

Competency Framework Of Technical Lecturers At Universities

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Abstract: In the context of socio-economic development and international integration, high-quality human resources, especially human resources in technical fields. This requires vocational education to train a high-quality workforce for the socio-economic development of the country. Teaching staff plays an important role in determining the quality of training. As a result, the faculty, especially the technical faculty members, must have the capacity and qualities to meet the requirements of training high-quality human resources for the labor market. This paper analyzes the competency framework required for the faculty of engineering in the universities.

Keywords: Competency framework, technical lecturers, universities, Vietnam

Introduction

Lecturers are high-level intellectuals, a key force determining the quality of training through directly transmitting ideas, orientations, knowledge, and good living values to learners, the young generation, and the future of the country. Although each university has its own characteristics of training goals and requirements for each profession, the development of faculty is important for meeting the requirements of improving the quality of education. education in the age of education 4.0 [1]. That is also the premise to motivate lecturers to work enthusiastically and bring positive energy to students, contributing to bringing a profound change to the quality of the university's training in particular and the background of the country's education in general.

The requirements for improving the quality of education require a transition in the role of the instructor from transmitting traditional knowledge to the instructor and designing an advanced learning environment, helping learners to self-direct their work [2]. Therefore, lecturers need to improve their qualifications and capacities with training methods using technology for teaching, in addition to the application of advanced forms and online models in teacher training. towards

research and improvement of foreign language skills. The urgent issue now is to update and develop the system for evaluating the competency standards of lecturers, from which to design and build appropriate strategies and measures to improve the faculty's capacity, to meet the needs. of society, requirements of education 4.0.

The rapid development of science, engineering, and technology, especially the industrial revolution 4.0, has changed the production industry of countries. Under such a circumstance, teams of lecturers, particularly technical lecturers (TL), play a decisive role in universities' training quality and human resources' output quality. Therefore, the establishment of a competency framework of teams of lecturers in general and technical lecturers in particular at universities in order to develop competency-based directions for lecturers is an essential factor asserting the strengths of universities today.

Research Results And Discussions

Positions and roles of technical lecturers in today's context

Positions of technical lecturers in today's context:

Technical lecturers at universities are recruited from different sources and assigned in accordance with their training majors. In particular, lecturers graduating from pedagogical institutions are assigned to teach courses of pedagogical knowledge and general courses; and lecturers graduating from technical universities or institutions are assigned to technical majors. Especially, in the course of training, universities retain outstanding graduates of appropriate majors and high-quality workmanship as lecturers of practice courses. However, these lecturers still have limited experience and do not undergo the production process in reality [5]. Lecturers of technical majors, as well as university lecturers, must meet lecturer requirements as stipulated in Article 54, Law on Higher Education (2012), in which 1) lecturers of higher education institutions must have a clear identity, good personality and conduct, and good health condition as required; and meet expertise and profession requirements as stipulated in item e, clause 1, Article 77 of Law on Education; 2) The standardized qualification of university lecturers is Master degree or higher; 3) Titles of lecturers include assistant lecturer, lecturers, senior lecturers, associate professor, and professor.

Roles of technical lecturers in today's context:

Today, scientific engineering and technology are increasingly developing, which has fundamentally changed the social system, and the industrial revolution 4.0 is also becoming a matter of global concern. Therefore, the positions, functions, and roles of universities and lecturers have also been subject to changes. UNESCO has changed the concept of the positions, roles, and duties of lecturers. Particularly, today lecturers are not only responsible for transmitting knowledge but also performing the function of organizing and managing educational and teaching activities with the aim of shaping students' personalities to meet social requirements [9].

According to the Resolution of the 11th National Congress of the Communist Party, it is emphasized that "the development of teachers is crucial" in the strategy of "fundamental and comprehensive renovation of education". Lecturers in general and technical lecturers, in particular, have an extremely important position in the process of education and training, as this is the decisive labor force in the development of education

and training. At the same time, lecturers of technical majors are also a key factor deciding in the training quality of human resources with technical skills, meeting the demand for human resources in the socio-economic development of the country in general and the locality in particular [10].

Lecturers in general and lecturers of technical majors, in particular, are the transmitters of the quintessential knowledge of humanity, as well as the organizers, instructors, and guides of students during their dynamic, active, and creative acquisition of knowledge. Besides, lecturers also act as educators giving students career orientation in the future. Lecturers, through their activities, directly and actively contribute to students' personality shaping and development. Along with the teaching tasks, lecturers are required to fulfill their responsibility of scientific research, contributing to the improvement of teaching and learning quality at universities and the advancement of their professional qualifications.

Tasks of technical lecturers at universities in today's context

Lecturers of technical majors at universities have specific functions and undertake diverse and sophisticated tasks and jobs as follows:

- Teaching responsibility: The responsibility includes teaching theory and practice courses in classrooms, workshops, laboratories, and production facilities and implementing a range of teaching-related tasks. Lecturers are required to have extensive knowledge of the relevant expertise and technical pedagogical skills. In particular, as for practical skills, lecturers have to apply their acquired knowledge, skills, techniques, and experience to successfully solve all practical tasks in professional activities [6].

Lecturers of technical majors, while in their teaching of production practice at universities, are responsible for providing learners with skills, techniques, and abilities to have technically creative operations, movements, and actions and possess technical thinking, in particular (-) Preparing and implementing productions plans and processes, having an understanding of tasks, preparing materials, technical tools, technological processes and being able to carry out working operations and movements; (-) Being able to prepare for the production process by choosing

materials, tools, parts, and fixtures and organize the workplace; (-) Having the skills and techniques in modifying and checking the production process, which involves checking equipment, considering and evaluating the nature of working operations and controlling the product quality; (-) Acquiring skills and techniques in production and maintain the working condition of specialized equipment [6].

In order to form students' skills and techniques in the course of practice teaching, lecturers have to conduct their instruction in the following stages: (i) Introductory instruction is given to identify sufficient and appropriate orientation basis for practice. Lecturers provide students with clear instruction concerning the upcoming jobs and familiarize students with equipment, tools, machines, technical documents, workplaces, regulations, processes, and procedures through visual demonstrations of operations. The purpose of this stage is to form a general view of technological operations for students; (ii) Regular instructions are seen as the most important stage in forming students' skills and techniques, honing their operations and movements, helping weak students as requested, monitoring the practice effectiveness, checking and assessing the practice results in accordance with the established purpose and requirements; (iii) The instruction ends after the practice process with the answering of students' inquiries, giving assessment scores to each student; recollecting equipment and devices and introducing preparatory tasks for the next practice session.

- Responsibility at production facilities: Lecturers' responsibility is not limited to tasks implemented at universities' workshops but is extended to production facilities, where students can conduct their learning in combination with reality production. Lecturers are able to provide on-site instruction for students at production or service facilities and universities' workshops, as well as organize field trips and internship programs for students at factories, enterprises, businesses, etc. Through this task, lecturers are further trained in the context of reality production; therefore,

they have practical conditions to access modern tools, devices, and technologies [6].

- Responsibility for scientific research, learning, and self-improvement: In the context of rapid changes in science, technology, and market-oriented production operations, technical lecturers have to constantly improve the competence of market research to apply their study results in the production reality for enhancing the quality of education, serving the society, and acting as scientific and technological centers on the local and national scale.

- Social responsibility: Along with the development of society, positions and relationships of lecturers are also expanded. Lecturers need self-training in these relationships. Social knowledge and experience have become important factors in the process of improving lecturers' professional quality and effectiveness.

Competency framework of technical lecturers at universities

Competency diagram and profession diagram of technical lecturers:

The competency diagram of technical lecturers provides a general and genuine picture reflecting their activities. Apart from teaching competency, technical lecturers also have other competencies to participate in many different activities. Technical lecturers not only have the teaching capacity as a pedagogist with the required qualifications and the ability to organize and manage day-to-day vocational and educational activities but also possess engineering expertise as a skilled worker with the required qualifications of a specific technical major. They also have the managerial ability to manage the teaching activities at universities as well as practice activities in enterprises. Besides their teaching responsibility, they have to participate in other activities with competencies concerning scientific research and social activities. As specified by Phan Chinh Thuc [12], the competencies of technical lecturers in general and vocational lecturers in particular are expressed as in diagram 1.

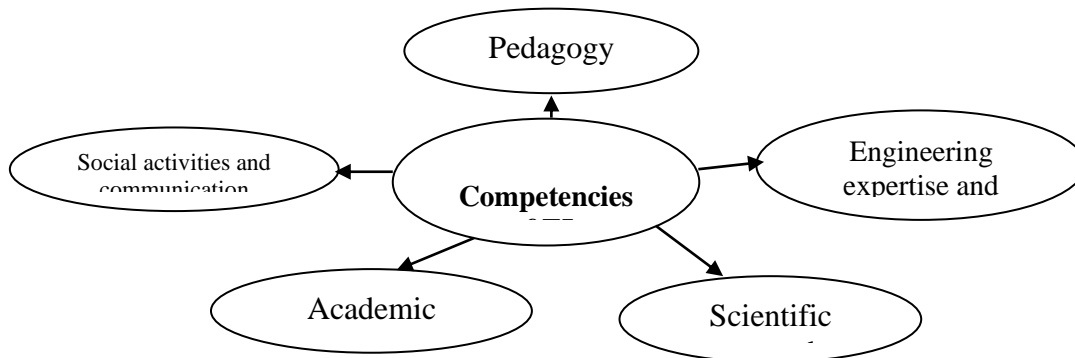


Diagram 1. Competency diagram of engineering lecturers

According to the competency diagram, to organize the training and instruction program for technical lecturers, it is prerequisite to identify the standard of the mentioned competencies and adopt a synchronous development of those competencies. Technical lecturers are recognized as having sufficient capacity in vocational activities when the identified competencies are formed, coordinated and promoted in an effective manner. Of all the specified competencies,

engineering expertise and technique serve as a key competency directly affecting the development of lecturers.

Besides, the identification of technical lecturers' activities also makes an important contribution to the training and instruction of vocational teachers. As specified by Nguyen Duc Tri [13], the vocational analysis by Dacum method has introduced the activity model of technical teachers as in diagram 2:

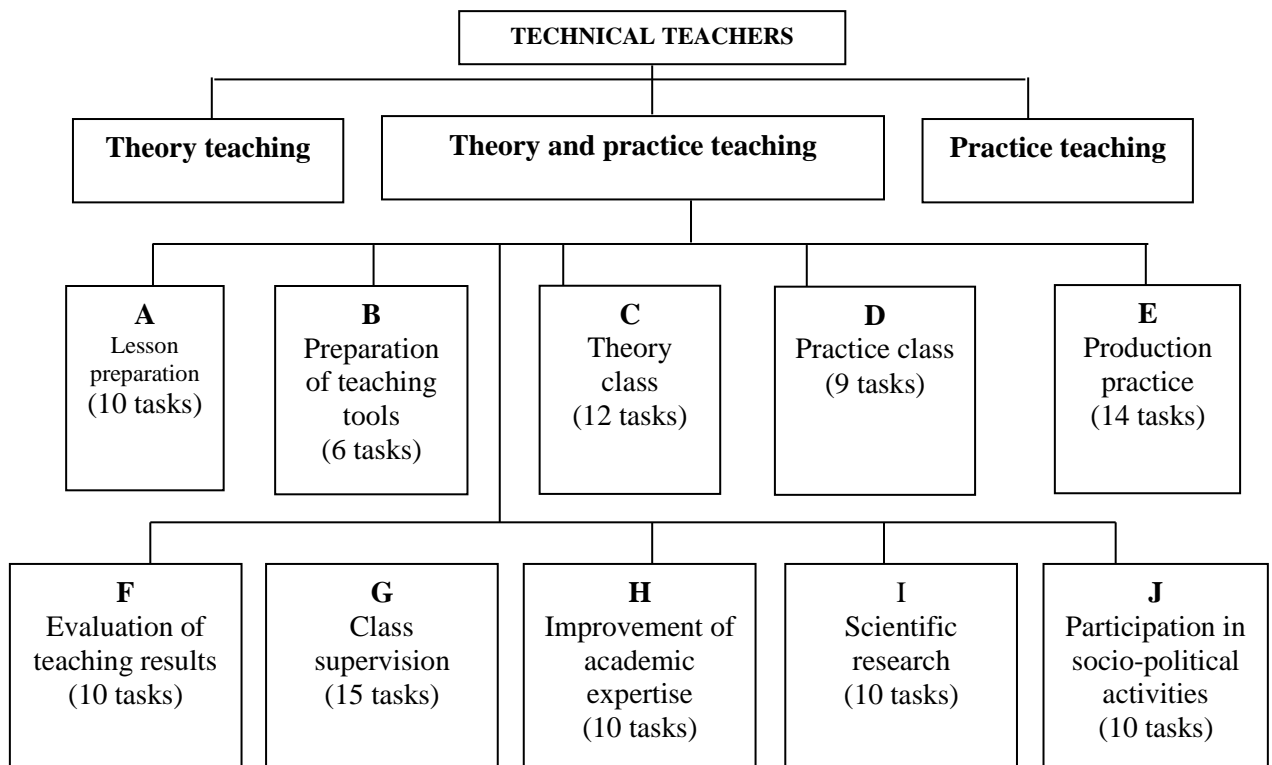


Diagram 2. Activity model of engineering teachers [13]

Professional competency:

A worker is required to have the professional competency of his job. The content of the professional competency varies from

profession to profession, but the structures of the professional competence in all professions are the same. On the basis of professional analysis according to Dacum method, the

structure of professional competencies of technical lecturers involves:

- Technical lecturers are required to have a solid and profound knowledge of their professional expertise as expertise theory is the foundation for skill development. All skills and techniques of a profession are formed on basis of the theory constituting those skills and techniques. Therefore, technical lecturers have to meet the following criteria: (i) Meeting the standard of training qualifications of university lecturers as stipulated by Law on Higher Education; (ii) Having extensive, profound, accurate and scientific academic knowledge; updating professional knowledge, information and technology on a regular basis to improve the quality of teaching and scientific research; (iii) Having specialized knowledge; having a good understanding of practice and the ability to associate and apply such knowledge in teaching activities and scientific research.

- Hands-on operational skills: The main responsibility of technical lecturers is to train technical human resources for the labour market. Therefore, technical lecturers are required to: (i) Have solid hands-on operational skills to apply professional knowledge in dealing with issues arising in professional practice; (ii) Be proficient in profession-related skills and regularly update new professional skills.

- Organization and management of production: The training objective of technical majors at universities is for applied career orientation; therefore, professional tasks implemented by technical graduates involve: (i) Organizing technological processes and production; managing technology; (ii) Solving problems arising in production, studying and applying new technologies. Therefore, besides the basic factors mentioned above, technical lecturers also need production competency involving (iii) the ability to access production reality and new technologies to include in lectures, prepare lesson plans, and organize the production.

Technical thinking competency:

As emphasized by Tran Khanh Duc [8], the development of science–technology and practical activities (production, service, and research) is in line with thinking activities. The diversity and complexity of activities, especially in the process of modern technology development and knowledge economy, has

given rise to the investment of knowledge in products and intellectual and thinking activities.

Today, the working nature of many professions is changing as intellectual workers have been replacing manual workers. It is estimated that, in the course of adjusting and repairing machines and equipment, the amount of time allocated to technical diagnosis and identification of causes of failure and solutions occupies 60-80% of the full process. This means that a majority of the time requires thinking competency while the remaining 20-40% is allocated to repairing. Thinking competency is formed and developed during the technology practice activity to deal with technical problems (tasks) which require specific and unique factors compared to the usual way of thinking. This process is commonly known as technical thinking.

The above analysis shows that the current technical thinking competency is very important to technical majors. As a technical teaching instructor, it requires technical lecturers to have dynamism and flexibility in solving technical issues, helping students understand and practice well in the learning process, especially during practical learning hours and participation in production activities at universities as well as in reality.

Teaching competencies:

Teaching competencies is the specific capacity of teaching profession, involving the organization of vocational training and association with enterprises. These belongs to most crucial group of competencies that technical lecturers are required to have to well perform the technical teaching. Teaching competencies are constituted by:

- Preparation competency: This competency requires technical lecturers to have a profound understanding of learners, develop objectives, teaching plans and teaching materials, choose teaching methods and instruction steps to form students' skills, prepare suitable teaching tools and equipment. Lecturers also needs to anticipate pedagogical situations and methods of handling them. All of these requirements should be included in the lesson plan.

- Performance competency: Technical pedagogical capacity of lecturers is expressed when conducting technical teaching. Lecturers have to organize all activities of the class. This

competency requires lecturers to have the necessary competencies as follows:

+ The competency to proficiently and effectively use the teaching methods, especially teaching practical skills and professional practice to students in accordance with the objectives and content of applied career-oriented teaching, characteristics of learners and training environment;

+ The competency to use teaching equipment and means: Being able to use teaching aids appropriate to teaching objectives, content and methods. Lecturers have to regularly update and use modern teaching aids to improve the teaching effectiveness;

+ Language competency: Language is a means of communication for lecturers. Thanks to language, lecturers are able to convey information to learners, control the learning process and practice of learners. Lecturers must be able to well express themselves and have clear language use;

+ Communication competency: The essence of teaching is the communication process between lecturers and learners. This competency includes actions related to the pedagogical establishment of relationships between the educator and the object of education. The communication competency is demonstrated in the evaluation and development of the subject's needs to coordinate teaching and learning activities in terms of politeness in pedagogical behavior.

- Evaluation competency: Evaluation competency is very important, and lecturers base on this competency to understand the level and ability of students in order to timely improve teaching methods. This competency requires technical lecturers to: have a firm grasp of the training regulations, types, methods and techniques of examine and evaluating students' learning outcomes according to the competency-based approach; carry out progress assessment; monitor and supervise the learning process of students in different forms of teaching ; design and adopt different test forms - evaluating according to the competency-based approach and paying special attention to the evaluation of professional skills and attitudes; instructing students to conduct self-evaluation in their learning process (including students' self-evaluation and peer evaluation); supervising

the self-evaluation process of students to ensure the accuracy, fairness and objectivity; coordinating with enterprises in evaluating students' learning outcomes, including coordinating in designing assignments for learning plans and projects; regularly communicating with enterprises where students conduct their internship or practice to monitor students' learning process; cooperating in evaluating students' internship or practice results; giving instructions to enterprises in evaluating students' learning outcomes concerning developing guidelines for evaluating students' learning outcomes of the responsible course/module; advising on methods and techniques for evaluating students' learning outcomes according to the competency-based approach; using results of evaluating students and students' and enterprises' feedback to modify and improve the teaching activities.

Scientific research competency:

One of the tasks of lecturers of technical majors is to conduct scientific research to apply research results into practice in order to improve the quality of education, serve the society, and act as the local and national scientific and technological center.

The scientific research competency of lecturers of technical majors is the ability to effectively carry out scientific research activities according to identified problems and objectives. This competency includes the ability to detect technical problems, develop research proposal, organize and conduct research, process research data and figures, publish and apply research results in practice, instruct students in scientific research, and evaluate students' scientific research results [14].

The scientific research competency of lecturers, not naturally available, must be trained, fostered, formed and developed through educational research activities. To develop the scientific research competency, lecturers have to receive training in scientific research capacity and practice scientific research skills and, most importantly, individual lecturers have to learn by themselves to develop their own scientific research competency.

The competency of developing and performing educational and technical training programs

One of the duties of lecturers is to participate in the development of training plans, content and programs and the implementation of training programs. Training programs at universities are flexible and open to adapt to the program modifications in response to changes in the labor market within each industry.

To carry out this task, technical lecturers need to have the ability to develop and implement the training programs. This competency requires lecturers to have the following basic qualities: (i) Understanding of the process, methods and techniques of developing training programs to meet the needs of the labor market and the profession; (ii) Participating in/organizing surveys, using opinions of stakeholders (employers, former students, experts...) to analyze training needs and determine training requirements; facilitating the development, adjustment and updating of professional profiles, competency profiles and training programs; (iii) Developing, adjusting and updating the training program content on the basis of competency profile and professional profile; (iv) Proficiently designing and tools of training program evaluation; (v) Implementing and guiding the implementation of training programs in accordance with regulations and applied career orientation.

Competency in building relationships with enterprises:

In order to well perform their roles and tasks, technical lecturers also need to have the competency in building relationships with enterprises and professional development. The competency in building relationships with enterprises is an important capacity to help lecturers perform their role of bridging between schools and enterprises, thereby establishing long-term relationships with enterprises in cooperation in skills training and professional attitude for students through practical experience, expert visits and feedback collection from enterprises. In addition, technical lecturers' competency in building relationships with enterprises is reflected through basic criteria: (i) Having experience in working in enterprises or collaborating with enterprises; (ii) Understanding the culture, organization and operation of enterprises in the professional field; (iii) Planning, finding and building relationships with enterprises in the industry; (iv) Regularly maintaining the

relationship and communication between universities and enterprises; collecting feedback from enterprises to improve the quality and effectiveness in the cooperation between universities and enterprises; (v) Planning, implementing or participating in university-enterprise cooperation activities; especially in the field of scientific and technological research and students' internship and practice.

Professional development competency:

Professional development competency serves as an important basis for standardizing and improving the quality of technical lecturers as well as the basis for developing work competencies to meet innovation requirements and improve training quality.

The professional development competency of lecturers of technical majors at universities is reflected in the following criteria: (i) Self-evaluating and preparing plans for career development and improvement of professional skills and levels; (ii) Learning and updating new knowledge in professional fields to improve the quality of teaching and scientific research; (iii) Being able to use foreign languages in professional development activities: Reading and understanding foreign documents; directly exchange and work with foreign experts/scholars in specialized fields; seeking cooperation opportunities; maintaining relationships and communications with enterprises; (iv) Applying information technology in professional development activities: Exploiting information and learning resources, scientific research materials on the Internet; seeking cooperation opportunities; maintaining relationships and communications with enterprises; (v) Being able to use specialized software and software for teaching and scientific research; (vi) Consulting, assisting and supporting colleagues in career development.

Therefore, the competency of university lecturers is not a capability; the competency cannot be developed in people with inappropriate specialized knowledge in terms of technical education; the competency is also not reflected in qualifications or work history but in real existence making the difference in each lecturer [14], [15]. This is the combination of the professional competencies including teaching, scientific research, training program development and implementation, business relationship, and career development.

The combination of these competencies is called the professional competency system of technical lecturers.

Conclusion

The determination of the competency framework of technical lecturers at universities plays an important role, serving as the basis for training and fostering to development of the teaching staff in general and university lecturers in particular, especially technical lecturers. This is an important factor in deciding the success of training high-quality human resources in line with the socio-economic development of the country, and the development of the industrial revolution 4.0 with the trend of developing intelligent artificial intelligence. In addition, developing a team of teachers and educational managers is also a key solution to the project of the fundamental and comprehensive reform of Vietnam's education today.

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