

Development of Vietnamese Vocational Education Teachers to adapt the Industrial Revolution 4.0

Bui Van Hong ^{a,*}, Do Van Dung ^a

^a Ho Chi Minh City University of Technology and Education, Vietnam

*Corresponding Author: hongbv@hcmute.edu.vn DOI: <https://doi.org/10.34256/ajir1941>

Received: 19-09-2019

Accepted: 29-10-2019

Abstract: Teacher is always a key factor which determines training quality in general and vocational training quality of the Vocational Education System (VES) in particular. In face of strong influences from the fourth industrial revolution (IR 4.0), teacher is getting more important in training of human resources, especially qualification level and capacity to apply technology and innovate teaching methods. Based on the analysis for impacts of the IR 4.0 on VES, requirements for capacity of teachers and the reality on vocational education teachers (VETs) today, this article suggests some solutions to develop VETs to adapt to the IR 4.0 as a basis for development of teachers at vocational education institutions in Vietnam.

Keywords: Vocational training teachers, Application of technology to teaching, Innovation of teaching methods, Industrial Revolution 4.0.

1. Introduction

Training of quality human resources to meet demand of enterprises and international integration is one of the important goals in the vocational education today. For actualization of this goal, apart from factors on training program, training method, facility, equipment and teaching conditions, teachers are always considered an important and core factor. In the past years, through policies on training and fostering, teams of VETs have developed strongly in both quantity and quality, which had a great contribution to the training of quality human resources for society.

In the context that science - technology develops increasingly, amount of knowledge increases constantly, learning needs is more and more diverse, the teacher's qualification and ability to innovate and apply teaching method play the decisive role for quality of

human resource training. Besides, the strong impact of IR 4.0 has change career structure in society with appearance of various new careers and disappearance of several traditional ones, which results in change of requirements on capacity for the teacher, those directly involved in the training of human resources to adapt. In addition, in the VES, training program is developed according to the integrated module orientation. Therefore, implementation of training program requires teachers to be good at not only technical expertise and education skills but also vocational practice skills. Therefore, for innovation and improvement of vocational education quality in the current context, the study on solutions in order to develop teams of VETs both in terms of scale, qualifications, vocational practice skills, ability to innovate

methods and apply technology in teaching is very urgent and has high practical significance.

With the goal of proposing solutions to develop VETs to adapt to IR 4.0, this article presents the study results on impacts of IR 4.0 on the VES, requirements for capacity of teachers, the reality of VETs today and several solutions in conformity to current context.

2. Method of Research

The article uses the following educational scientific research methods:

2.1. Theoretical research method

- Collect documents in relation to professional standards and specialization of VETs; current situation, needs for development of VETs; impact of IR 4.0 on the VES.
- Analyze professional standards of VETs as a basis for evaluating actual status of teacher quality.
- Analyze actual status and needs for VETs and impacts of the context on VES as a basis for suggesting solutions to develop team of VETs.

2.2. In-depth interview method

- Discuss with Board of Administrator and Head of Departments of Vocational Education Institutions in Ho Chi Minh City about actual status and needs for VETs.
- Discuss with some educational experts about general evaluation for qualifications, teaching capacity and technology application ability of VETs.
- Collect information through interviews, then analyze and compare it with data on actual status and needs for VETs that is collected from other reference sources in order to ensure accuracy of the data.

3. Content of Research

3.1. Professional capacity of VETs to adapt to IR 4.0

3.1.1. Impact of IR 4.0 on the VES

The IR 4.0 on the basis of integrating a series of new technologies such as: artificial intelligence, IoTs (Internet of things), Big data, cloud computing (Icloud), etc., is developing rapidly and have a strong impact on all aspects of socio-economic life, including vocational education [1]. With breakthrough technological developments, this revolution will quickly change structure of industries in the future. Thus, many industries will disappear and many new other ones appear. which influences change of structure and list of training industries in the whole VES. Especially, the development of artificial intelligence and intelligent robots, automatic machines will gradually replace human force in many industries [1]. Therefore, in order to maintain job, the employees must be proactive to equip professional knowledge and skills in conformity to requirements for job in the new situation. Thus, training program and training methods for vocational education institutions also have to change in the orientation of openness and flexibility to meet diverse learning needs of learners.

3.1.2. Professional capacity frame of VETs

Under impact of IR 4.0 to current vocational education, the demand for VETs will have many changes in the future both in terms of structure and quality. Together with application of IoTs technology in development of Dital Pedagogy and virtual reality technology in teaching. The role of teachers will gradually shift from transmitting knowledge to instructing students to find out new knowledge. At the same time, digital classes and classes will thrive. The learners will be familiar with online learning with

instruction of a virtual teacher. This is an inevitable development trend in vocational education and training activities. In order to adapt to IR 4.0, the capacity of VETs is the integration of technical and professional competence, pedagogy method, vocational practice skills, ability to apply digital technology to teaching and core skills of the 21st century, namely as follows:

- 1) General core capacity.
- 2) Technical professional capacity.
- 3) Vocational practice capacity.
- 4) Capacity of using teaching methods.
- 5) Capacity of applying technology in teaching.

Where:

General core capacity: is the core capacity in the 21st century that all students need to equip, including: capacity of cooperation, communication, IT use, culture and society; capacity of creativity, critical thinking and problem solving [2]. These are considered a compulsory capacity group of VETs in the context of current international integration in Vietnam.

Technical professional capacity: is the capacity of applying knowledge, technical skills and technology in the professional field of teachers to teach learners in vocational education and training, such as: Electrical - Electronics Engineering, Mechanical Engineering, Automobile Technology, Manufacturing Technology, Biotechnology, etc.

Vocational practice capacity: is the practical contents to develop workmanship for learners in conformity to each career position of a VETs according to national vocational skill standards. For example: Industrial Electrics, Electrical Installation and Industrial Controls, Metal Cutting, etc.

Capacity of using teaching methods: is the capacity of flexibly using teaching methods and strategies of teachers to arrange learning activities for students in vocational education and training, especially the capacity

of innovating and applying digital pedagogy based on a Blended Learning and Flip - Flopped Classroom; Project based Learning; Learning by doing; etc.

Capacity of applying technology in teaching: is the capacity of proficiently using technology of teachers in the classroom, including skills of using proficiently computers, technology tools and technology applications in teaching such as: Operation of basic technology, personal technology use, social and ethical issues and application of technology in teaching [3]. In addition, technological capacity also includes ability of applying STEM and programming the application of STEM products in teaching.

Thus, the capacity of VETs is shown through integration of component capacities such as: general core capacity of the 21st century, technical and professional capacity, vocational practice capacity, capacity of pedagogical methods, capacity of applying technology in teaching. Groups of capacity for teachers are formed and developed through training, fostering and self-study.

3.2. Reality on professional capacity of VETs

3.2.1. Professional capacity

The reality on professional capacity of VETs is illustrated in Figure 1 as follows:

Where:

Training level: 100% of teachers meet the standards of professional training, in which, proportion of VETs with postgraduate level accounts for 29,4%; undergraduate level accounts for 57,8%; Other level accounts for 12,8% [4].

Vocational skills: Nearly 60% of VETs meet the standards of vocational skills, of which approximately 41% of teachers teach are integrated [4].

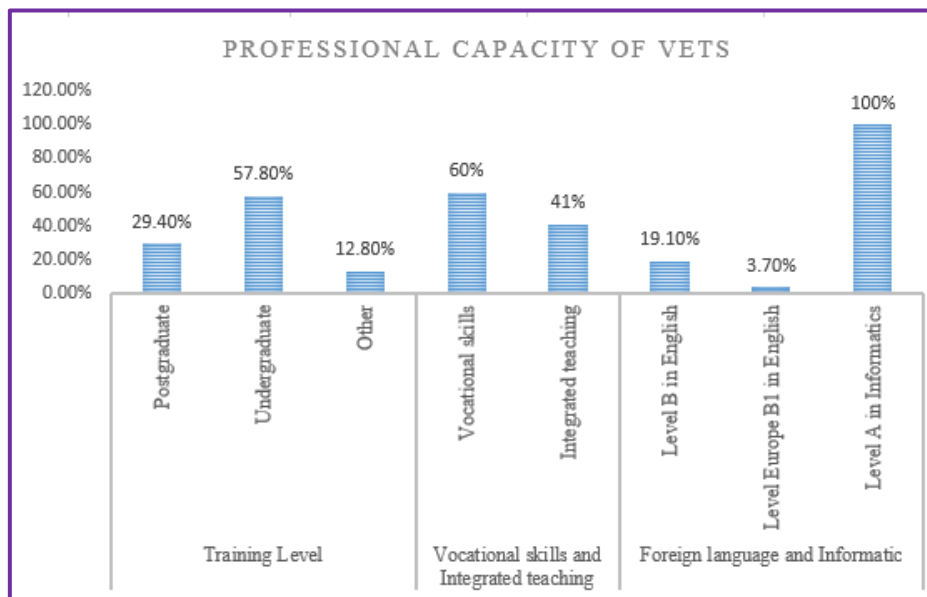


Figure 1. Professional capacity of VETs

Foreign language and informatics: Nearly 19,1% of VETs have level B or higher level of foreign languages, of which, level Europe B1 or equivalent or higher accounts for approximately 3,7%; 100% of VETs have degree A of informatics or higher [4].

3.2.2. Capacity of using teaching methods

92,6% of VETs teach at college level, 85,9% of VETs do at intermediate level and 81% of VETs do at vocational training centers who meet the standards of pedagogical skills. However, only 41% of VETs have capacity of integration teaching in VETs, this is still a low percentage compared to requirements [4].

3.2.3. Capacity for professional development and scientific study

Nearly 70% of VETs meet the standard of professional development and scientific study [4].

Comments:

In comparison to professional standards of VETs prescribed in Circular No. 08/2017/TT-BLDTBXH dated 10/3/2017 of the Ministry of Labor - Invalids and Social

Affairs [6], the majority of VETs is qualified. However, their vocational skills are still limited. The foreign language, information technology and soft skills are weak compared to the requirements of international integration and self-study to improvement [4].

Under the impact of IR 4.0, apart from qualifications and profession, VETs must be able to innovate teaching method as follows:

Role of a teacher is shifted from transmitting knowledge to instructing students to study and research to find out new knowledge.

Innovation of teaching method, especially application digital teaching method based on models of Blended learning and Flip - Flopped Classroom; Project based Learning; Learning by doing; etc.

Combine equipment of knowledge, professional skills, technical creativity with development of autonomy and self-responsibility capacity; professional ethics education, labor discipline and industrial behavior.

3.3. Actual status of training and fostering of VETs

Vietnam now has 06 Universities of Technology and Education (UTE) and about 05 faculties of Technical Education belonging to Universities of Education that participate in training, fostering and developing VETs. However, mainly 05 traditional UTE with large training scale and multi-sector career structure, including: (1) Ho Chi Minh University of Technology and Education, (2) Hung Yen University of Technology and Education, (3) Vinh Long University of Technology and Education, (4) Vinh University of Technology and Education, (5) Nam Dinh University of Technology and Education.

For tasks of training and fostering VETs, UTE are proactive to enhance quality of training through model innovation, teaching method innovation, examination and training program evaluation so on. Thus, the quality of training for VETs are always guaranteed and constantly improved. However, there are still some limitations in fostering VETs, as follows:

Professional capacity is not paid attention to be trained, especially vocational practice skills, capacity of integration teaching and innovation of teaching methods, capacity of creativity and autonomy promotion and self-responsibility for students.

The fostering program for VETs is not developed appropriately; the training and fostering capacity of educational institutions participating in is not equal.

Investment resources from Ministry of Labor - Invalids and Social Affairs for UTE that are not under Department of Labor - Invalids and Social Affairs is limited and not commensurate with their contribution to VES.

3.4. Solutions for development of VETs to adapt to IR 4.0

From analysis results of actual status and requirements for capacity of VETs, it can

be seen that the development of VETs in the future will be affected by the following trends [7]:

The demand for number of VETs increases.

The career structure of VETs changes by career structure of training human resources that directly serve the IR 4.0.

Professional qualification, pedagogical skills, vocational practice skills, foreign language skills and soft skills of VETs are considered as a key role to actualize the goal of improving the quality of human resource training to meet social requirements and international integration.

The capacity of applying teaching methods in a turned positive way and digital teaching of teachers is an inevitable trend in the teaching method innovation of VETs.

Therefore, in the context of vocational education and training subjects to strong impact of IR 4.0, the development of VETs to meet innovation and improvement of vocational education and training quality should pay attention to the following issues:

- 1) Develop mechanisms and policies towards openness, make structure for VETs, prioritize the development of teachers in line with the trend of IR 4.0.
- 2) Vocational education institutions actively cooperate with enterprises in training of human resources, propose policies to invite technical staff of enterprises to teach and increase duration of internships for students in enterprises.
- 3) Have policy of ordering UTE to organize training and fostering VETs.
- 4) Have a policy of fostering and regularly evaluate the quality of fostering vocational educating teachers.
- 5) UTE are proactive in innovating and improving the quality of training and fostering of VETs.

- 6) Vocational education institutions take the initiative in making plan for training and fostering teachers of vocational education and training quality in the current context.

3.5. Proposal - Recommendation

- 1) Develop a list of careers serving IR 4.0 and order UTE to train and foster teachers
- 2) Foster capacity of applying technology in developing digital teaching and online teaching for VETs
- 3) Enhance content and increase duration of internship at enterprises for students (future VETs)
- 4) A linkage in the training of vocational educating teacher between Ministry of Education and Training and the Ministry of Labor, War Invalids and Social Affairs in the training of Technology Education programs is required.
- 5) Invite experts from enterprises and digital enterprises to teach
- 6) Re-evaluate capacity of vocational education faculty in colleges

4. Conclusion

The direct and in-depth impact of technology devices and IoTs technology today rapidly changes learning need of learners, especially in the field of vocational education and training. Therefore, VETs today are both good at technical skills and capacity of technology and education as well as vocational practice skills, capacity of applying and innovating teaching methods. Therefore, the capacity of VETs is an integration of general core capacity, technical professional capacity, vocational practice capacity, technical teaching capacity, capacity of applying technology and innovating teaching methods.

Based on analysis for impact of IR 4.0 on the VES and current situation of VETs today, this article has suggested a number of solutions for teacher development to meet the requirements on renovation and improvement

5. References

- [1] Ministry of Labor - Invalids and Social Affairs (2018), Draft on pilot project of training and retraining for workers to adapt to the 4th industrial revolution, Hanoi.
- [2] Teemu Valtonen, Erkko Sointu, Jari Kukkonen, Sini Kontkanen, Matthew C. Lambert, Kati Mäkitalo-Siegl, TPACK updated to measure pre-service teachers' twenty-first century skills, *Australasian Journal of Educational Technology*, 33(2017) 15-31.
- [3] Okworo Gibson Samuel, Caleb E.E, Touitou Tina C, The Technical Teacher, Teaching and Technology: Grappling with the Internationalization of Education in Nigeria, *International Journal of Scientific Research in Science and Technology*, 2 (2016) 259-265.
- [4] Department of Teachers, General Department of Vocational Education (2018), Reality and solutions for vocational skills assessment to standardize team of vocational educating teachers, *Documents of Preliminary Conference on evaluation and certification of National Vocational Skills*, Da Lat.
- [5] Department of teachers and enterprise managers (2017), *Orientation for building and developing teachers to meet the requirements on comprehensive innovation of vocational education*, General Department of Vocational Education, Ministry of Labor - Invalids and Social Affairs.
- [6] HCM Ministry of Labor - Invalids and Social Affairs (2017), *Circular regulating professional standards and qualifications of vocational educating teachers*.
- [7] Do Van Dung, Solutions for development of vocational educating teachers, Scientific conference paper on planning network of vocational education institutions and development of vocational educating teachers, *National Council of Human Resource Education and Development, Sub-Committee for Vocational Education*, Hai Phong, (2018) 11-19.

Funding: No funding was received for conducting this study.

Conflict of Interest: The authors have no conflicts of interest to declare that they are relevant to the content of this article.

About The License

© The author(s) 2019. The text of this article is open access and licensed under a Creative Commons Attribution 4.0 International License