N.N. Aleksandrova

UDC 377.1

The Mission of Competencies in Quality Management Discipline as a Part of Master's Programme "Civil Construction"

N.N. Aleksandrova[1]
[1]Tyumen Industrial University, Tyumen, Russia

Received: 08.06.2017 / Accepted: 16.12.2017 / Published online: 31.12.2017

Abstract
The article describes the role of competencies in mastering quality management discipline as a part of the master's degree programme "Civil Construction". The competencies are analyzed in accordance with the Federal State Education Standard 3+. In addition, the article presents the methodological bases of "Quality Management" discipline.

Key words: quality management, professional competencies, education programme "Civil Construction", teaching techniques, discipline content.

Under modern conditions, each economic entity is dependent on the numerous factors of internal and external environment. Under such circumstances, to ensure effective performance and prosperity, an enterprise should constantly explore the options for ensuring its development, leadership and competitive advantages. In this context, the most important task for a company is to produce high-quality products that meet both evident and latent requirements. The latter is often hidden and unconscious.

This statement is proved by the current National Standard ISO 9000-2015 that describes the fundamental concepts and principles of product and service quality as an ability to meet the consumers' needs via intentional or unintentional influence on the corresponding interested parties. In this context, the quality of products and services includes not only performance of functions according to the intended purpose and characteristics, but also consumers' value and benefits [1, p. 2].

Based on the above-mentioned, it is obvious that there is a need for the experts focused on ensuring quality both of products, technological processes and all aspects of interaction with the interested parties.

Modern education system is rooted in competency-based approach which implies that each discipline is an important stage in shaping the required graduates' competencies and skills.

In accordance with the Federal State Education Standard of Higher Education (FSESHE 3+) for the master's degree programme 08.04.01 "Civil Construction", the graduates should gain knowledge and experience in the following domains:

1) Innovative, research and design.
2)) Engineering and manufacturing.
3)) Research and teaching.
4)) Project management.
5)) Professional expertise and normative-methodological [2, p. 3].

While designing and implementing master's degree programme, a university is focused on the certain types of professional activity a master student should get familiar with according to the labor market needs,

research and technological facilities of the enterprises.

A graduate who has completed the master's degree programme "Civil Construction" should acquire a number of cross-cultural, integrated professional and professional competencies that include: PC-14 – ability to adjust modern quality management systems to certain manufacturing conditions on the basis of the international standards.

This competency can be acquired by completing the discipline "Quality Management". In this context, a student should fulfill the following triad of requirements (Fig. 1).

Obviously, independently of the functions and sphere of their application, future specialists should possess relevant knowledge and be able to apply it in their professional activity within the following domains:

- the role of quality in the construction company management;
- compliance of modern organization with the bases and principles of the overall quality management;
- the content of the approach to managing quality on the basis of the international standards;
- fundamentals of creating effective quality management system at construction companies;
- responsibility for construction works and development of optimal conditions for the most complete satisfaction of consumers' requests, needs and expectations.

These requirements indicate the importance and significance of the competences related to the quality management, especially within the master's programme "Civil Engineering".

In view of the foregoing, table 1 presents the recommended content of the discipline "Quality Management" delivered within the master's programme 08.04.01 "Civil Construction" [3, p. 2-3]

According to the curriculum of "Quality Management" discipline, lectures and practical classes are the basic teaching formats.

Lectures are recommended to deliver in a traditional format supported by Power Point presentations.

To ensure effective discipline mastering and enhance students' cognitive activity, it is recommended to use active teaching techniques

For example, within the lectures master's students could be asked to express their opinions on the discipline being taught via the "name-quality" method. The essence of this method is that a student writes a term, for example "quality", and a word or word combination related to this notion against each letter of the given term. It is recommended to use this kind of task in a systemic manner, i.e. at the very beginning of the course – to refresh the available knowledge; in the middle of the course – for interim assessment; at the end of the course – to assess residual knowledge. In addition, there is an opportunity to monitor any positive changes in students' knowledge of the terminology and discipline nomenclature, to assess a real knowledge increase. Besides, students might be given the tasks to match the terms and definitions at the end of each lecture.

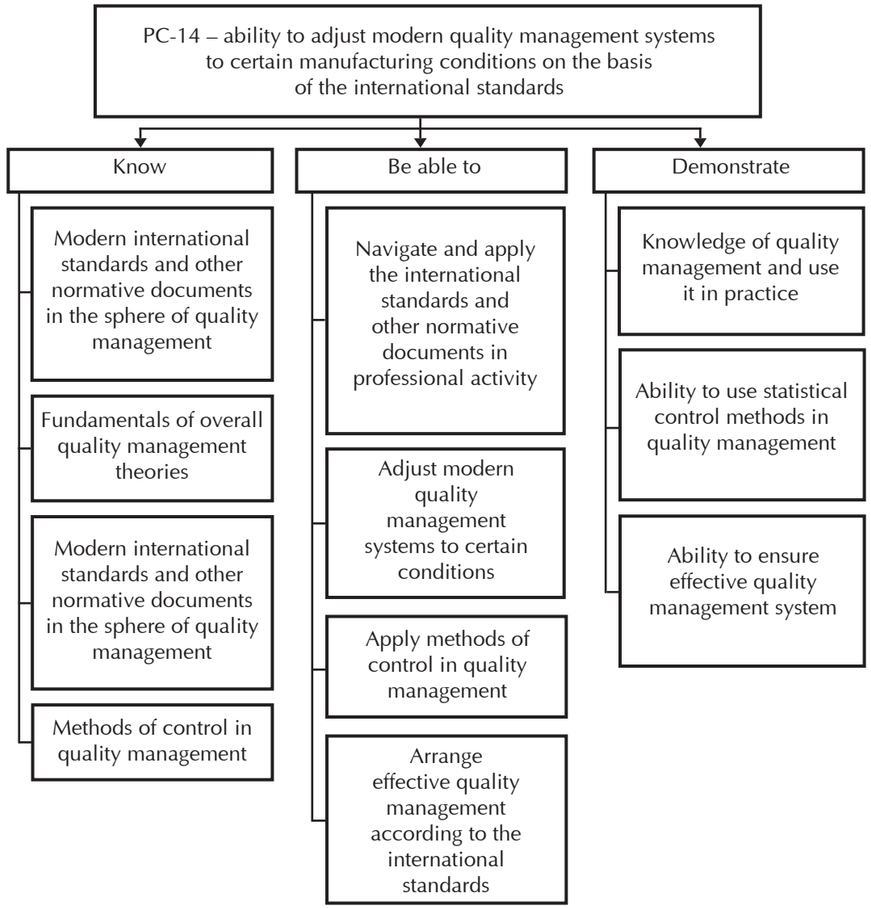
The practice classes within "Quality Management" discipline are recommended to arrange on the basis of traditional and modern teaching techniques.

Most students are enthusiastic about and interested in practice classes organized as a group discussion, i.e. one of the active teaching techniques. This teaching format allows master's students to debate together the issues, ideas and suggestions related to the given task, complement each other or defend their opinions. This teaching technique is recommended for the following practice classes: "Fundamentals of quality management", "Standardization in quality management system", "Compliance conformation and quality management".

Another active teaching technique that can be applied in the practice classes of "Quality management" discipline is a

ENGINEERING EDUCATION
22'2017

Fig. 1. Learning outcomes of the discipline "Quality Management" within competency PC-14



research-based teaching method which implies independent students' search activity. For example, to consolidate the acquired knowledge within the module "Quality as an object of management", students are asked to assess the quality of construction products of various companies. In this context, students gain experience in formulating their points of view and arguments. The algorithm of shaping the competency PC-14 within the discipline "Quality management" is given in fig.2.

To consolidate the knowledge of "Statistical methods of quality management control", master's students could be asked to prepare the presentation that would describe the algorithm of using statistical methods to monitor a certain construction process. Such task is aimed at enhancing students' independent work, developing logic and

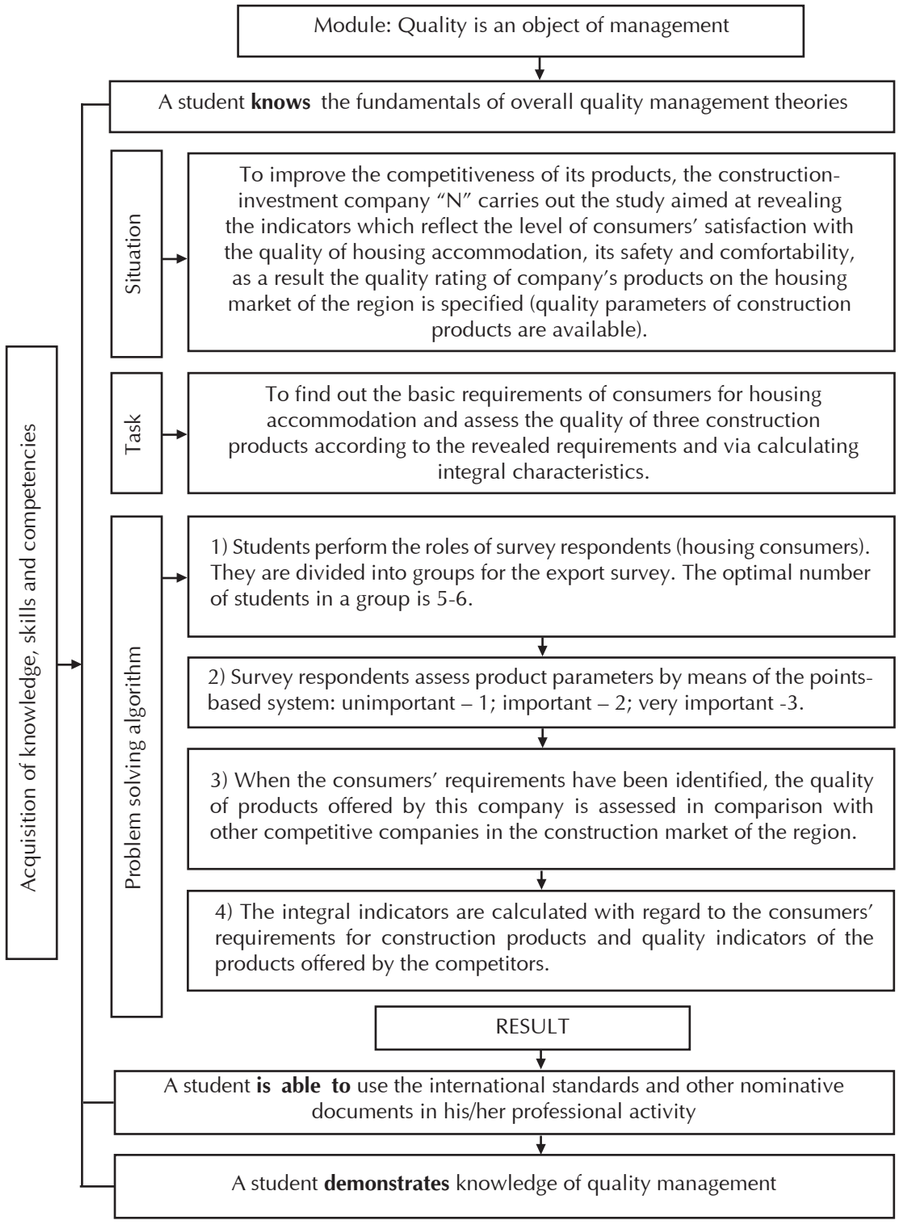
Table 1. Brief description of "Quality management" discipline modules aimed at shaping competency PC-14

№	Discipline module	Content of discipline module
1	Quality as an object of management	Methodology and terminology of quality management. The classification of product quality indicators and characteristics of basic quality indicator groups. Basic conditions and factors that affect the quality of products. The key principles of systemic quality management.
2	Fundamentals of quality management	Systemic approach to quality management. Russian and foreign experience in quality management. General approaches to ensuring quality. Quality management in civil construction.
3	Product quality control system	Basic methods of product quality control. Engineering control system. Product quality control system in civil engineering.
4	Statistical methods of quality management control	Statistical methods of quality control. Statistical methods of quality management.
5	Budgeting of quality assurance	Budgeting peculiarities of quality assurance. The concept of cost and benefit analysis in terms of quality management. The development stages and quality costs.
6	Standardization in quality management system	The notion, goals and functions of standardization. Objects and methods of standardization. The system of standardization nominative documents. Types of standards. Engineering regulative documents and technical conditions in standardization. Russian and foreign standardization companies. Standardization in civil engineering.
7	Compliance confirmation and certification fundamentals	Goals and principles of compliance confirmation. Types of compliance confirmation. Certification system of the Russian Federation. Certification in civil construction. International certification.

reasoning skills and helping students apply theoretical knowledge in a real situation [4].

The use of active teaching techniques for delivering "Quality Management" discipline is an effective way to enhance the teaching process of students pursuing master's degree in "Civil construction" education programme 08.04.01 as they help students develop the required competences and skills that allow them to design, implement, maintain and improve quality management system in the framework of a modern construction company.

Fig. 2. The algorithm of shaping competency PC-14 within the discipline "Quality management"



QUALITY OF ENGINEERING EDUCATION

ENGINEERING EDUCATION 22'2017

REFERENCES

1. GOST R ISO 9000-2015. Nacional'nyj standart Rossijskoj Federacii. Sistemy menedzhmenta kachestva. Osnovnye polozhenija i slovar': [Jelektronnyj resurs] [GOST R ISO 9000-2015. National Standard of the Russian Federation. Quality Management Systems. The main provisions and glossary]: approved by the Order of the Federal Agency for Technical Regulation and Metrology dated from 28.09.2015 № 1390. Available at information-sharing and consultant system "Kodeks".
2. Ob utverzhdenii federal'nogo gosudarstvennogo obrazovatel'nogo standarta vysshego obrazovanija po napravleniju podgotovki 08.04.01 Stroitel'stvo (uroven' magistratury): [Jelektronnyj resurs] [On the approval of the Federal Sate Education Standard of Higher Education for master's programme "Civil Construction" 08.04.01]: The Resolution of the Ministry of Education and Science of the Russian Federation dated from 30.10.2014 № 1419. Available at information-sharing and consultant system "Kodeks".
3. Chikisheva, N.M., Aleksandrova, N.N., Semjannikova, O.G. Upravlenie kachestvom [Quality Management]. Tyumen: TyumSABU, 2015. 240 p.
4. Aleksandrova, N.N., Iogolevich, N.I. Disciplina "Upravlenie kachestvom" v sisteme podgotovki magistrov napravlenija "Stroitel'stvo" [Quality Management discipline as a part of master's programme "Civil Construction"]. Problemy inzhenernogo i social'no-jekonomicheskogo obrazovanija v tehnicheskom VUZe v uslovijah modernizacii vysshego obrazovanija: Pervaja mezhdunar. nauch.-prakt. konf. [Problems of engineering and socio-economical education at engineering university in the context of higher education modernization: the first international research-practical conference]. Tyumen: Publ.TIU, 2017.