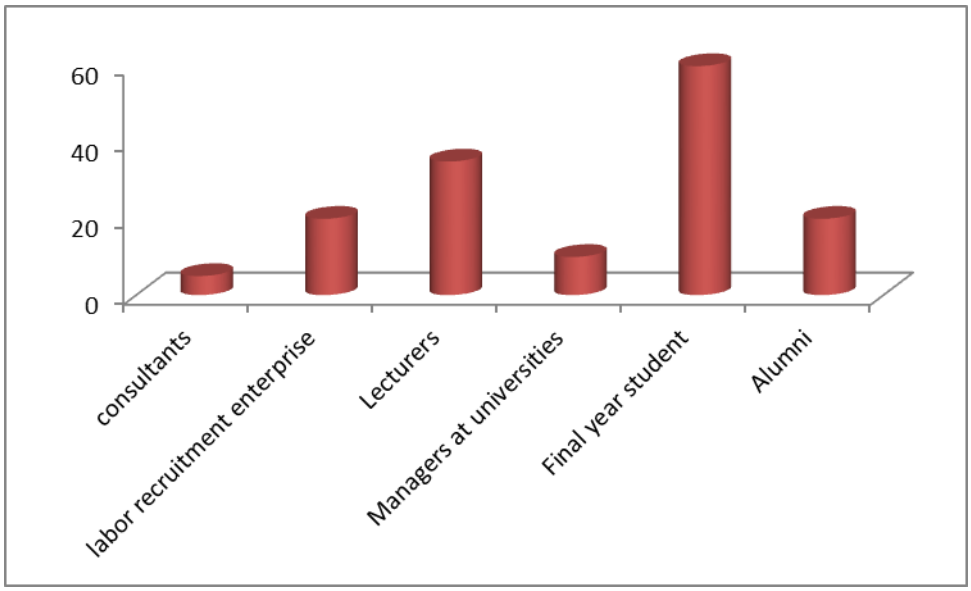

Figure no. 3. Number of survey questionnaires by subjects

Source: Processing results from the author's collected data

After drafting the output standards aimed at the necessary blocks of knowledge, skills and competencies, the expert team held a meeting and absorbed the opinions of the Faculty-level Scientific Council for adjustment and improvement. Next, conduct an online survey for the defined set of survey subjects. Including: Experts: 5 votes, businesses and employers: 20 votes, lecturers 35 votes, administrators 10 votes, alumni 20 votes, final year students 60 votes. Based on the opinions of the survey participants, we discussed, edited and perfected the output standards of the training program specialized in Economic Informatics. The output standards of the training program specializing in Economic Informatics include 18 standards in all 4 groups.

After having the survey results, we tested the reliability using Cronbach's Alpha coefficient for the observed variables. This method of analysis also helps to eliminate the observed variables, the scales fail. Cronbach's alpha coefficient is a coefficient that allows to evaluate whether it is appropriate if given certain observed variables that belong to a research variable (latent variables, factors). Hair et al (2006) give the following evaluation rule:

Cronbach's alpha < 0.6. The factor scale is not appropriate (maybe in the research environment the subject has no perception of that factor);

Cronbach's alpha = 0.6 – 07: Acceptable with new studies;

Cronbach's alpha = 0.7 – 0.8: Acceptable;

Cronbach's alpha -= .8 – 0.95: good.

Cronbach's alpha >= 0.95: Acceptable but not good, should consider observed variables that may have the phenomenon of “coincidence”. That is, there is a possibility of redundant observed variables in the scale. It is similar to the case of multicollinearity in regression, where the redundant variable should be eliminated.

To calculate Cronbach's Alpha for a scale, the scale must have at least 2 measurement variables. In theory, the higher the Cronbach's Alpha, the better (the more reliable the scale is). However, if the coefficient of Cronbach's Alpha is too large (>0.95), it shows that there are many variables in the scale that do not differ from each other (that is, measure the same content). This phenomenon is called redundancy.

If a variable in the measurement has a corrected item total correlation >=0.3, then that variable meets the requirements (Nunnally & Bernstein, 1994).

If Cronbach's Alpha >= 0.6 is an acceptable scale in terms of reliability (Nunnally Bernstein, 1994).

The scale has good reliability when it varies in the range [0.7,0.9].

Table no. 2. Cronbach's Alpha of the variables in the output standard scale to meet social needs

Observed variables	Medium scale if variable type	Variance scale if variable type	Correlate total variable	Cronbach's Alpha if variable type
Technical knowledge and reasoning (KTLL): Cronbach's Alpha = 0.886				
KTLL1	11890	8.122	.824	.812
KTLL2	12009	8.565	.678	.856
KTLL3	12232	8.761	.701	.887
KTLL4	12221	9.081	.611	.833
KTLL5	12114	9.433	.745	.812
Skills, personal and professional qualities (KNTCNN): Cronbach's Alpha = 0.891				
KNTCNN1	9.1223	7.002	.872	.878
KNTCNN2	9.2110	7.110	.878	.890
KNTCNN3	8.9987	8.109	.798	.867
KNTCNN4	9.1221	7.901	.780	.912
KNTCNN5				
Communication and teamwork skills (KNGTLVN): Cronbach's Alpha = 0.782				
KNGTLVN1	10.2343	12.343	.798	.822
KNGTLVN2	12.9901	16.445	.687	.787
Competence to apply knowledge into practice (Conceive ideas, design, implement and operate in business and social contexts - NLTT): Cronbach's Alpha = 0.902				
NLTT1	9.1644	5.221	.788	.866
NLTT2	9.4132	4.662	.798	.872
NLTT3	9.3622	6.001	.822	.791
NLTT4	9.2116	4.299	.801	.822
NLTT5	9.4552	5.788	.767	.898
NLTT6	9.5661	6.212	.887	.801

Source: The author's results have been processed on SPSS software

- Scale of Knowledge and Technical Reasoning: Cronbach's Alpha = 0.886. The total correlation coefficients of the variables KTLL1 - KTLL5 all reached values greater than 0.3.
- Scale of skills, personal and professional qualities: Cronbach's Alpha = 0.891. The total correlation coefficients of the variables KNGTLVN1, KNGTLVN2 are all greater than 0.3.
- Scale of Competence to apply knowledge in practice: Cronbach's Alpha = 0.902. The total correlation coefficients of the variables NLTT1 – NLTT5 all have values greater than 0.3.

The Cronbach Alpha results of the factor are at a good level. That shows that the observed variables are very good. Thus, the scale is reliable, all observed variables have good explanations for the original factor.

To consider the appropriateness of factor analysis, the study uses the KMO coefficient (Kaiser-Meyer-Olkin). The value of KMO must reach a value of 0.5 or more ($0.5 \leq KMO \leq 1$) which is a sufficient condition for factor analysis to be appropriate. If this value is less than 0.5, then factor analysis is likely not suitable for the research data set. Next, perform Bartlett's test of sphericity to see if the observed variables in the factor are correlated or not. The necessary condition for applying factor analysis is that the observed variables reflecting different aspects of the same factor must be correlated with each other. Therefore, if the test shows no statistical significance, then factor analysis should not be applied to the variables under consideration. Bartlett's test has statistical significance (sig Bartlett's Test < 0.05), showing that observed variables are correlated with each other in the factor.

Table no. 3. KMO and Bartlett test results for independent variables

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure Adequacy		.812
Balett's test of the scale	Approx. Chi-Square	2760.221
	df	302
	Sig.	.000

Source: The author's results have been processed on SPSS software

From Table no. 3, it can be seen that the coefficient KMO = 0.812 > 0.5 is suitable for factor analysis. The significance level (Sig.) = 0.000 < 0.05 so the variables are correlated with each other on the overall scale. Therefore, the given observations satisfy the conditions and meet the reliability.

The multivariate regression equation is built as follows:

$$Y=y0+y1*X1+ y2*X2+ y3*X3+ y4*X4$$

Inside:

Y: Output standards to meet the needs of society and businesse

X1: Technical knowledge and reasoning (KTLL).

X2: Skills, personal and professional qualities (KNTCNN).

X3: Communication and teamwork skills (KNGTLVN).

X4: Competence to apply knowledge into practice (Conceive ideas, design, implement and operate in business and social contexts – NLTT).

Table no. 3. Results of multivariate regression

Variable name	Coefficient B	Coefficient Beta	Sig.
Constant	3.897	-	.000
X1	0.388	0.501	.000
X4	0.174	0.376	.000
X3	0.190	0.301	.000
X2	0.122	0.180	.000
Sig F coefficient of the model	.000		
Corrected R^2 factor	0,6947		

Regression equation: Y = 3.897+0.388*X1+0.174*X4+0.190*X3+0.122*X2.

The results of the regression analysis show that the adjusted R^2 coefficient is 0.6947. That means that 69.47% of the variation of the Output Standards that meet the needs of society and businesses is explained by the factors in the model. The remaining percentage is explained by other factors that have not been studied. The p-value coefficient of the F statistic is < 0.05, so the regression model is significant. That is, the independent variables have an effect on the dependent sea Y.

The results of the regression analysis show that there are 4 main factors affecting the output standard to meet the needs of society and businesses, with the level of impact depending on the magnitude of the coefficient β ranging from 0.180-0.501.

After analyzing and absorbing the opinions of stakeholders, we have developed an output standard for the major in Economic Informatics to match the needs and development of society.

The general objective of the output standard of the training program majoring in Economic Informatics is to train a bachelor's degree in Management Information Systems, majoring in Economic Informatics, to master three blocks of knowledge: Basic knowledge of business economics and business administration; basic knowledge of information technology; In-depth knowledge on exploiting and applying information technology to build information systems to support managers in forecasting, planning, administering, managing and making optimal decisions, building plans strategic planning for organizational development. Equip knowledge and form

consulting skills in the field of administration and management in enterprises; implementing investment projects to develop and apply information technology to management and administration; Effectively operate and exploit modern technology systems in corporate governance and economic management.

The training program equips learners with independent research thinking, the ability to self-study, supplement knowledge, improve professional qualifications, and adapt to the changing working environment.

The training program also contributes to improving political quality; personal and professional ethics; compliance with the law and a spirit of lifelong learning for learners.

The specialized training program in Economic Informatics aims at 6 specific objectives:

O1: Equipping general education knowledge, core background knowledge in economics, engineering, management and in-depth knowledge in the field of economic informatics.

O2: Equipping in-depth knowledge on the application of informatics tools in data analysis and economic forecasting; develop information technology applications to support managers in planning, administration and making optimal decisions.

O3: Developing skills in applying informatics tools to solve economic, administrative, management, forecasting and statistical operations; skills in planning, decision making, and time and resource management in the organization.

O4: Help learners develop communication ability, lifelong learning ability, teamwork skills and work in organizations and businesses.

O5: Helps learners to form ideas, design, deploy and operate strategies and solutions in the fields of economic management and corporate governance.

The training program is designed with the aim of meeting the needs of society. Therefore, it has shown flexibility, the content has been adjusted to suit the needs and trends of the Industry 4.0 labor market. At the same time, the training program is designed to meet the social orientation, on the other hand, training provides human resources to meet the requirements of the labor market. However, the pressure on universities is increasing when the training program is both highly specialized in a certain field and interdisciplinary (information technology, digital, networking, architecture specialized knowledge) and other indispensable skills, such as: the ability to think systematically, the ability to synthesize, the ability to link the real and virtual worlds, creativity, teamwork skills, possibility of interdisciplinary cooperation… In the context of rapidly changing technological knowledge, equipping self-study and lifelong learning is more important than the knowledge of the training program. Thus, Industry 4.0 has created great pressure in training activities for universities, from developing training programs, updating program content to training skills for learners to meet requirements. Orientation of education according to needs in order to create a balance in training and using human resources in industries, regions, regions and economic sectors, avoiding unnecessary waste when training workers. The national education system began to improve towards an open education system, lifelong learning and building a learning society.

5. CONCLUSIONS

Recognizing the importance of digital transformation is the process by which people change their production methods, their ways of living and working with digital technologies. Therefore, in higher education there is a need to improve the content and teaching methods to suit the actual situation. Universities need to develop solutions to gradually improve the quality of human resources, in which improving the training efficiency for learners is the key solution. It is necessary to increase awareness for learners, to switch from traditional ways of thinking, attitudes, ways of living and working to ways of thinking, attitudes, ways of living and working with digital versions. Learners need digital thinking to be aware of entities and their connection in digital space. Digital transformation is not simply digitization – the conversion of things into digital formats; but more than building a digital operation model (digitalization). Therefore, universities need to build and innovate training methods in the direction of attaching importance to developing learners'

qualities and capacities. The purpose of this job is to create high-quality human resources, adapting to the ever-changing labor market and technology, meeting the requirements of industrialization and modernization.

To master in the digital economy, employees must quickly change their thinking, catch up on awareness, improve their own capacity, and hone their professional skills. This helps them to quickly approach reality to be firm at work and proactive in life. In the context that all careers are related to digital technology and digital skills, if not trained, workers will lose their jobs without finding new ones. Digital transformation makes it possible for universities to build an online training platform for learners. Students can practice in the virtual lab at any time; study, consult with teachers, take exams at any time… From this study, it can be said that shaping digital skills in addition to equipping learners with professional knowledge is very important. Digital literacy is the ability to use digital devices, communication applications, and the internet to access and manage information. They enable people to create and share digital content, communicate and collaborate, and solve their own problems in an efficient and creative way. This has important implications in life, study, work and social activities in general. At a basic level, digital skills are expressed through the ability to use digital devices and online applications. At an advanced level, digital literacy is the ability to leverage digital technologies to enhance capacity and adaptability in career areas, such as those in the information and communication technology sectors. Technologies such as artificial intelligence (AI), machine learning, big data analytics, blockchain… change skill requirements, thereby affecting construction capacity and skills development of the workforce in the digital economy. Therefore, it is extremely important and urgent for universities to upgrade both knowledge and skills, especially digital skills for the workforce. Improving the quality of human resources not only helps employees to stabilize their jobs, but also contributes to improving labor productivity and raising their incomes. Moreover, it also helps businesses reduce costs, enhance competitiveness for Vietnamese businesses, as well as attract foreign investment. In order to build a high-quality workforce ready for digital transformation, close cooperation and coordination between universities and employers play an important role.

Digital transformation is a path that the whole society needs to take, not an option anymore. In the new development model, there is convergence for a national media institution, a ministry, a locality, or an agency, organization or enterprise; and more importantly, to carry out transformation, in which an overall and comprehensive change process takes place, from the top leadership to all members of agencies, organizations and businesses in different countries, ministries and localities. Universities play an important role in that, in order to create people with enough knowledge, skills and experience to operate and implement that digital operation model. Therefore, it is necessary to create a mechanism to encourage the implementation of training and vocational training orders between employers and training institutions. Universities need to do well in forecasting labor demand in each field and profession in order to develop appropriate training targets. Universities need to develop mechanisms and policies to attract and foster talents, attract investment capital from all economic sectors to develop vocational training activities and introduce jobs to employees so that they adapt in the new development context of society and the digital economy. In the next study, we will continue to learn about the change of the content and training program of the major in Economic Informatics. From there, we realize the change in the adjustment of training programs towards improving the quality of training, meeting the human resource needs of the society.

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