PEDAGOGICAL TECHNOLOGIES FOR DESIGNING AND FUNCTIONING AN INTEGRATED SYSTEM OF SPECIALISTS' TRAINING QUALITY CONTROL IN HEIS

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Abstract: In the modern pedagogical practice, based on high-tech and sociocultural approaches to the system of specialists' training quality control, the student is an active individual, capable of self-organization and self-control, producing ideas and problem-solving. However, the classical university models of quality control are not adapted to the changes in university education and require reform, which determines the relevance of this paper. This study aims to establish the pedagogical regulations for designing and functioning of the education quality control system. Also, we should determine the assessment of the university administration and students with the presented new comprehensive system of specialists' training quality control using the pedagogical training system (PTS) and monitor the progress of the quality control system. An experiment is a primary method in the work. We collected all the data by evaluating the PTS by the educational process participants and the quality department specialists, which required the application of the survey method. The study also used the method of observation, analysis, and synthesis. The central hypothesis assumes that PTS designing and functioning pedagogical technologies should be high-tech and correspond to the university mission and strategy, requiring continuous improvement. As a result, the effectiveness of pedagogical infrastructure as the core in the designing and functioning of education quality systems should be considered in the development and improvement of new management systems for the specialists' training in university education. Further perspective is the research and analysis of improved technologies of functioning of integrated education quality control systems, the search for effective pedagogical technologies of educational process design.

Keywords: Education Quality Management, higher education, management, pedagogical technologies, designing, Quality of Education, education institution.

1 Introduction

A socio-cultural approach to learning is essential in present-day university education. It should be modern and meet the demands of the educational market, where students can independently solve open problems, freely use different sources of information, and all the variety of educational platforms, i. e., actually create new knowledge. These shifts in university education impose new requirements on university management and administrators for designing and functioning quality control in education. Classical models of learning design and their development are becoming more versatile, indirect, and focused on organizing the conditions for joint activities of all participants in the educational process, where cause-and-effect results determination is only one of the components. Pedagogical design technologies must consist of technical, social, epistemological, and cognitive components. The successful functioning of the education quality control system should depend on the continuous development and monitoring of improved PTS technologies. Indeed, it defines the problematics of many current studies in pedagogy and educational management (Etzkowitz et al., 2019).

Many studies also consider the role of e-learning content in university education, which is a crucial tool for evaluating all reforms and improvements in the university's training quality and effective operation.

A comprehensive quality control system helps measure teachers' and students' training levels and constantly monitors changes in teacher and student satisfaction, their attitudes towards the university, and its brand image (Cheng, Ming Tam, 1997).

It opens up opportunities for the introduction in the educational process based on the democratization of new pedagogical technologies for designing systems of education quality control.

Traditional systems of education quality control rely primarily on the final assessment of students' performance, the level of methodological skills, teachers' proficiency, and the executive capacity of the administration (O'Mahony, Garavan, 2012; Centobelli et al., 2019). However, the proposed innovative integrated systems with a pedagogical component allow for an improvement of the specialist's training quality control and consider all areas of growth and development of university activities (Ricci et al., 2019). In the modern educational paradigm, university management should be concerned about the volumes and final results presented in the knowledge assessment form and democratization and expanding the framework of specialist training quality control in HEI. At the same time, this is a prospect for further research towards finding comprehensive administration systems that involve pedagogical design technologies.

2 Aims

This study aims to establish a pedagogical framework for the designing and functioning of the quality control system in university education and determine the assessment of the university administration and students of the presented new comprehensive system of specialists' training quality control using the pedagogical training system (PTS).

There are the following tasks to be accomplished to achieve the aim:

- to establish the main components of pedagogical technologies for the designing of educational quality control systems;
- to evaluate the AS (academic staff) according to the quality evaluation system of training specialists at the university and the technologies of control, which are used by the control authorities;
- to monitor the quality control system progress.

3 Literature review

The theory and practice are actively considered in the pedagogical paradigm (Giones, 2019) in designing and functioning educational process quality control systems, focusing on the principles of management systems formation and the future specialists' quality training. In addition, the problems of seeking quality management systems in education have theoretical research fields (Guerrero et al., 2019) and practical projects (Etzkowitz, 2019).

Various aspects of being comprehensive educational management systems have been considered in multiple studies. Chuchalin & Zamyatin (2011) consider the problems of democratization of methodologically normative documentation and ways to encourage teachers to apply innovation, research, and pedagogical learning technologies. Smuts et al. (2017) analyze technological barriers in the students' educational process in an online learning environment. A separate topic became the study of changes in pedagogical processes under pandemic conditions, advantages and disadvantages of distance learning technologies, and ways of systemic quality control of

HEIs specialists' training under these conditions (Paľová & Vejačka, 2020). Pakhomova et al. (2021) analyzed the situation of innovation processes within HEIs within the context of implementing ICT-based student learning. We should also mention the research on assessment systems for e-courses (Suradi, Kahar & Jamaluddin, 2018) and consider the evolution of university education quality culture through the concept of sustainable development as a learning component (Rahnuma, 2020). Finally, the authors presented factors for improving the education quality system and ways to assess them in universities (Vykydal et al., 2020).

Among the theoretical studios, some papers consider the concept of "educational process quality" and "assessment", where the main was the interpretation of assessment as a process of collecting and analyzing information to determine the level of educational services quality and achieve academic goals, the ability to resort to effective solutions (Cheng et al., 1997; Rybnicek et al., 2019). Furthermore, the study of integrated education quality control models has consistently remained a broad field for academic development. The current pedagogical and managerial paradigm analyzes the mutual influence of educational service quality and participant satisfaction with the university's educational process (Chaudhary, Dey, 2021).

The theoretical research should be further implemented and used to implement pedagogical design technologies in educational quality control systems and lead exploration towards finding optimal models for organizing effective quality control of future specialists' training in HEIs.

4 Methods

Implementation of the pedagogical experiment was applied several empirical (diagnostic) methods, a questionnaire (written form), a survey, and an observation method. In addition, the data were analyzed using statistical analysis tools.

The study was conducted during the 1st semester of the 2021–2022 academic year at the Kharkiv National University of Economics, named after Semen Kuznets. The experiment involved representatives of the administration, dean's offices, academic staff, quality department employees, and technical staff of pedagogical and training systems (PTS) site support service at KhNUE named after Semen Kuznets (63 people).

Respondents were surveyed using Google Drive forms. The experiment considered the experience of people involved in the research conducted in our project. We used the basic concepts of this methodology. Considering the research goals, we analyzed the specifics of the respondent's evaluation of the education quality control system functioning and the respondents' evaluation of the pedagogical technologies involved in the education quality control system.

At the I stage we determined the central points of the pedagogical experience. Questionnaires drawn up to implement the research goal were adapted to the professional characteristics and demands of AS and university management. The survey was conducted in privacy, and all participants agreed in written form to participate in the experiment. The research team guaranteed anonymity. Survey materials were not made public outside the research work.

At the II and III stages, respondents were interviewed on the evaluation of the reformed and functioning control system (PTS) by the administration and quality control department, and AS on the assessment of the quality control system of educational services, university training, control technologies used by the administration as a source of methodological and pedagogical control. As a result, the research group established changes in the level of attitude assessment to innovations in terms of quality control of future specialists' training and assessing the level of technical support and digital literacy of the education participants.

We should note some disadvantages and difficulties identified during the experiment: the research team had the position of a passive observer; time constraints did not allow for in-depth qualitative research, so it was impossible to identify the causes of changes in the respondents' preferences and assessments.

5 Results

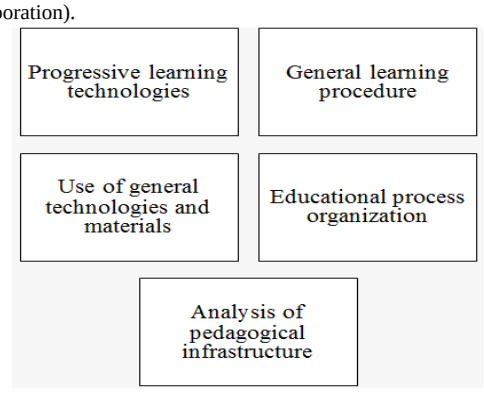
HEIs quality management systems use the concept of TQM (Total Quality Management). It is an HEI quality management system aimed at developing its scientific and methodological support. The concepts of such systems are built on several components. First of all, the American educational philosophy (Malcolm Baldrige National Quality Award) is based on the priority of management system operation, student-oriented approaches, academic productivity, and constant maintenance of a high satisfaction level of this management system by all participants in the educational process.

This article describes an essential part of the PTS management system – EFQM (European Foundation for Quality Management). This philosophy considers the provision of a partnership policy between staff and management, where there is constant communication and analysis of students, faculty, administration activities, and results and the provision of the necessary educational resources as the core components.

Stage 1. At this stage there was training of the experiment participants according to the rules of use, structure and features of the model of training quality control implementation, as well as presented features of university planning, control and management within this system. There were a constant series of face-to-face and remote consultations, training events to master all participants of PTS training and administration. During the experiment, a technical helpdesk was introduced to assist in the operation of the system.

The represented model of an integrated approach to the education quality control system at the institution considers the results and performance levels of all training and administration participants only at the final stages – at the end of the semester, module, or topic. However, the control during the implementation and design of the educational process is provided. In this way we can see a holistic picture of how effective the educational process was. The obtained results are analyzed and certain components of the system are changed, weaknesses are canceled, the necessary for improving the education quality control are formed.

Figure 1: The main components of pedagogical technologies of designing educational quality control systems (author's elaboration).



In other words, the determining components of pedagogical design technologies of educational quality management systems in controlling the specialists' training level are intensive involvement of progressive teaching technologies, reforming the general teaching order, systematic use of educational and methodical technologies and materials, selection of convenient and suitable specialty of the educational process organization, constant monitoring of the pedagogical infrastructure.

At the II stage of the experiment, after the training activities to work the system (PTS), all participants in the educational process were involved in PTS. We also surveyed the participants in the educational process to assess the effectiveness of the reformed control system. This stage includes the first assessment of the feasibility of changes and reforms that have been introduced in the education quality control system (PTS). It also monitors the satisfaction with the educational services quality level and motivation to use the system. All calculations are made in percentages.

Table 1: Educational participants' evaluation of the implementation of the reformed control system (PTS) on the education quality (author's technology).

№	Question	Yes	No	Don't know
1	Does this university's proposed quality control model meet your ideas about democracy and openness as stated in its charter?	45	35	20
2	This HEI that uses the updated PTS system makes it possible to give feedback to the administration and the student community.	30	40	30
3	Have you had a positive change in the quality and effectiveness of the learning after working 2 months with the system?	48	27	25
4	Do you feel the external control is influencing the changes taking place at the university?	20	37	43
5	Do you have free access to PTS, as well as to developing labs, co-working and libraries?	50	25	25
6	Thanks to the system, are you able to assess the teacher's qualifications and express your opinion about the learning process?	50	32	18

As we can see, the most positive was assessed the democracy as a pedagogical technology of management system design. In paragraphs 5 and 1 (Table 1), overall, 47 % of students considered it in this way. On the other hand, the slightest response has caused the theses about the external control effectiveness (paragraph 4) – only 20 % of students had positive responses.

Stage III. In the final stage, we repeated the final questionnaire. The changes in the respondents' evaluation of the expediency of implementing modern quality control systems in the educational process determined the attitude toward systematized planning, control, and management of HEIs. In addition, the survey demonstrated changes in the administration and students' attitudes toward the democratic foundations represented in the university control system of the educational process. Again, we made the calculations in percentages.

Table 2: Educational process participants' evaluation of the implementation of the reformed control system (PTS) on the education quality (author's elaboration).

№	Question	Yes	No	Don't know
1	Does this university's proposed quality control model meet your ideas about democracy and openness as stated in its charter?	65	18	17
2	This HEI that uses the updated PTS system makes it possible to give feedback to the administration and the student community.	28	50	22
3	Have you had a positive change in the quality and effectiveness of the learning after working 2 months with the system?	52	35	13
4	Do you feel the external control is influencing the changes taking place at the university?	32	38	30
5	Do you have free access to PTS, as well as to developing labs, co-working and libraries?	55	32	13
6	Thanks to the system, are you able to assess the teacher's qualifications and express your opinion about the learning process?	65	33	7

In general, the number of positive evaluations of the innovative changes introduced into the educational process quality control implementation model is 55 % of the respondents. The number of positive assessments increased on average by 10 %. Respondents gave the most favorable review of the teachers' methodological skills and qualifications (65 %) and believed that the European educational institution standards for the democratization of education quality control are being met.

In the III stage, we conducted a survey of AS on their involvement in the education quality control system of specialists training.

Table 3: AS (academic staff) evaluation of quality assessment system of university training specialists and control technologies used by control bodies (author's elaboration).

Control type	Evaluated by colleagues	Evaluated by students	Evaluated by administration
Survey of students on my teaching activities	20 %	67 %	13 %
Relevance and completeness of my classroom content	43 %	38 %	48 %
External results of my students' knowledge	13 %	62 %	61 %
Self-evaluation of my work (reports, portfolios, public lectures)	58 %	64 %	55 %

As we can see from the results, more than 60 % of teachers talked about the democracy and openness of pedagogical technologies and the design of education quality control systems (high self-assessment criterion). For academic staff, in turn, was important the students' opinion on the methodological skill, technology, and teaching quality (67 %). The administration, in turn, highly evaluates the students' performance.

Everything mentioned above indicates a comprehensive activity to democratize the quality control systems of education, focus on high qualification of the teaching staff, and openness to all educational process participants.

6 Discussion

Pedagogical technologies for designing and functioning a comprehensive system of education quality control, according to some researchers (Kuzmina et al., 2020), involve the use of high-tech and innovative models of assessing the specialists' training quality in higher education institutions, dictated by the need for solutions (Khalil, 2021; Dolan, 2019).

Several studies have measured innovative and pedagogical technologies for checking the specialists' training quality system. It is an essential indicator of the success of a holistic learning quality system. Quality control technologies together ensure the learning quality, student performance, and their

ability to be innovators both in learning and in further professional activities. For example, for teachers in the Czech Republic, the main types of innovations are knowledge innovations, teaching methods and technologies, and teaching tools: 49,8 % of students learn at a highly innovative level (knowledge and methods). In Poland, this index was 63,9 %. The number of young professionals (graduates) who play a significant role in presenting innovations in professional activity is 80,8 % in the Czech Republic, 62,99 % in Hungary, and 67,9 % in Poland. According to our study, 55 % of the respondents have a positive attitude towards the democratic components of a comprehensive system of education quality control, and 60 % of teachers are focused on professional innovation and self-assessment.

The researchers of management systems in education (Hsu et al., 2016) have evaluated how to measure the students' and teachers' learning quality depending on the context, innovative methods, high technology, and human-centered pedagogical approaches. They concluded that several digital education control models (Input, Process and Product, Total Quality Management) effectively improve quality assessment (Scherman, Bosker, 2017; Nurmanov A., 2020). In our study, the involvement of pedagogical technology in designing a comprehensive educational quality management system relies on a comprehensive and systematic approach adopted by 55 % of respondents in total. This approach proved to be effective and efficient, being in line with the European education philosophy. At the final stage of the experiment, the approval of the innovative system of education quality control increased by 10 % on average, where we should pay more attention to the resource base of the university and the teacher's pedagogical skills.

Comprehensive systems of university education quality control via high technology (TQM approach – Total Quality Management) ensure the functioning of a highly innovative learning and management environment (Kolodii et al., 2021). In comprehensive studies of the theory and practice of the management systems' involvement in the HEI training quality control system, there is a tendency to increase attention to the management of the overall educational process quality (Yaro et al., 2016) and consideration of the socio-cultural and general education component of pedagogical design technologies (Perronet, 2018). However, we should take individual characteristics, professional specificity, and university development strategy into account for creating a compelling set of tools for controlling the future specialists' training quality.

The effective use of pedagogical design technologies in educational activities involves forming and strict adherence to a set of priority goals:

- obtaining deficit positions;
- internal administration;
- HEI's resource management;
- constant focus on learning strategies;
- meeting the labor market needs.

7 Conclusions

Despite using different pedagogical technologies in European education to create and function a comprehensive system of specialists' training quality control, a relatively high number of students with low interest in success, and insufficient familiarity with different types of pedagogical technologies of education quality control is determined. Therefore, each educational institution should choose a convenient system for implementing and functioning the specialists' training quality control system. And this system should meet the strategy of the institution and the directions of its development, educational mission, and goals, and the best way on this plane is to use pedagogical technologies of design in a complex. Pedagogical technologies in the quality control system are provided by a system of different control forms by both internal and external stakeholders; the system of administrative quality control through various forms of participation of participants in the educational process and administration.

Firstly, this study aimed to establish the defining components of pedagogical technologies and the design of educational quality management systems. Therefore, it is primarily the control of the specialists' training level, intensive involvement of progressive teaching technologies, reforming the general teaching order, systematic use of shared teaching and methodological technologies and materials, the choice of the educational process organization system, and continuous monitoring of the HEIs' pedagogical infrastructure.

Secondly, the experiment found that the reform per the needs of the labor market and basic European educational standards design quality control of university training is positively evaluated by staff and administration. At the end of the experiment, PTS support increased by 10 %, and in general, respondents approvingly considered the quality control of the educational process effective.

The comprehensive system presented for consideration is intended to become a part of the European system of pedagogical technologies of design and effective operation of specialists' training quality control systems.

Further research projects related to the successful functioning of integrated systems in the education quality at all levels should be organized, collect data and analyze the results of research projects.

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Primary Paper Section: A

Secondary Paper Section: AM