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BUILDING QUALITY MANAGEMENT SYSTEM FOR STUDENT
VOCATIONAL TRAINING BASED ON TECHNOLOGICAL
APPROACH

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Abstract

Building a quality management system for training students is aimed at enhancing the training of highly qualified professionals able to work effectively in line with national and international standards, and committed to obtain greater professional development in a knowledge-based economy. Subject to a certain environment, the concept “quality of education” can refer to some endeavors to fulfil the highest quality requirements, the ideal to strive for in academic education, compliance with established educational standards, goals, mission of university and educational programs, the ability of an organization to constantly improve and enhance the educational process. The authors review technological approach applied in the education system and quality management system built thereunder for vocational training of students. Management ensures the quality of vocational training of students through the integration of many components. The system for managing the quality of student training based on technological approach is a constructive means of implementing pedagogical ideas, educational programs, teaching technologies and streamlining the process of student vocational training. Technological approach is considered as a specially organized interaction of all educational agents, aimed at achieving certain learning outcomes. Quality management of student vocational training based on the technological approach embraces diagnostic and operational presentation of expected learning outcomes; diagnostic tools to evaluate the current state and forecast trends in the nearest development (monitoring) of the system; a set of technologies; building of an optimal training model for given specific conditions; feedback mechanism.

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1. Introduction

Today we can observe that pedagogy has entered a new technological era. The pages of scientific publications (Bespalko, 2009; Bordovsky et al., 2019; Bulaeva & Isaeva, 2018; Guzeev, 2009; Monakhov, 2012; Podymova, 2019; Polat, 2003; Potashnik, 2018; Selevko, 2016; Uman, 2017; Utkina, 2013) contain a huge number of combinations of the concept “technology” with various didactic terms including pedagogical technology, educational technology, teaching technology, communication technology, modular technology, group learning technology, interactive technology, etc. Most authors give their own definitions for each technology. Therefore, today there is no common understanding of what technology is within the education system.

2. Problem Statement

The authors asked about the possibility of applying a technological approach not only in the education system, in general, but also about the possibility of applying it to build a quality management system for vocational training of students.

3. Research Questions

The hypothesis of research is the thesis that once used technological approach can provide high-quality management of vocational training of students through the integration of many components including the quality of theoretical and practical training of students; the quality of programs and learning technologies; the quality of teaching and the quality of self-study of students; quality assurance in the higher education; the quality of material and technical base; student satisfaction with the educational process and its outcomes. Herewith the paper describes the subject addressed.

4. Purpose of the Study

The paper aims to provide a comprehensive analysis of the concept “technology” and its use in education in relation to technological approach and building quality management system for vocational training of students, consistent with the principles of the international quality standard.

5. Research Methods

The research methods involve content analysis of literature on the quality and quality management of education, the use of technological approach in pedagogy, participant observation of university and teaching activities, interviews with students, teachers, university leaders and potential employers on the satisfaction with the quality of vocational training of students.

6. Findings

We always use an English equivalent to determine the meaning of the foreign word “technology”. For example, the phrase “pedagogical technology” means the science of pedagogical art or the science of

pedagogical skill (*tech* – “art, skill” and *logos* – “knowledge, teaching”, “science of art” or “science of craft”) (Fatkhudinov, 2016).

In the minds of Russians, the word “technology” does not refer to a unique demonstration of craftsmanship, but to routine operations performed in production. Technological process is usually referred to as a controlled production process, consisting of a series of operations based on scientific laws. A technological chain consists of sequential procedures that turn an object to a certain state. A sequence of such procedures forms an algorithm for performing activities. Technological approach can be split into the following necessary production components including a flow chart describing a sequence and scope of operations; an input; an outcome; diagnostic tools for the initial, intermediate and final state of technology system; means for basic and corrective actions; feedback mechanisms that ensure the interaction between production and diagnostic means (Utkina, 2013).

A brief overview of technological approach in industry helps to understand the reasons for technological research to appear in education. The growth of large-scale industrial production in the early 19th century determined the need for massive education of the younger generation. Education acquired a production-like character, which was due to the availability of technology. Massive education led to standardization and unification of the process, creation of a quality control system. This is how the technology of educational process appeared (Uman, 2017).

Polat (2003) showed that the term “pedagogical technology” appeared in its modern meaning in the 1920s. It was provoked by the endeavors to integrate new technical means into the educational process. Anton Makarenko supported technological approach to complement educational process. In his book “Pedagogical Poem” he wrote: “Our pedagogical production was never built on technological logic, but always on the logic of moral preaching ... That is why we simply do not have all the important production components like workflow, recording of operations, design, the use of designers and devices, rationing, control and rejection.”

Since the second half of the 20th century, scientists from Western Europe and the United States have been developing technologies for the educational process. With technical means integrated into the educational process, the term “teaching technology” has become widespread. At that time, technological approach was widely discussed in the foreign press and at international conferences. Consequently, two directions were identified. One of the directions linked technological approach with the integration of technical means into the educational process. The other direction, technological approach to the construction of the educational process, begins to evolve, a new term “teaching technology” appears (Selezneva, 2017). This concept is very broad and can describe any technologies used in various subsystems of education (management, material support, finance, professional development, training, educational process, etc.). In this context, the authors are interested in creating quality management system for vocational training of students based on technological approach. This is a specially organized interaction of all educational agents, aimed at accomplishing certain objectives that reflect the quality of education.

In different countries, the concept “quality of education” is semantically similar. There are some country-bound terms, though, adopted in national education systems. Most often, being a multidimensional, multilevel and dynamic concept, quality in higher education in different countries is

understood as academic quality, i.e. the quality related to an adopted educational model, some established mission and learning objectives, and the standards defined for this model.

The quality comprises:

- consistent actions among stakeholders (meeting the requirements set by the government, university, students);
- inputs, processes, deliverables, missions, objectives, etc.;
- features of the academic environment;
- historical benchmarks in the development of higher education (Burlakova, 2014).

Subject to a context, the concept “quality of education” can refer to some endeavors to fulfil the highest quality requirements, the ideal to strive for in academic education, compliance with the established educational standards, goals, mission of the university and educational programs, the ability of the institution to constantly improve and enhance the educational process.

In foreign systems of higher education, the term that in Russian is defined as “assessment of the quality of education” varies. Thus, in the Scandinavian countries it is “Quality Evaluation in the Higher Education” (eng), in the USA – “Assessing Education Quality” (EN), in Australia, Ireland, Great Britain – “Quality Assurance in the Higher Education” (EN). In Germany and Switzerland, the term “Die Verbesserung der Qualität der Hochschulbildung” (DE) is used, which is defined in Russian as “improving the quality of higher education” and its meaning corresponds to “assessing the quality of higher education”. Most often, it is not only and not so much about assessment, but about ensuring the quality of education, for which the term “Quality Assurance in the Higher Education” is used, and can also mean assurance of the quality in education. Moreover, it is about quality assurance in education that is most often discussed. Quality assurance is a way to ensure that the results achieved are in consonance with the results planned. It underlies the parameters that frame and determine the mechanisms and procedural characteristics of the educational process. They include the organization and content of educational programs, technologies and criteria for assessing their implementation, their effectiveness and efficiency, the qualifications of scientific, pedagogical and auxiliary personnel, the conditions for their provision, as well as compliance the requirements specified for educational programs (Burlakova, 2014).

The concepts “level”, “standards”, “quality” are often confused. This has much more to do with the level of a professional educational program, i.e. whether it complies with a certain qualification or degree. For example, the level of education can be primary, secondary, higher or bachelor’s/master’s educational program. Educational standards generally mean the minimum necessary requirements for graduates, the level of knowledge, skills and abilities they acquired while mastering a curriculum, requirements for the content and provision of an educational program, and other norms. It is impossible to assess the quality in education by the level and standards. Hence, once again we have to focus on the quality of education as an integral characteristic of the process and outcomes of education.

To define “quality in higher education” in terms of the system, process and result, the following notions are used in different countries.

Quality in higher education is a way of describing how well the learning opportunities provided by vocational education and educational institutions, their products, services, etc. correlate with the

requirements of consumers. In European countries, quality (*fitness for propose* – EN) is defined as the compliance with the goals set.

Quality system is a governing system to ensure that educational services provided by an educational institution meet the established quality standards and are constantly being improved.

Quality assurance is a set of processes, tools and policies developed and implemented by an educational institution to ensure that the services provided meet the established requirements (standards, norms), are constantly analyzed and continuously improved. Quality assurance refers to a process planned by an educational institution that is regularly repeated to establish that the quality assurance system is kept running and continuously improved.

Assessing education quality involves collecting and analyzing data about the state of a system or process through widely used methods and criteria for deciding whether an objective can be achieved or if established standards can be met. Quality evaluation in the higher education is generally narrowed down to the terms “evaluation of a subject”, “evaluation of a program”, “evaluation of a theme”, “evaluation of a university activity”, “meta-evaluation” that means validating the accuracy of any type of assessment, its compliance with transparency and independence requirements. More often than others European countries rely on the assessment of educational activities (institutional assessment) and assessment of educational programs (professional assessment).

Quality assessment implies certain actions of an independent third party that provide an appropriate confirmation that a particular product, process or service conforms to an established standard or other regulatory document. These actions are also called “certification of conformity”. In education and training, this is called “identification and assessment” and is demonstrated through exams, performance presentation, or other means that the level of competence achieved by an individual meets professional and/or training standards. The Glossary of the European Training Foundation (1998) defines “identification and assessment” as the process of appraising knowledge and competences of an individual against predefined criteria, and the decision taken on the evidence that a mastery level has been achieved (Vasilenko, 2017).

Consequently, quality assurance in the higher professional education can be considered as consistent collection, analysis and use of information in assessing the effectiveness of training and the compliance of programs implemented by an education provider as a whole (institutional assessment) or its educational programs (program assessment). The latter refers to the assessment of the main university activities (quantitative and qualitative results of educational activities and the results of scientific research). Assessment is necessary to confirm a formal accreditation decision, but does not always lead to a positive accreditation decision.

Quality management is a general approach to managing an organization that rests on the participation of all its members to meet the needs of individuals and ensure long-term success. It is a set of actions determining the goals and objectives of quality policy, implemented through a four-step management method referred to as the PDCA (plan–do–check–act) cycle (also known as Deming-Shewhart cycle in the theory of General Quality Management) (Fatkhudinov, 2016).

Firstly, it is necessary to define two interrelated concepts “quality” and “quality management” in the context of professional training of students. The quality of professional training of students is defined

as the unity of goals and content, implemented in the form of curricula, effective teaching methods, means and methods (learning technologies) of achieving personal, meta-subject and subject outcomes.

Selezneva (2017) gives the following definition of quality management in higher education. This is an impact on the processes of framing, providing, maintaining, developing (improving) quality in relation to all educational agents and processes (in the chain of their life cycles) and organizing feedback (control, assessment, analysis) in accordance with the goals, norms, standards established. In a broader sense, it implies governing the rate of adequacy (conformity) of higher education (as a social institution), while in a narrower sense, it is quality management of vocational training (both process and result). This understanding of management is closest to the methodology of the international standard ISO 9001 (GOST R ISO 9000-2001, 2001).

Building quality management system for training students is aimed at continuous improvement of the training of highly qualified professionals able to work effectively in line with national and international standards, and committed to obtain greater professional development in a knowledge-based economy. The system for managing the quality of student training based on a technological approach is a constructive means of implementing pedagogical ideas, educational programs, teaching technologies and optimizing the process of professional training of students (Bordovsky et al., 2019).

Quality management system of professional training of students based on technological approach broadly rests on (a) operational diagnostic presentation of learning outcomes; (b) diagnostic tools and expected trends in the nearest development (monitoring) of the system; (c) a set of technologies; (d) building an optimal learning model aligned for specific conditions; (e) feedback mechanism.

A few years ago, it was possible to create one tool and use it for years under similar conditions. Today, it is getting impossible to enable such conditions. Contemporary technologies give priority to the development of activities, rather than the accumulation of facts, thereby stimulating changes in the content of education (Potashnik, 2018).

The idea of applying technological approach to education is as follows. Quality management should be ensured at all levels of education and have a clear relationship in the activities of all university departments. It seems impossible to train a competitive employee without modern learning technologies, means and forms of organizing the educational process at the university.

In the 60–70s of the twentieth century, recognition of the need to embed technological approach into quality management led to the fact that a number of countries developed national standards with requirements for a step-wise implementation of quality policy. Based on national standards, the International Organization for Standardization (ISO) developed ISO 9000 (ISO 9001-2008, 2008) – quality management and quality assurance standards. Following these standards, the experience of technological approach embedded into quality management was documented. The basic principles of building quality management system in an organization may coincide with the key principles of quality management specified in the ISO 9001:2000 standard (Burlakova, 2014, Egorshina, 2019; Guzeev, 2009; Uman, 2017).

The principles encourage and guide organizations to move forward. However, this happens if the principles are an accepted value that determines the purposeful activities of the staff. The importance of

transforming quality management principles into co-management principles stems from the collective nature of educational activities.

Co-management consists in interacting with partners (schools, parents, employers, students, educational and methodological departments), ensuring the purposeful functioning of all structural divisions comprising quality management system for vocational training of students (Academic Council, administration, research and methodological councils, faculties).

However, the system of professional training of students is still ineffective:

- curricula of theoretical and practical courses, their scientific and methodological support require annual updating;
- traditional forms and means of teaching are used;
- forms of progress check are outdated;
- no new areas of expertise;
- students do not have an opportunity to choose their own learning path.

Joint efforts of leaders, teachers and students can encourage the development of promising curricula, new forms and means of teaching and assessment.

A leading role of management is acknowledged by some university administrations. It is necessary:

- to create a specific academic environment;
- to establish and meet high requirements at the level of a single corporate culture;
- to attract the best teaching staff;
- to foster research;
- to create professional associations;
- to specify the requirements to ensure professional growth of teaching staff;
- to organize conferences and seminars;
- to diversify student communities (Bulaeva & Isaeva, 2018).

Involvement of employees rests on the expansion of innovative activities towards the technologies implemented in the educational process, involvement of teachers in quality management to provide student professional training. The material factor is considered to be an effective argument for teachers. However, other factors have already proven to be crucial in choosing a job and creating an atmosphere of cooperation. These include psychological climate, working conditions, the status of the educational institution as such, career prospects, possibility of business trips, and others (Uman, 2017).

Continuous improvement is focused on achieving learning outcomes at personal, meta-subject and subject levels through the most convenient modern technologies geared to streamline the educational process.

Partnership is about building subjective relations between educational agents. This conception includes interaction of all educational agents, the use of modern learning technologies, appraisal of outcomes achieved, evaluation of personal development of students, use of modern forms of organization of the educational process.

Fact-based decision-making aims at consistent and continuous monitoring of student training. Monitoring is considered as one of the stages of quality management. This principle implies constant opinion polls, research, analytical work to collect facts, information, forecasts, etc.

Mutually beneficial cooperation with partners involves interaction with secondary educational institutions, establishment of a network of educational institutions for vocational guidance, development of a unified policy for the formation of student cohort. Establishing strong relationships with partners allows for more effective improvement of the vocational education system.

Quality management in education is based on the sequence of the following actions: (a) quality planning → design of quality management model → (b) implementation of the model → (c) monitoring (check) of the requirements of the model → (d) analysis and correction. This chain is well known as the Deming cycle (Fatkhudinov, 2016).

7. Conclusion

Management ensures the quality of professional training of students through the integration of many components: the quality of the intellectual and moral potential of students, their theoretical training; the quality of programs and learning technologies; the quality of teaching and the quality of self-study of students; the quality of knowledge and skills of students; the quality of monitoring; the quality of material and technical base; student satisfaction with the educational process and its outcomes

Technological approach embedded into quality management in education characterizes different distribution of attention, resources and efforts in management. This suggests that there are many options for the technological construction of management process. It also becomes necessary to select, design and change them in accordance with performance and quality criteria. The technology helps to solve complicated problems that include not only the quality management at the university as a whole. Such problems include the development of educational programs and the construction of the educational process, preparation of new textbooks, use of various methods for assessing the quality of education, rotation of the teaching staff by type of scientific and pedagogical activity, etc.

The educational process is based on some objective laws established to govern the functioning of pedagogical system and general laws of management. It involves drawing up certain algorithms, invariant schemes, making and implementing management decisions, through which it is possible to design management activities, to regard management as a set of activities organized according to certain step-wise rules. Besides this, target objects functioning and developing in the educational process require flexible control. Despite common algorithms, technological management schemes, it cannot be based on some ready-made recipes for all occasions, but presupposes creative implementation enabling to adequately reflect the varied nature of possible solutions.

References

- Bespalko, V. P. (2009). *Pedagogy and progressive learning technologies*. Nauka.
- Bordovsky, G. A., Nesterov, A. A., & Trapitsyn, S. Yu. (2019). *Quality management of the educational process*. Herzen State Pedagogical University.

- Bulaeva, S. V., & Isaeva, O. N. (2018). *The system of world education: modern development trends*. Ryazan.
- Burlakova, I. I. (2014). *Technological foundations of the quality management system for teacher training*. [Monograph].
- Egorshina, A. P. (2019). *Management of Russian education*. N. Novgorod.
- Fatkhudinov, R. A. (2016). *Production management*. Textbook for universities (6th Ed.). Peter.
- GOST R ISO 9000-2001. (2001). *Quality Management Systems. Requirements*. Publishing house of standards.
- Guzeev, V. V. (2009). *Teaching. From theory to mastery*. Research Institute of school technologies.
- ISO 9001-2008 (2008). *Quality Management systems Requirements = International Standard: Quality Management System. Requirements*. Publishing house of standards.
- Monakhov, V. M. (2012). On the model of a university full-cycle technological textbook ensuring the implementation of the Federal State Educational Standard of Higher Professional Education. *Pedagogy, 10*.
- Podymova, L. S. (2019). Self-determination of teachers in a situation of uncertainty. *Modern vectors of education development: current problems and promising solutions. Proceedings of 11 International Scientific and Practical Conference*.
- Polat, E. S. (2003). *New pedagogical and information technologies in the education system*. Academy.
- Potashnik, M. M. (2018). *Quality management in education*. Yekaterinburg.
- Selevko, G. K. (2016). *Modern educational technologies*.
- Selezneva, N. A. (2017). *The quality of higher education as an object of systemic research: lecture-report*. Research Center for the Quality of Training.
- Uman, A. I. (2017). *Technological Approach to Learning*. Textbook for universities (2nd ed.). Orel: Orel State University.
- Utkina, T. I. (2013). *Formation of key competencies of students as a factor in ensuring the quality of education in the context of a comprehensive school*. [Monograph]. Orenburg: Publishing house of SBD RTSRO.
- Vasilenko, N. V. (2017). *Education Management: An Institutional Approach*. Institute of Advanced Professional Training.