

Content substantiation of the regional advanced training educational program “Kaizen Technology”

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Abstract. The relevance of the article is related to the need to modernize school education in Ukraine in the context of reform on the basis of the best world standards and models. The purpose of the article is to reveal the essence of Kaizen technology in secondary education, to substantiate the content of the regional educational program of teachers' professional development on this basis. The research methods are theoretical analysis, synthesis, modeling, systematization, generalization and survey. The results of the research are following: the essence of the possibilities of Kaizen technology in secondary education is revealed, the complex of approaches to the program content development is determined and its content is substantiated. There are three modules such as “The essence and origins of Kaizen technology”, “Lean-education”, “Management in education based on Kaizen technology”. Conclusions: Kaizen technology is a long-term strategy of personal development, based on the creativity of the teacher; mastery of Kaizen is carried out in three stages; the updated content of teacher advanced training is based on a set of scientific approaches; the criterion for the effectiveness of Kaizen technology and its purpose is the professional readiness of teachers for creative and constructive professional activity and continuous self-development.

1 Introduction

The relevance of our article is due to the following:

1. In the concept of pedagogical education of Ukraine development in 2018 [1] among the obstacles to creating a quality system of teacher training and professional development it was mentioned “... the problems of combining in the preparation program of the chosen subject specialty mastering with aspects of its teaching, and also with taken into consideration the interdisciplinary links; and insufficient awareness of the teacher with the research methods at the level of their responsibilities or lack of appreciation of its necessity” [1]. It is determined that the factors that led to this are “outdated content, structure, standards and methods (technologies) of teaching in the system of pedagogical education, which do not provide would-be teachers with the opportunity to master the competency approach and modern effective tools of pedagogical work” [1]. Therefore, one of the ways to solve this problem is to form the teacher's competence in the use of Kaizen in the educational process, and this will promote both

self-development of teachers and children's creativity. It is new, but is not implemented in the practice of Ukrainian higher pedagogical education institutions and institutions of continuous pedagogical education.

2. The current state of education and science in Ukraine requires from teachers the creativity in the education, which involves the child's personality in creative and constructive activities. Creativity is a condition for the development of society and meeting the growing needs of people. Without creativity, the society would still live in the caves if people solved problems only on the basis of reproduction. There are many methods of developing the creativity of children and adults. These include problem-based learning, which involves the teacher creating problem-solving situations in teaching process and solving them; the technology of solving inventive problems, which relates mainly to the technical education; the concept of intercultural dialogue, which applies to more humanities; the concept of activating the students education process, which contributes to the formation of positive motivation for learning and cognitive activity and children independence in learning; V. Davydov, L. Zankov de-

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velopmental training, which are designed mainly for primary school, etc.

The question arises about the presence in education of such learning technology, which would apply to all disciplines and children of different ages, and the teachers at the same time. Kaizen technology meets these requirements, but it is not known in Ukraine in education. We conducted an oral survey of postgraduate students at H. S. Skovoroda Kharkiv National Pedagogical University (KhNPU), and at Ternopil Volodymyr Hnatiuk National Pedagogical University (TNPU). A total of 234 people testified that only 7 people out of 234 (3%) heard this term, but they cannot explain it and cannot use it in the educational process. They have heard it mainly in terms of the efficiency of Toyota workers. However, most respondents are interested in learning about this technology and its capabilities and would like to learn how to use it in the educational process (96%). This indicates the readiness in teachers for professional self-development. Moreover, military education institutions have become interested in Kaizen technology. And these are the institutions where the executive thinking is traditionally formed along with the formation of responsibility and initiative in fulfilling the set tasks. We interviewed the scientific-pedagogical employees of the Departments of Pedagogy and Psychology, and the social and humanities studies of the National Academy of the National Guard of Ukraine – whether they know about this technology and want to learn how to use it. More than half (57%) of all surveyed teachers of these departments were interested in it. But none of them had heard of her before. Teachers of economics from all these higher education institutions know about Kaizen as a technology of lean and inventive production, staff development in Japan, but do not know whether it can be used in the education of teachers and children. Thus, Kaizen technology has significant opportunities in the modernization of pedagogical and not only pedagogical education in Ukraine, there is a motivation of teachers to master it and implement it in the educational process.

3. The work of educational institutions is being reformed, including through the use of innovative technologies in the educational process. The concept of the New Ukrainian School states that “A powerful state and a competitive economy will be ensured by a cohesive community of creative people, responsible, active and enterprising citizens. Such citizens should be prepared by the secondary school of Ukraine” [2]. Today’s requirement for the organization of the educational process in higher education institutions is to change all components that determine the state of the educational process of educational institutions, as well as to identify specific forms and methods of its organization, to create appropriate training facilities, which means updating educational programs as well as their mod-

ernization. Currently, the informatization of the educational process means changing the entire educational system, its focus on a new information culture, increasing the availability of quality education through the development of distance learning and information support of the educational process with modern information and telecommunications technologies [3]. One of the possible ways to solve these problems is the implementation of Kaizen technology in the advanced training of teachers and scientific-pedagogical employees.

4. We conducted a content-analysis of the educational programs of the would-be teachers, social educators in KhNPU, Donbas State Pedagogical University (DSPU), TNPU. The term “Kaizen” is missing in them. Accordingly, the programs of the pedagogical employees advanced training in the postgraduate education institutes of Ukraine were further revised. Also, this technology was not used for the teachers. While managers, polygraphers of different countries use this technology to improve the skills of already working people, to train personnel and managers for the industry and large enterprises, there are even centers for advanced training in enterprises based on this technology [4–6]. The Kaizen Institute has been working since 1985, but in Ukraine it has been existing since 2017. The Kaizen Institute offers certified programs of three levels for practitioners, managers and trainers [7]. There is a choice of programs for certain positions and the programs with a certain result [8]. But their content is not disclosed on the website. The programs work in the workplace at the enterprises. Also, the Kaizen Institute in Ukraine annually organizes the All-Ukrainian Kaizen Conference, which is an excellent platform for cooperation for owners and managers of companies, the heads department, HR-managers and specialists in innovation and continuous improvement [9]. The advantage of this Institute is that it is the original source and original provider of Kaizen in Ukraine. It (Institute) supports companies of all sizes from all market segments, providing them a stable competitive advantage. This means that Kaizen is common, can be applied to professionals in various fields of work and management, trainers – and therefore to teachers.

The existing Kaizen Centre in Russia [10] offers Kaizen training for lean production. There is a free trial program of three distance training sessions, which relates to production. There are on-site topics and content of open and corporate thematic trainings and seminars, quests on the problem of production and campaigns. But all this process does not apply to teachers and the theory of learning, their work with children and students. At the same time, we did not find in public access the advanced training programs of teachers based on this technology. Therefore, the development of such a program by taking into account the essence and philosophy of Kaizen is

an important step in the development of andragogy and theory of pedagogy, and in the implementation of the advanced pedagogical experience in education in Ukraine, by joining the Ukrainian education to the world education.

5. Kaizen technology (from the Japanese words: *kai* – change and *zen* – good) involves the desire to improve at every stage of personal development, which is confirmed by the opinion of I. Masaaki, Kaizen relies on gradual progress [11]. As R. Maurer points out, Kaizen is a way to achieve complex goals and achieve great change. The essence of Kaizen is that you need to go to the goal in very small but progressive steps, because small steps lead to big changes [12]. This corresponds to the didactic principle of systematization and systematicity in teaching process, the combination of science and accessibility, the connection of theory with practice. But how to do it on the basis of this technology still needs to be justified in relation to teachers. There is a practice of learning based on Kaizen technology in Ukraine [13] – Kaizen as an alternative learning that involves learning English on its basis, children’s project activities and their creativity. Such training involves the children purposefulness, their planning of their activities and projects, independence in creativity, passion for learning, distance learning from the first grade, the formation of learning and general competencies, self-diagnosis of their interests and their implementation in projects, connection of children’s projects with real practice, individual work with children, and the school’s relationship with parents related with the interests of children [13]. But there is no theoretical substantiation of Kaizen technology in pedagogical theory today. As for teachers, it is valuable not only to use Kaizen technology working with children, but also to apply it to themselves, which is manifested in the attitude of thinking to the development, but not to the given [14]. This is what makes Kaizen technology modern and necessary.

Theoretical analysis of the Kaizen technology use and introduction in the world process of teacher training and the mastery of creative and constructive types of pedagogical activity by them allows us to state that it has been studied in different directions. Thus, M. Colenso proved the Kaizen feasibility for successful organizational changes and R. Maurer studied the method of Kaizen, its psychology and gave recommendations for its implementation in the individual life [12, 15]. I. Masaaki formulated the Kaizen philosophy, where Kaizen is the key to success [11]. Kaizen is revealed in the teaching of creative thinking of adult employees [15]. Researchers also studied such following issues as the use of Kaizen technology in the creative and constructive activities of teachers, which is designed to form a creative person, who is consistently creative and logical thinking, developed, able to produce creative ideas and gradually able to create the final product of his/her work [4]; the effectiveness of the

use of innovation-oriented professional environment and the Kaizen philosophy implementation in the education of future professionals, and this will ensure the transition from knowledge of facts to the development of competencies and improve the quality of educational activities of higher education establishment [16]; and Kaizen technology implementation as a systematic method of creating, applying and defining the whole process of teaching and learning, considering all educational resources and their interaction. It is proved that Kaizen technology optimizes the forms of education, develops the creativity of both students and teachers [17]; of Kaizen technology use in self-development and professional growth of teachers, formation of new pedagogical competencies, creation of methodical resources for introduction of technologies of creative development [1]; of Kaizen implementation as a comprehensive management concept and as a philosophy of continuous improvement within the team, to implement corporate culture and management decisions that encourage employees to constantly offer improvements and implement them in the daily work [18]; of increasing the efficiency of educational and business management through the introduction of Kaizen technology, which has a positive impact on the process of implementation and management of innovations, significantly increases its level [1], and the practitioners have proven the effectiveness of Kaizen technology at Toyota production [19]; of Kaizen technology application in the field of health care and medical workers education, which leads to the improvement of human health and the work of medical staff.

2 Purpose and objectives of the research

Given the above, we can formulate the purpose of the article – to justify and formulate the content of the educational regional program “Kaizen Technology” for teachers. The objectives of the article are:

- 1) “Kaizen technology” concept concretization and disclosure within the teacher training,
- 2) scientific-theoretical substantiation and disclosure of the content of the advanced training regional educational program of “Kaizen technology” pedagogical employees and recommendations for its teaching.

2.1 Research materials and methodology

The materials for the study we selected were:

1. Research on the innovative technologies’ application in the process of training and retraining of teachers [20–23]. These works revealed the basis for the introduction of innovations, showed the technologies and conditions of their implementation, revealed the concept of technology.
2. Kaizen technology was also analyzed as an innovative technology for improving personality and lifestyle and thinking, aimed at constructive action, through the use of internal resources and creativity

[24]. We relied on the advantages of Kaizen technology in the teachers training, such as: the development of social experience, basic social roles; formation of readiness for creativity in the professional activity according to the revealed own interests, individual features and abilities, formation and development of knowledge, attitudes, personal landmarks and norms of creative and constructive interaction, self diagnosis by teachers of the interests, realization of project activity in training, aspiration to constant daily improvement and focus on the quality of the learning process [1, 9, 24]. We also relied on the key principles of Kaizen philosophy that H. James Harrington singles out: continuous change; open recognition of problems; promotion of openness; creation of work teams; project management with the help of cross-functional teams; development of self-discipline; self-improvement; informing each employee; delegation of authority to each employee; elimination of the root cause and prevention of recurrences; embedding quality in the process; standardization [12]. The organization of training on these principles provides trainings, counseling and work in small groups (teams). Kaizen technology is a technology of progressive and continuous improvement of personality, and is based on a comprehensive concept that encompasses philosophy, lean-education, theory and management tools [19]. In pedagogy, that organizes the process of learning something new, it is also acceptable. Thus, there is a practice of introducing lean-education in Norway, and it has given good results [25]. Lean-education at this school was aimed at performing the following tasks, after teachers have studied its experience at the Toyota Company:

- (a) To improve student learning outcomes. To give to the students more time to learn and to the teachers more time to teach, and to improve the quality of training.
- (b) To improve the working environment for teachers.
- (c) To create a more attractive work environment at school and eliminate what reduces their most time in classroom management [24].

Both teachers and students were involved in these processes. This means the need to take into account the theory of children's participation in their problems solving and training teachers to work under such principles, and in training time management implementation. Nowadays, Berland Elementary School focuses on three line practices:

- (a) Workplace organization according to the "5S" methodology.
- (b) Continuous improvement.
- (c) Standardization of the best way of teaching. This indicates a constant exchange of best practices and learning from experience,

which implements an androgynous approach in teacher training. We also considered research on different approaches.

Among them, there are the competency approach as a basis for education reformation in Ukraine; acmeological approach to the education as a basis for self-development and self-realization; the androgynous approach as a basis for adult learning, child-centeredness as a philosophy of modern education in Ukraine; the systemic approach as a basis for "Teacher-child" "Teachers-parents" and "Teachers-teachers" interaction; the creative and constructive approach to educational activities; synergetic approach as a basis for self-organization of learning; the personality-oriented approach as a basis for taking into account personal interests; creative approach to educational training, requirements of secondary education reform in Ukraine teacher training [2, 26–31]. These researches revealed the guidelines, principles, directions, forms and methods of teacher training under modern conditions, which is important for the introduction of Kaizen technology in postgraduate teacher training. It shows the possibility of its implementation in the New Ukrainian School based on consonance of ideas.

At our research we used such methods of scientific and pedagogical research as concretization, generalization, theoretical analysis of sources, content analysis of programs, synthesis, induction, deduction, modeling, survey.

3 Research results and their discussion

On conducting the scientific research, we specified the category "Kaizen technology" as a complex procedural component of the educational process, which aims to study and assimilate knowledge, achieve the goal in the process of creative interaction and find a constructive solution to professional issues. It forms a creative, constructive and mobile skilled specialist with motivated for continuous self-improvement in the professional sphere. In general, Kaizen technology is a system of personal development, and implies a systematic improvement in all spheres of human life such as professional, social and personal. This technology is also common for all and applies to all parts of the educational process: teaching, education, management of educational institutions. It is personality-oriented, takes into account the experience and interests, human aspirations, and teaches daily creativity in life and professional activities, to self-development and lifelong learning by improving the experience of their own professional activities. It becomes a way of life, thinking and thus contributes to the development of personality in everyday life and improve the conditions of work and life. Kaizen technology is a long-term strategy for the individual development and improvement, with certain goals and uses in the process of achieving them the creative potential of the individual. Individual improvement is impossible without

creativity or the ability to create (creativity), a creative approach, professional activity and creativity, so it is logical that Kaizen technology is based on creativity. Creativity itself is a productive human activity capable of generating qualitatively new material and spiritual values of social significance. Its basis is the development in teachers of diverse, deep and strong systems of knowledge, maximum stimulation of independent activity, development of sustainable creative interests task execution time [18].

In addition, creativity is a certain ability for creativity and it is considered a special quality of personality. According to E. Torrens, creativity is a common feature of personality and affects creative productivity regardless of the sphere of personal activity [32]. That is why the Kaizen technology implementation in the teachers training process promotes the creativity of participants in the training process and develops creativity and the ability to creative and constructive interaction both with teachers and with their students. Thus, the theoretical basis of Kaizen technology as an educational technology is a creative and constructive approach to educational activities, and is characterized by: the formation of training goals and objectives, based on the basic skills of the individual; the goals are different in perspective and term; positive interaction and separation from the training material of personally significant elements that will stimulate creative thinking; regulation of the author's creative and constructive position on solving professional tasks; formation of positive experience in the implementation of creative and constructive actions in professional pedagogical activities [12, 18, 33]. The purpose of Kaizen technology as an educational technology is realized in the process of achieving a system of following tasks in education: providing conditions for person self-actualization and self-realization, using modern forms and methods of teaching; realization of creative potential of personality; mastering the techniques of constructive thinking; and readiness for creative and constructive professional activity.

Formation of creative and constructive interaction on the technology of Kaizen in teachers advanced training should consist of three stages: information-theoretical; reconstructive and creative; creatively representative. Each of these stages corresponds to a certain stage of the educational process. It has its own purpose and objectives and is carried out by certain forms, methods, tools and resources. It should be mentioned that the original Kaizen technology training of employees in the workplace is carried out in five steps, gradually and progressively. The first step is introduction to the problem. A brief description of the problem is provided and the main and secondary factors of its occurrence are highlighted. The second step is collecting information. The employees conduct a comprehensive and in-depth information analysis of the problem, collect, and evaluate additional information. The third step is consideration of alternatives under the problem creative and comprehensive consideration from different point of views and mastering the techniques of constructive thinking. The fourth step is constructive decision-making, each alternative advantages, disadvantages and consequences analysis, and finding the most acceptable solution to the

problem. The fifth step is presenting creative and constructive solution of a professional problem. To organize teacher training, we combined these five steps into three stages. Because it is important for us to organize the new material learning. The training involves firstly the knowledge development, then their implementation in practice intentionally and then the implementation under new conditions, with expression of creativity. Therefore, we have implemented these five steps in three stages of organizing advanced teacher training. We will reveal them in more detail.

1. The information-theoretical stage is a preparatory phase for the development of creative and constructive teacher background. The purpose of this stage is teacher self-actualization, self-development of creative abilities and creative thinking. The tasks of the information-theoretical block are to provide knowledge about creative interaction and search for a constructive solution to professional issues. This stage involves the search for information and work with it on self-diagnosis and selection of methods of self-diagnosis, methods of teaching and education in accordance with creativity. The main methods of working with information are the information analysis, its filtering, cutoff, aggregation, and sampling. The methods of obtaining information are survey, pedagogical observation, and theoretical analysis of sources, analysis of products, method of analysis of weak points, professional discussions, pedagogical meetings, Balint groups, structural-morphological method, method of terminological and lexical analysis, method of indicators analysis and more.
2. Reconstructive-creative stage involves the accumulation of knowledge about creative activity. It forms a specialist with creative, constructive-mobile thinking who desires to improve himself in the professional field. The purpose of this stage is to use creative tasks, creative techniques and techniques of various nature in the teacher educational activities including training. Then one follows the reconstruction and analysis of various professional situations. The tasks of the reconstructive and creative stage are the teacher development as a creative intellectual, capable of creative and constructive interaction in all spheres of human life such as professional, public and personal. The core idea is to professionalize teacher training and learning from personal experience. The main methods of teacher training here are individual ones. They are following heuristic thinking; empathy; analogy; writing a solution to the problem, the method of structural matrices; inversion; the method of control questions, the method of coincidences and associations chains, the method "Why?"; Metchett's method; cards questionnaire; method of dividing the problem into components; presenting a nonspecialist's opinion; algorithm for solving inventive problems; method of eliminating hopeless situations; method of sevenfold search;

classification; induction; deduction; method of time relations; etc.). This stage at first involves identifying traditional, ineffective, ways to solve the problem so as not to follow to them. And the attention to the new or accidental ideas, to all aspects of problem solving, the conditions of its occurrence and solution.

3. Creative-representative stage is focused on the formation of skills and abilities of creative design and continuous improvement in processes (in their broad sense, not concentrated on the result) and within the team (approaches to work, thinking, relationships, work organization, professional activities, management). The idea of this stage is to consolidate the creative and constructive interaction skills in teachers and this allows to achieve advantages in competitive professional activities. The main tasks of this stage are the solution of creative tasks, which are the self-actualization of creative and constructive activities, and activation of internal potential, which affects the productivity of professional activity [12, 18, 33]. The main methods here are frontal and group. Among them there are such methods as brainstorming, synectics, professional discussions, the method of focal objects, circles, Balint group, round table, "speaker-opponent", discussion of weak points, laboratory of unresolved issues, conference of ideas, Philips-66, system of decision-making in a circlekingisio, method 635, business games, method of trigger technique, triads, wheels, TILMAG – method of transformation of ideal decision elements by means of matrices by association and community, method of morphological analysis, method of irritating word analysis, brainwashing pool, collective notebook method, Delphi method, engineer of ideas, etc.

All these steps (stages) must be implemented in a continuous process of training teachers. In the Japanese version, this process is called - "muda". Most work is a sequence of actions that will turn the source information into the final finished product. Some of these actions add value to the product, and some do not. The part that does not add value is a loss and must be eliminated, that is, all losses must be eliminated in the educational process. It should be mentioned that the level of scientific and pedagogical activities development in teachers "... is characterized primarily by values, coach interaction skills, reflection, the desire for continuous Kaizen-growth in the personal and professional sense" [16]. Thus, Kaizen technology is aimed at education in the result in the form of acquiring new competencies and new qualities. Given the effectiveness and possibility of using Kaizen technology in the children and teachers' education, the need to master it by teachers, as well as the fact that the Ministry of Education and Science of Ukraine Order No. 776 "On approval of the concept of pedagogical education" states, "successful professional activity pedagogical worker requires continuous training in conditions of dynamic change and the ability

to adapt to them. Professional development is aimed at the realization of the pedagogical worker himself as a person. The desire for self-improvement and self-education are important factors in the professional growth of the teacher, ensuring the expansion of his professional opportunities, cognitive interests and the formation of creative individuality" [1]. We have developed a regional educational program for teachers "Kaizen Technology", which acquires theoretical and practical knowledge about Kaizen technology and creative activity of teachers in particular; development of his creative and constructive interaction; training of a competitive specialist who will show creativity, professionalism and ability to make constructive decisions in his professional activity, generate and implement creative ideas in professional activities. We used the methods of synthesis, generalization, specification, modeling. The program is based on the qualifications of the teacher, on current legislation on education and secondary education in Ukraine. The purpose of studying the "Kaizen Technology" program is development in students following competencies: the ability to communicate in the state language both orally and in writing; ability to search, process and analyze information from various sources; ability to identify, pose and constructively solve problems; ability to generate new ideas, show creativity; ability to act socially responsibly; ability to adhere to the norms of professional ethics in the process of solving social, cultural, economic issues.

Objectives of the curriculum: acquisition of knowledge about Kaizen technology as a complex concept of providing conditions for self-actualization, self-realization of the individual, by modern-day forms and methods of teaching; realization of creative potential of personality; mastering the tools of Kaizen technology; mastering the techniques of constructive thinking; consolidation of skills of creative and constructive interaction; readiness for creative and constructive professional activity, development of professional, communicative, value-semantic competencies; development of the teacher's personality as a creative intellectual, capable of creative and constructive interaction in all spheres of human life such as professional, public and personal. The program consists of three modules. They are "The essence and origins of Kaizen technology", "Lean-education", "Kaizen-technology in educational management". The educational and thematic plan of the program is designed for in total 30 hours of full-time and part-time distance learning. So, 10 hours are given for classroom activities and 20 hours are reserved for independent study (correspondence form) [34]. The topics of the module "The essence and origins of Kaizen technology" are designed to master the philosophy of problem solving. The module covers topics related to the effectiveness and essence of Kaizen technology, Kaizen philosophy, the use of Kaizen in education. The topics of the module "Lean-education" include mastering the methods of diagnosing one's own interests and methods of self-development, improving education every day through collective and individual lean-thinking. Topics of the module "Management based on Kaizen technology in general secondary education" include mastering time management by teachers, the

theory of children's participation and educational dialogue on a subject-subject basis, facilitation, standardization in the selection of best teaching methods in the teaching staff of the secondary school. The educational and thematic plan includes online lectures. Correspondence-distance stage involves independent study of individual topics, professional literature and practical tasks. Evaluation of the effectiveness of training in refresher courses is carried out by writing a professional test and performing tasks in a microgroup.

Content of the educational program by modules and topics:

Module 1. "The essence and origins of Kaizen technology".

Topic 1.1 The essence and origins of Kaizen technology. Kaizen concept in scientific theory and practice, in education. Philosophical and ideological foundations of Kaizen technology as an indicator of social progress. Retrospective analysis of the definition of Kaizen as the basis of creative and constructive pedagogical interaction. Principles of learning in Kaizen technology.

Topic 1.2 The concept of Kaizen technology in education. Theory and experience of Kaizen technology implementation in education. Kaizen technology schools in the world and in Ukraine: advantages and difficulties. Kaizen concept: features of formation of innovative and creative educational environment.

Topic 1.3 Kaizen technology as a comprehensive strategy of personal self-improvement. Self-diagnosis of the teachers and children interests and needs. Methods of interests and needs self-diagnosis. Methods of collecting and analyzing the received information. Basic methods of working with information: analysis of information, its filtering, cutoff, aggregation, sampling. Methods of obtaining information: survey, pedagogical observation, theoretical analysis of sources, analysis of products, method of analysis of weaknesses, professional discussions, pedagogical meetings, Balint groups, structural-morphological method, method of terminological and lexical analysis, method of analysis of indicators and more. Features of application of Kaizen technology in pedagogical employees training.

Module 2. "Lean-education".

Topic 2.1 The concept of lean-education. Lean-education, its possibilities in the secondary education institution. The role of teachers and children in its implementation. Acmeology as a basis for daily improvement of one's activity and oneself. The role of self-actualization, self-realization and personal activity in improving the quality of education and self-education. Theory of children's participation (in the educational process). Kaizen technology tools and their application in the educational process.

Topic 2.2 Individual methods of creative thinking that improve educational outcomes. Rules of creative problem solving in lean-education. Individual methods of creative solution of educational problems: heuristic reasoning, empathy, analogy, writing a solution to the problem, the method of structural matrices, inversion, the method of control questions, the method of coincidences and associations chain, the method of "Why?", the method of Metchett, card survey, method of dividing the problem into components, presentation of non-specialist opinion, algorithm for solving inventive problems, method of eliminating hopeless situations, method of seven-fold search, classification, induction, deduction, method of time relations, etc.). Quality of education in lean-education. Methods of choosing the best solution for lean-education.

Topic 2.3 Collective methods of creative thinking that lead to improved educational outcomes. Rules of behavior in solving problems. The main methods of lean education (frontal and group): brainstorming, synectics, professional discussions, the method of focal objects, circles, Balint group, round table, "speaker-opponent", discussion of weak points, laboratory of unresolved issues, conference of ideas, Philips-66, system of decision-making in a circle – kingisio, method 635, business games, method of trigger technique, triads,

wheels, TILMAG – method of transformation of ideal decision elements by means of matrices by association and community, method of morphological analysis, method of irritating word analysis, brainwashing pool, collective notebook method, Delphi method, engineer of ideas, didactic games, brainstorming, written methods of collective problem solving. Methods of selecting the best solutions.

Module 3. “Management based on Kaizen technology in general secondary education”.

Topic 3.1 Teacher time management. The concept of time management. Techniques of time management in preparation for the lesson, at the lesson, and after lessons. Organization of children’s time in class.

Topic 3.2 5S workplace organization. Maintaining an organized and efficient teacher workspace without clutter and wasting time for searching and preparing. Organization of convenience for the student at school. Multi-purpose design. Scientific organization of the teacher’s work.

Topic 3.3 Organization of continuous improvement. Organization of morning five-minute teacher meetings. Mailboxes at school. Mapping programs. Effective communication and dialogue, facilitation. Class improvement meetings. Visual boards for improvement. Standardization of best practices and methods of organizing the educational process. The sequence of Kaizen technology implementation in the educational process.

Table 1 shows the structure of the program. It is important that teachers have the opportunity to creatively search, realization of personal creative potential. They should be able gradually master the techniques of constructive thinking and tools of Kaizen technology. Also, the teachers should have the opportunity to consolidate the skills of creative and constructive interaction and at the same time to conduct self-improvement and influence the future development of their pedagogical activities and their students. This program can be implemented in person, remotely, in the process of blended learning – it depends on the epidemiological situation and the desire of students. But for digital forms of education, they must have digital pedagogical competencies or at least digital literacy of the population. We discussed the possibilities of using Kaizen

technology in education at the round tables and methodological seminars of departments in such institutions of higher education as TNPU, I. Horbachevsky Ternopil National Medical University (TNMU), KhNPU and National Academy of the National Guard Of Ukraine (NANGU). It is recognized that this technology is interesting, but it is necessary to teach teachers and pedagogic employees to work on it. TNPU is preparing a program of elective discipline for the second level of higher education for future social educators “Kaizen-technology in socio-cultural activities”. At NANGU, this technology was the subject of methodical classes with scientific and pedagogical employees of the Department of Social and Humanities studies.

All this reflects the interest of teachers and educators, social educators to the problem and describes the possibility of its implementation in the training of specialists in various fields: military, pedagogical, socio-cultural and medical. At the same time, it is the pedagogical employees of general secondary education institutions of Ukraine who already have the opportunity to study under such a training program in Kharkiv and Ternopil [34, 35]. Training is based on philosophical, acmeological, complex, competence, creative and constructive, andragogic approaches. This involves the use of experiential learning, through training and exercises of a creative nature, gradually experiencing all stages of Kaizen technology. Comparing this program with the above training programs on lean-education, Kaizen technology in the workplace, we note that these programs are different in form and purpose and they have different participants in the educational process. Because workers are trained for themselves, and teachers still need to be trained to learn and educate by this technology children and themselves as an example of educational training for children. Although the philosophy and the principles of teaching are similar. The scientific foundations of the content are similar. The pedagogical program also adds the principles of teaching on Kaizen technology.

4 Conclusion

The analysis of the need to introduce innovative Kaizen technology in the training of teachers showed that this topic is very useful and interesting for teachers, as well as for research and teaching staff. The use of Kaizen technology is relevant in the training of teachers, as it will provide an opportunity to develop creative and constructive interaction, train a competitive specialist who will show creativity, professionalism and the ability to make constructive decisions in their professional activities. There are already schools that work on Kaizen technology, so teachers need to be trained. The purpose of the study is achieved – there is a developed program, its content is scientifically sound, the program includes 3 modules: “The essence and origins of Kaizen technology”, “Lean-education”, “Management in education based on Kaizen technology”.

Achieving the goal involved the implementation of research objectives, namely:

Table 1. The structure of “Kaizen Technology” regional educational program

Modules and topics	Instructor-led		Independent study
	Lecturers	Seminars	
Module 1. The essence and origins of Kaizen technology			
Topic 1.1. The essence and origins of Kaizen technology.	1		
Topic 1.2. The concept of Kaizen technology in education.	1		4
Topic 1.3. Kaizen technology as a comprehensive strategy of personal self improvement.	1	1	2
Module 2. Lean-education			
Topic 2.1. The concept of lean-education.	0,5		2
Topic 2.2. Individual methods of creative-thinking that improve educational outcomes	1		4
Topic 2.3. Collective methods of creative thinking that lead to improved educational outcomes.	0,5	1	
Module 3. Management based on Kaizen technology in general secondary education			
Topic 3.1. Teacher time management.	0,5		2
Topic 3.2. 5 S workplace organization.	1	1	4
Topic 3.3. Organization of continuous improvement.	0,5		4
Total	7	3	20

- 1) concretization and disclosure of the essence of the concept of “Kaizen technology” in the training of teachers, which is that: this technology is a long-term strategy for personal development, which has certain goals and uses in the process of achieving creative potential of the teacher; Kaizen technology consists of three interrelated stages, which gradually develops teachers’ independence, creative orientation, creative thinking, pedagogical skills: information-theoretical, reconstructive-creative, creative-representative; Kaizen technology involves mastering the essence and philosophy of Kaizen, lean-education and self-management of teachers.
- 2) scientific-theoretical substantiation and disclosure of the content of the regional educational program of advanced training of pedagogical workers “Kaizen technology”, recommendations for its teaching: according to this task it is substantiated that updating the content of professional training of teachers for mastering Kaizen technology is a complex of innovative scientific approaches: philosophical, andragogic, competence, constructive and creative, complex, acmeological approaches; the criterion for the effectiveness of mastering the Kaizen technology by teachers and its purpose is the professional readiness of teachers for creative and constructive professional activities. The developed regional educational program of advanced training of pedagogical workers “Kaizen technology” is based on these principles and stages, specification of its essence for teachers which are stated in point above. Recommendations for its implementation are experiential learning, through training and creative exercises in teacher training in blended learning, full-time or distance.

It should be noted that several schools in Kharkiv and Ternopil have already applied for this program, but now there are red quarantine zones in these cities, so their im-

plementation has been postponed until the danger of infection is eliminated. Prospects for further research are the approbation of the regional program for the implementation of Kaizen technology, its specification for research and teaching staff of higher education institutions, school social educators, psychologists, administration, etc., its experimental implementation in the educational process of general secondary education in various disciplines.

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