

Proposing The Structure Of IT Competence Framework For Teachers In Online Teaching

Phan Chi Thanh¹, Ngo Tu Thanh²

Abstract - In the digital age, the Information Technology (IT) competence in teaching is one of the important occupational skills of teachers. Therefore, the definition and application of IT competence in accordance with the practical conditions of education in Vietnam and the general trend of the world are essentially put into consideration.

This study aims to identify the structure of IT competence framework for teachers in online teaching based on investigating the needs of applying IT in online teaching. The parameters in this paper are used to determine the stage of research towards building a framework for the using of IT competence in online teaching, which requires the criteria to successfully organize online teaching activities. This also includes a variety of theoretical and practical pedagogy of technology in education and online education.

Keywords - IT in education, IT competence, IT competence framework, Online teaching

1 INTRODUCTION

In today digital world, in addition to the basic IT application in teaching, the identification of criteria and the demand for using of IT competence in online teaching is an indispensable trend in education. Many research results show that the integration of technology has many benefits for both teachers and students in the teaching process. Therefore, in addition to the teachers need IT competence to improve the quality of teaching activities of themselves, teachers can shape and develop IT competence for students through training.

The research was developed and distributed to experienced online teachers to assess the importance of online teaching tasks with a 7-point Likert measuring tool (Paula Mae Bigatel et al.'s, 2010). Effective online course development depends on: course content is set good design, the interaction between teachers and learners, the teachers are well prepared and fully supported; create a sense of online learning community; and the rapid advancement of technology (Sun, A., & Chen, X, 2016), which demonstrates the impact of technology that brings fundamental success in online teaching and is essential in organizing and implementing courses.

This study aims is to assessment needs and identifying IT competence in online teaching, to propose criterion, requirements and procedures for using technology tools and resources from the IT competence to communicate, organize, store, administer and assessment in online teaching. The research process was carried out with methods of summing up experiences, investigating education and seeking expert opinions to establish research results. The research's results will contribute to the theoretical and practical pedagogy of technology in education.

2 BACKGROUND OF THE STUDY

By analyzing the concepts of competence, competence can be defined by categories: activity category (competence is the mobilization of knowledge, skills and other personal attributes

excitement, belief, will ... to perform a certain type of work in a given context (The Education and Training Ministry, Vietnam, 2015)); Category of individual attributes (competence is the characteristic of an individual who demonstrates the level of proficiency - ie, can be practiced successfully and certainly - one or several types of activity (Institute of Linguistics, 2010)). Although there are differences in the use of terminology, the commonality of these concepts is that the two characteristics of competence are the competence that is expressed through action and ensures effective operation, good results.

The term of IT is defined as a set of modern scientific, technological and technical tools for the production, transmission, collection, processing, storage and retrieval of information. exchange of digital information (National Assembly of Vietnam, 2006). IT competence is defined as a diverse set of tools and technology resources used to exchange, create, disseminate, store and manage information.

The concept of IT competence in teaching is understood to be the storage, processing, and communication of information by means of electronic means, and through such means to communicate, communicate, and communicate information between many people or group together effectively in the teaching process.

Some IT competence frameworks in teaching:

According to UNESCO: In 2011, the United Nations Educational, Scientific and Cultural Organization - UNESCO set up an ICT (Information Communication Technology) Competence Framework for Teachers, in which the competence framework covers 6 dimensions. In teaching, the teachers include: (1) Understanding ICT in Education, (2) Curriculum and Assessment, (3) Pedagogy, (4) ICT, (5) Organization and Administration, (6) Teacher Professional Learning. Each aspect consists of 3 levels of continuity in the development of teacher competence: Technology literacy, Knowledge deepening, Knowledge creation.

¹ Thanh Phan Chi, Quang Tri Teacher Training College, Vietnam
PhD Candidate at Ha Noi University of Science and Technology, Vietnam
Email: thanhpc.sp@gmail.com

² Thanh Ngo Tu, Ha Noi University of Science and Technology, Vietnam
Email: ngotuthanh2002@yahoo.com

ISTE's technology skills standard for teachers: In 2008, the International Society for Technology in Education (ISTE) published a set of standards for technology skills for teachers including five standards. This standard defines the skills and pedagogical ideas that educators need in the digital age.

In 2011, a standard set of IT competence for pedagogical students (based on UNESCO's IT competence standards for teachers) was consulted at the "UNESCO IT Program" workshop with 6 component competence and 3 levels of development (VVOB, 2011).

3 METHOD

This study used the combination of qualitative and quantitative methods. This would be best equipped to provide the depth of description needed to clarify how the essential needs of using IT competence in online teaching. Based on teacher interviews and review of relevant studies, teaching tasks were identified and included in the survey instruments. In this study section, we used investigation results for data collection and analysis methods.

All interviews were recorded with the permission of the participants, and subsequently translated from Vietnamese into English. The database was initially constructed for each case. Then, each case's data would be organized, classified, edited and analyzed according to the research objectives.

The methods were used in this study, through the study process, empirical analysis and getting of the specialist's view, and the analysis has generated reliable factors. These methods based on ICT competence framework for UNESCO's Teachers (UNESCO, 2011), the results of the study on 7-point scale of Paula Mae Bigatel et al.'s (2010).

The results were analyzed from the investigation and survey data, with which we assess the needs of applying IT competence in online teaching (Fig 1), identify 5 factors associated the criteria of teaching tasks, including 17 corresponding components in online teaching (Table 1); Six steps identify the IT competence framework (Fig 2), and aim the purpose of this study propos the structure of IT competence framework for teachers in online teaching (Fig 3).

4 RESULTS

Current situation of applying IT in online teaching

Online teaching is faculty-delivered instruction via the internet. Online instruction includes real-time (synchronous) and anytime, anywhere (asynchronous) interactions.

In recent years, the schools in the education system have been strengthened with adequate infrastructure and tools in the using and exploitation of IT in online teaching. The system of IT equipment and machinery to support in teaching, the software development, in which the educational software actively supports the teaching process.

Surveyed on 102 teachers teaching at college and university in the region. Survey forms: questionnaires, live interviews and online surveys (via google docs forms, zalo, and other media).

The results of the analysis conducted through the survey factors of the demand for using IT in online teaching as follows:

- *The attitude of teachers the using of IT in teaching, Level of teacher using IT in teaching and communication:* The most teachers have used the internet as a tool to support information search to improve professional skills, but still some teachers have not fully utilized the internet. The teachers have used various forms of communication such as email, forums, social networking sites to communicate effectively with colleagues. Nearly half of the surveyed teachers said that they not often used communication technologies.

- *The need for IT competence framework in teaching:* The issues to be investigated include:

+ The urgency of the introduction of using IT competence framework for teachers.

+ Self-assessment of proficiency the use of IT equipments in teaching.

+ Assessment of coherence between teaching methods and the use of IT in teaching.

+ Assessment the level of IT application in teaching, from data storage, communication to the exploitation of online resources to teach.

The results from the survey in Figure 1 show the need of teachers to use IT competence in online teaching:

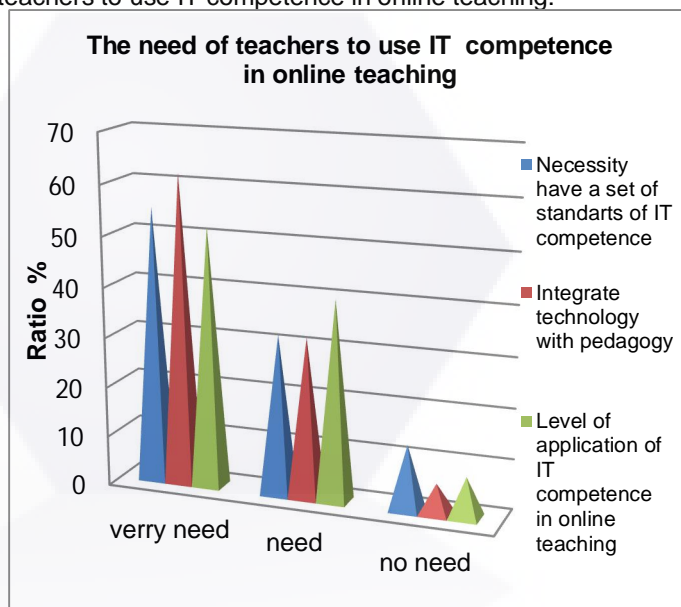


Fig 1 - The need of teachers to use IT competence in online teaching

Assessment: Most teachers are aware of the importance of applying IT in online teaching with the current trend of the digital age with the requirements of competence:

+ There should be a set of criteria for assessing of using IT competence for teachers.

+ Teachers need to know the combination of teaching methods and the using of IT in teaching.

+ Teachers need to know how to use IT to store, communicate with colleagues, and use IT resources to improve their teaching effectiveness.

Principles of identifying IT competence in online teaching

The study show that teaching methods are effective in online learning environments with the organizational and competence requirements for online courses. Online teaching, online education, online tutorials and online courses are used interchangeably in the online teaching methodology (Sun, A., & Chen, X, 2016).

Gascoigne C. & Parnell, J (2014) researched in technology and teaching methods that focus on core skills in online teaching organization, including: (1) technology, (2) pedagogy, (3) administrative competence.

+ *Technology and social communication skills:* Technological skills are fundamental, and although social communication skills are not essential, it enhances the ability to connect with the instructor's students.

+ *Management and organizational skills:* Skills such as time management, providing constructive feedback on students' assignments, proficiency in the content of the course and the ability to submit grades upon request, in accordance with track academic integrity issues.

+ *Pedagogical skills and teaching methods:* Centralized learning models, content-guided instruction and learning guides do not provide content, provide feedback on building, establishing and maintaining online presence.

Paula Mae Bigatel et al.'s (2010) have identified the potential for success in online teaching, which 7-point rule of effective teaching with an online teaching success:

- 1). Encourage contact between students and faculty,
 - 2). Develop reciprocity and cooperation among students,
 - 3). Encourage active learning,
 - 4). Give prompt feedback,
 - 5). Emphasize time on task,
 - 6). Communicate high expectations,
 - 7). Respect diverse talents and ways of learning.
- (Chickering, A., and Gamson, Z, 1987)

Teacher needs competence: In the knowledge creation approach will be able to design learning based on IT resources and environment; use IT to support the development of knowledge creation and critical thinking skills of students; assists students continuously, effectively learning and creating knowledge communities for students and colleagues.

Process of Identifying IT Competence Framework

The IT competency model identifies the knowledge, skills, and abilities deemed necessary for workers to perform successfully in the field of IT. This work was one of many sources that provided a foundation for the teaching curricular guidance (U.S. Department of Labor, 2012).

According to Keengwe & Kidd (2010), the course design process has 5 stages: (1) content design; (2) content development; (3) content implementation; (4) course assessment; (5) modify the content.

Research on materials related to the using of IT competence framework in teaching and the criteria in assessing the using of IT in online teaching. In order to build the IT competence framework in line with the online education and to approach the international trend, we will base on the following principal bases:

- 1) IT Law
- 2) Regulations on the application of IT in teaching by MoET
- 3) IT competence building program of MoIC
- 4) Output standard of students in the university training program
- 5) ICT competence framework for teachers by UNESCO
- 6) Characteristics of online learning model
- 7) Technology factors in online teaching

Through research, practical assessment of the application of IT in teaching and the need of using IT competence in online teaching, we propose a process for identify the IT competence framework in online teaching including 6 steps after:

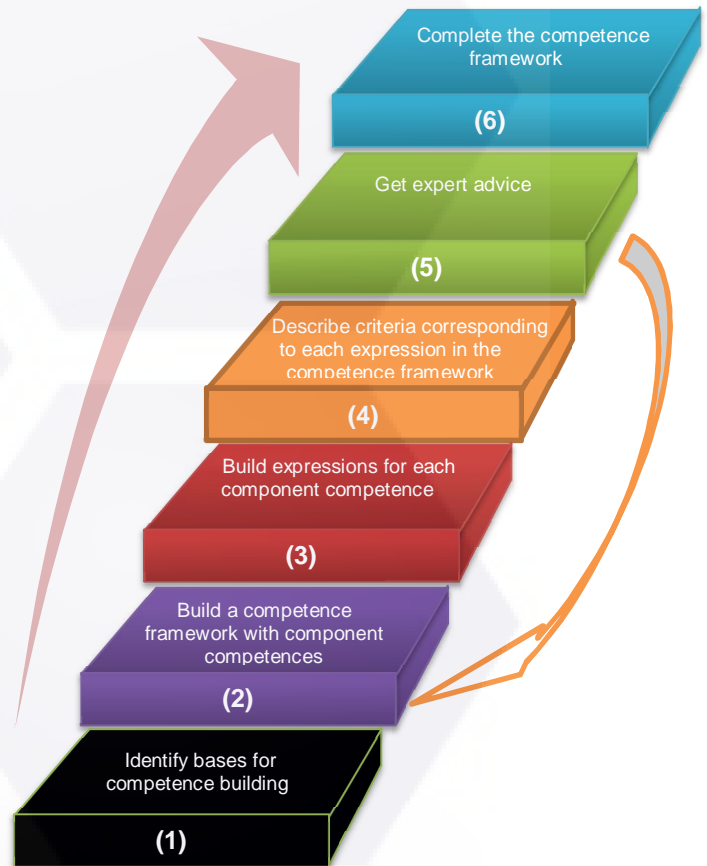


Fig 2 - Steps identify the IT competence framework

Identification of the IT competence framework including indicators and criteria developed on the basis of research, analysis survey data, assessment, control, and ask for experts who are educational researchers and knowledgeable teachers about field of applying IT in general teaching and online teaching in particular, along with some teachers have experience teaching in universities.

After receiving feedback from the experts, the IT competence framework was revised and further submitted for comments (repeat steps (2) <-> (5) of 6 steps on above). This process is repeated until there is high consensus from the experts.

The proposed framework for the use IT competence in online teaching is reviewed on the assumptions set out in the selection of criteria, measurement values and assessment results. How to define criteria, measure the value of criteria,

and evaluate effectiveness when applying the IT literacy framework in online teaching needs to be clarified; The identification of competence framework should cover common competences, speciality competence and managerial and managerial capacities in order to address the elements of mission objectives, criteria and competence requirements in online training promote effectiveness in teaching methodology for competence development.

Proposing The Structure Of IT Competence Framework For Teachers In Online Teaching

Through the results of our investigation and analysis of the successes in online teaching with the support of IT, we propose basic criteria in assessing teaching hours be associated with the using of IT competence in online teaching (Table 1):

Table 1 - The basic criteria of the successes be associated with the using of IT competence in online teaching

Key criteria	Description
<i>Knowledge content criteria</i>	1). Exactly about subject science, about ideology. 2). Qualified and fully meet the learning objectives. 3). Practical, relevant and educational relationships; using the illustrations for the electronic lecture (multimedia, text, film, sound, images, supporting software, etc.). 4). Integrate, interactive learning environment.
<i>Method criteria</i>	1). The teaching method is appropriate to the specific subjects, training. 2). Incorporation of methods in teaching and learning activities; To combine well the application of IT with teaching methods suitable with online content. 3). Promote the competence of learners through online learning.
<i>Vehicle and technical criteria</i>	1). Select appropriate teaching aids and techniques. 2). To combine well the use of means for electronic lectures and other teaching aids and equipment suitable with the content of online lessons. 3). Design of science lesson modules, in line with the subject's characteristics. 4). Effectively exploit the equipment and features used in the technology of the device.
<i>Classroom management and organization criteria</i>	1). Organize and implement flexible promotion, distribution of reasonable time in the parts, stages in the lesson. 2). Organize and control learners actively and proactively in accordance with the content of online lessons; Ensure multi-dimensional interaction between teacher and learner. 3). To develop a mechanism for organizing and managing the teaching process according to the model of online learning.
<i>Results and efficiency criteria</i>	1). Determining the using of IT competence helps teachers to organize positive teaching activities, contributing to the innovation of teaching methods and helping students develop their learning competence from

- knowing, understanding, applying, analysis, assessment, creation.
- 2). Applying technology in building storage systems and sharing resources from online learning models.
- 3). Accurate, effective evaluation in the feedback training results.

Proposing the IT competence framework structure for teachers in online teaching is considered on the assumptions set out about: selection criteria, measurement values and evaluation results. So how to determine the criteria, measure the value of criteria and evaluate the effectiveness when applying the IT competence framework in online teaching needs to be clarified; The building of the IT competence framework must cover the general capacity, professional competence and management and management capacity to solve the elements of mission objectives, standards and capacity requirements in online training to promote efficiency in teaching methods towards developing competence of students.

Based on the reference to the IT competence frameworks of UNESCO and researchers, the author proposes the IT competence framework for teachers in online teaching defined by the following groups of competence:

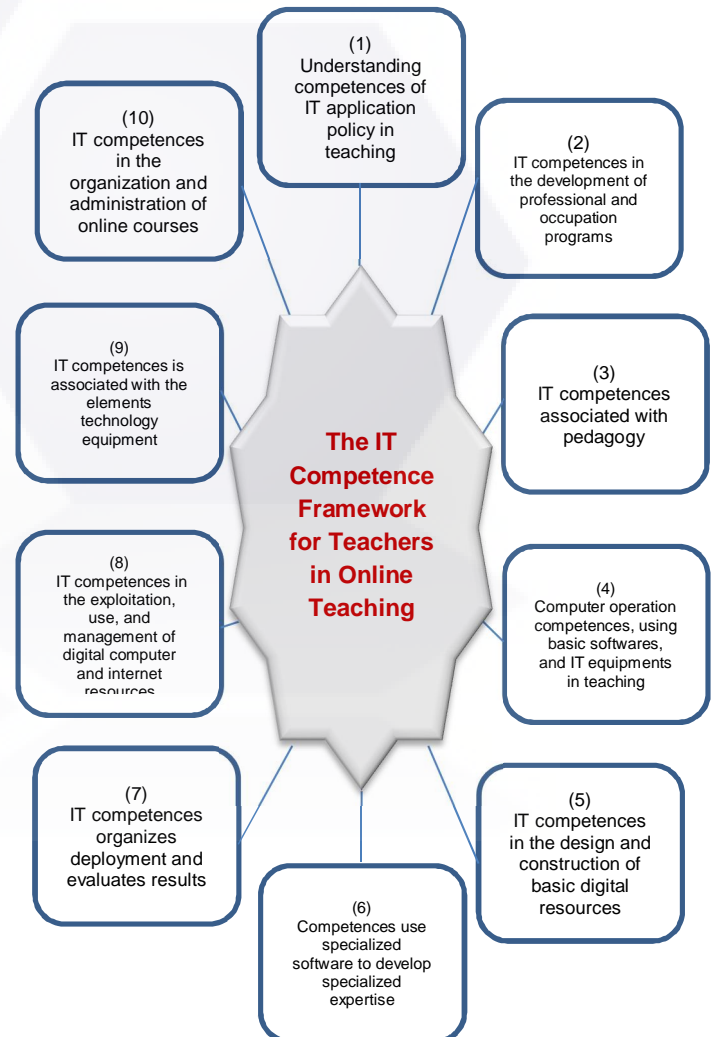


Fig 3 - The structure of IT competence framework for teachers in online teaching

We suggest 3 levels of determination for each expression, as follows:

Level 1: Low level of competence: Teachers has the expression but not often (apply stereotypes, little criticism).

Level 2. Average level of competence: Teachers expression quite often and actively (with their own assessment, criticism).

Level 3: High level of competence: Teachers expression often and actively (with their own assessment, criticism, and creativity), it can be guided and shared with others.

Assessment: The process of identifying the structure of using IT competence framework of teacher in online teaching is designed to exploit the application of IT in online teaching to meet the trend of education period with the public digitization, which is the core of IT and communication, addressing the main objectives of teaching in general and in online teaching in particular in the direction of competence development, including:

- + Knowledge and skills to use basic IT suitable for career objectives;
- + Integrate pedagogical knowledge and skills with technology to improve teaching and learning;
- + Apply technology to handle, store, respond and assessment learning outcomes;
- + Use technology to improve communication, collaboration and effectiveness in teaching;
- + Effectively exploit the application of IT in teaching in accordance with the period of digital technology.

Develop a set of criteria for the use of IT competence according the IT competence framework for teachers which is evaluated according to these 3 levels and is a measure of teachers' use of IT competence in online teaching and this is the issue to be clarified for the next research direction of this paper.

Ability to Apply IT Competence Framework in Teaching

+ Application of IT standards

Focus on applying IT standards to teaching, to show how to apply each standard to anyone who teaches and management levels.

The IT standards are applied to all teaching situations, including the online environment. These include creating appropriate facilities, creating a suitable learning environment, managing time and having the presence of teachers and students.

+ The IT infrastructure

Teachers in a traditional and online course need to understand that if a technical problem occurs, the learner may not attend the course anymore. Teachers need to have solutions to solve problems so that they can help learners follow the course in full.

Access to new technology, including equipment that can help any learner. In order to provide the best results for learners, other websites and online information need to be established in accordance with the universal design principle that product

and environmental design must be done in such a way that everyone can use it for the highest purpose without the need for special adjustments or designs.

+ Learning environment

A positive learning environment consists of many factors. In such an environment, learners can freely express their opinions and they feel they are always supported by their classmates and teachers. Learners need to be more involved in discussion activities as well as collaborating on assignments, applying and applying IT competence frameworks to be set up to ensure.

In order for learning to be the best, the online learning environment needs to have features that support interaction and collaboration among learners in order to create a good learning environment in IT.

+ Study time

Many older learners will be more inclined to take online courses because they face many demands for work, family and study. Thus, timelines need to be clearly defined so that learners can arrange. Therefore, when you need to have online activities at the same time, you need to have a plan in advance so that everyone can participate in the learning environment where the interactive platform is IT.

+ Identify characteristics of teachers and learners

Teachers and learners need to coordinate with each other in creating an educational and social presence in the course of applying IT competency framework, where learners always feel comfortable in interacting with other learners. Teachers and students are often the ones who design the course, always being a central factor in cognitive presence in the course.

Assessment: Education with the support of IT is an innovative solution, supporting students' learning to focus on critical thinking and creativity. However, IT application courses are often controlled by engineering and are designed more for the convenience of online systems and technology. With the advancement of technology, the main factor is IT, the need to increase the role of many technological tools in promoting more effective social interaction and the growth of a learning community through the social networking media and virtual reality environments.

5 DISCUSSION

In the process building of identifying the criteria of IT competence in online teaching, the following points should be discussed and clarified so that the use of IT competence is highly effective:

It is necessary to develop appropriate teaching and learning activities so that learners can express their behaviors or create learning products, which is a testament to the ability of learner online school.

A teaching content can not develop all the elemental competences so the teacher can select some appropriate

elemental competence for assessment corresponding to the learning content.

The assessment of the development of competence is very elaborate and time-consuming, effort of teachers. Therefore, teachers can encourage self-assessment and peer assessment. At the same time, teachers can use some software to synthesize, manage and process the most effective assessment results in the process of organizing online teaching.

What is unknown about the superior hidden of online education and technology and the changing the way design and management of national education programs (Callaway, S. K, 2012) that will be the core of the theoretical and practicality in organizing, assessing online courses with the current trend of teaching capacity development.

6 CONCLUSION

Through the process of surveying, analyzing, evaluating and proposing to identify the framework of IT competence in online teaching, we had gained some positive results with the research objectives set. The basic ability of applying IT in online teaching, identify the criteria of using IT to help teachers identify the goals set for students in each module, from which to build content teaching and selection of teaching methods more appropriate. At the same time creating opportunities for students to participate and evaluate the process helps students recognize what to do and need to improve to achieve the best results. This approach is perfectly suited to the requirements of teaching oriented learners.

Identify barriers in teaching, new role of teacher in the online learning environment to stimulate reflection of effective strategies to enhance the success of teachers in the transition from the pedagogical platform online learning (Keengwe & Kidd, 2010) with IT in teaching makes up the success factor of online teaching.

This study results provide a framework for accessing methods and content in the form of IT competence needed to be included in the curriculum for speciality development. The methodology and results presented in this study may prove useful to educational institutions determine to target professional development curricula for students, who need for using of IT competence in online teaching with the criteria and skills needed to successfully organize online teaching.

The next study is based on the proposed to identify the IT competence in online teaching available from study results of this paper, we will conduct assessing and proposal the process of developing sets of criteria of the using of IT competence framework in online teaching with aims to identify policies and sets of guiding indicators to successfully online teaching courses.

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Author Biography

Phan Chi Thanh¹



In 2006, I received Master degree in Information Technology at Hue University of Sciences, Vietnam. Presently, I am lecturer of information technology at Quang Tri Teacher Training College, Vietnam and PhD Candidate of teaching theory and engineering pedagogy at School of Engineering Pedagogy, Hanoi University of Sciences and Technology, Vietnam. My field of researches concerning to theoretical researches on teaching theory and pedagogy of information technology. I have researched and published some specialized scientific articles published in national and international journals.

+ Specialization: Teaching Theory and Methodology in Information Technology

+ Competing interests section: Information technology in teaching, online teaching and teaching reasoning, competence development teaching.

¹Quang Tri Teacher Training College, Vietnam

PhD Candidate at Ha Noi University of Science and Technology, Vietnam

Email: thanhpc.sp@gmail.com

Ngo Tu Thanh²



In 1989, I received Master degree at Ha Noi University of Science and Technology, Vietnam. In 2000, I received Doctor degree at Vietnam Research Institute of Electronics, Informatics and Automation. From 1980 to 1992, Lecturer of Hue University's College of Education, Vietnam. From 2002 to 2011, Lecturer at Post and Telecommunication Institute of Technology; from 2012 up to now, Lecturer at School of Engineering Pedagogy, Hanoi University of Science and Technology, Vietnam. Fields of interest: Application of knowledge science to improve the innovation of technical teaching at universities of technology, Application in teaching and learning specializing in electronics, in Telecommunications, in informatics basing on foundation of ICT, Cloud computing in education.

Specialization: Teaching Methodology in Electronic Engineering – Information Technology

²Ha Noi University of Science and Technology, Vietnam

Email: ngotuthanh2002@yahoo.com