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# **Pedagogy of the Twenty-First Century: Innovative Teaching Methods**

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Aigerim Mynbayeva, Zukhra Sadvakassova and  
Bakhytkul Akshalova

Additional information is available at the end of the chapter

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## **Abstract**

In the twenty-first century, significant changes are occurring related to new scientific discoveries, informatization, globalization, the development of astronautics, robotics, and artificial intelligence. This century is called the age of digital technologies and knowledge. How is the school changing in the new century? How does learning theory change? Currently, you can hear a lot of criticism that the classroom has not changed significantly compared to the last century or even like two centuries ago. Do the teachers succeed in modern changes? The purpose of the chapter is to summarize the current changes in didactics for the use of innovative teaching methods and study the understanding of changes by teachers. In this chapter, we consider four areas: the expansion of the subject of pedagogy, environmental approach to teaching, the digital generation and the changes taking place, and innovation in teaching. The theory of education, figuratively speaking, has two levels. At the macro-level, in the “education-society” relationship, decentralization and diversification, internationalization of education, and the introduction of digital technologies occur. At the micro-level in the “teacher-learner” relationship, there is an active mix of traditional and innovative methods, combination of an activity approach with an energy-informational environment approach, cognition with constructivism and connectivism.

**Keywords:** didactics, digital generation, innovative teaching methods, environmental approach to teaching, pedagogy

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## **1. Introduction**

The new century introduced significant changes in didactics and teaching methods. Pedagogy of the twentieth century differs from the pedagogy of the twenty-first century. Since the beginning of the twenty-first century, there have been many changes in the development of

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national and world education. The most observable phenomenon is now the Internetization of society and the penetration of digital technologies into learning. The modern generation of schoolboys is known by the name digital, socially digital [1], and generation Z [2]. Knowledge is the transition from acquiring knowledge through reading, from the teacher's monolog to visual perception, or discussion in the classroom.

Digital technologies change our way of life, ways of communication, way of thinking, feelings, channels of influence on other people, social skills, and social behavior. As Myamesheva states, "the high-tech environment - computers, smart phones, video games, Internet search engines - reshape the human brain" [3].

The theoretical changes in didactics and pedagogy lie behind the most obvious tendency. Pedagogy in the domestic science was redefined from the "science of upbringing, teaching and learning" to the "science of upbringing and education." The subject of the twentieth century pedagogy was "upbringing" [4] (in Kazakh—*tarbie*, in Russian—*vospitanie*, in Deutsch—*Bildung*). Tagunova et al. writes: "Upbringing in the broad pedagogical sense is a purposeful influence of the society to prepare the younger generation for life. Upbringing in the narrow pedagogical sense is a purposeful influence on the development of specific personal qualities..." [5]. The subject of the twenty-first century pedagogy—the category "education"—has expanded the scope of meaning and understanding. Competence and personal-oriented approaches have been introduced.

Here is how the post-Soviet tendencies of reforming education in the studies of Silova, Yakavets are generalized. There are some commonalities between countries in terms of the "post-socialist education reform package" [6–8], "a set of policy reforms symbolizing the adoption of Western educational values and including such 'travelling policies' as student-centred learning, the introduction of curriculum standards, decentralization of educational finance and governance, privatisation of higher education, standardisation of student assessment, and liberalisation of textbook publishing" [7–8]. This interpretation coincides with the assessment of the Russian researcher Romanenchuk "in the 2004 concept of the development of education 'westernization' of education (the transfer of the Western model of education to Kazakhstan soil) is embodied in full" [9]. On the one hand, one can agree with such assessments, and on the other hand, it is necessary to take into account the powerful tendency of the revival of Kazakh schools and the ethno-pedagogical foundations of education. Kazakhstani scientist Akhmetova defines the six reasons for modernizing education somewhat different: the quality of education, globalization and internationalization, politicization and the creation of a knowledge society, new teaching technologies, marketing and financing [10]. Kazakhstan is a young independent state that turned 25 years old. Therefore, the reforms of Kazakhstani education in the early twenty-first century were aimed at building a national education system as an attribute of independence. At present, Kazakhstan occupies leading positions on the dynamics of educational reforms in the post-Soviet space.

In this chapter, we consider four areas: (1) the expansion of the subject of pedagogy, (2) environmental approach to teaching, (3) the digital generation and the changes taking place, and (4) innovation in teaching. These changes lead to the renewal of teaching methods.

The purpose of the chapter is to summarize the current changes in didactics for the use of innovative teaching methods and study the understanding of changes by teachers.

## 2. Material and research methods

The sources of research were the works of Kazakhstani, Russian and foreign scholars on didactics, textbooks on Pedagogy of the twentieth century, UNESCO recommendations on the development of teaching strategies.

On the one hand, the section overviews, and on the other hand, the results of a practical study on the use of innovative teaching methods by teachers, and understanding of their strengths and weaknesses are presented.

Changes in didactics in the twenty-first century have been studied in the following areas, which lead to the active use of innovative teaching methods:

- the features of the expansion of the subject of pedagogy – “education” have been analyzed;
- approaches in modern foreign didactics on teaching the digital generation of students have been analyzed and generalized, taking into account their specific features;
- attention is focused on pedagogical innovation as a direction for the development of didactics;
- a survey of teachers on the using of traditional and innovative teaching methods has been conducted.

Therefore, in the first part of the chapter, the analytical and system approaches were used, and the theoretical changes of modern pedagogy were generalized. Another question is, how much do teachers take a positive attitude to innovation, accept them, and improve their skills? To answer this question, a questionnaire was compiled, and a survey was conducted among teachers who had been trained in the Republican Institute for Advanced Training of Teachers and Educators. The selection of respondents was carried out by random sampling. The survey was conducted in May–June 2016. The survey was conducted jointly with Esenova. The following questions were asked in the questionnaire:

(R1) Do teachers use innovative teaching methods?

(R2) What, in the opinion of teachers, are the advantages of innovative teaching methods, what are their shortcomings?

(R3) Why, for what purpose do teachers use innovative teaching methods?

(R4) Did the teachers learn how to use ITM? How did they learn (options: through qualification improvement courses with state payment, independently or at their own expense)?

(R5) According to teachers what is the parity of applying traditional and innovative teaching methods? Has the teacher formed a meaningful structure for updating teaching methods-an innovative culture of the teacher?

The results of the survey help to understand: first, how dynamic is the improvement of teachers’ pedagogical skills and mastering of innovations in teaching. Second, is the upgrade process systemic? And are the conditions created for this by the state? Or do the teachers update the pedagogical skills of the ITM independently?

### 3. Literature review

#### 3.1. Traditional didactics

Modern pedagogy from the “science of upbringing and training” has become a “science of upbringing and education.” The category “education” for the twentieth century has been transformed and expanded. Didactics since the days of Jan Amos Komensky has been understood as a theory of learning. In Soviet didactics, education was understood as a “learning outcome” [11], “the process and result of mastering the system of scientific knowledge and cognitive skills ...” [4]. That is, obtaining an education had an expression in obtaining a certificate of education or a university diploma.

In modern textbooks on pedagogy, for example by Bordovskaya and Rean, education is understood broader [12]: (1) as a process and result of learning, (2) as a society value, because society spent more than 8 millennia to build a cumbersome educational system; (3) the value of the individual, since modern man spends more than 15 years of his life on education and profession; (4) a social institution with its own powerful infrastructure, economy, educational programs, management bodies, didactic systems, and so on.

Theories of education consider the interaction not only of the pupil and the teacher (the micro level of interaction) but also of the interaction of the state and the education system, the social groups of pupils and teachers, parents and pupils, parents and school, schools and public organizations, schools and religions, schools and economic, social development of society. This is the level of macro influence of education on society and society on education. That is why didactic theories and problems are considered not only from the point of view of the internal relations of the teacher and the student, but as a didactic and at the same time social environment, open to innovations and interference, dynamic changes. Therefore, forming subject competencies, we simultaneously design the formation of social, communicative competences, life competencies.

#### 3.2. Environmental approach to teaching

In the 1970–1980s of the twentieth century in the USSR, the process of teaching began to be stated from the point of view of the activity approach in the domestic textbooks on pedagogy. The learning process as teaching and learning has components: purpose and objectives, content, methods, teaching tools, learning forms and results. When planning the lesson, we design these components. This theory is connected with the L. Vygotsky’s theory of educational activity, the theory of developmental learning of L. Zankov, V. Davydov, I. Lerner, M. Skatkin, Z. Kalmykova and others [13, 14].

Since the twenty-first century, the environmental approach to learning has been actively used. According to Manuilov [15], we define the functional environment as something, among which the subject resides, whereby his way of life is formed, which mediates his development and averages the personality.

In the 1990s of the twentieth century, the Italian scientist Rizzolatti discovered mirror neurons. Mirror neurons are neurons of the brain that are excited both when performing a certain action,

and when observing the performance of this action by another person. Such neurons were reliably detected in primates, their presence in humans, and some birds, is confirmed. These neurons play a key role in the processes of imitation, empathy, imitation and language learning [16].

According to the Albert Bandura's theory of social learning, human behavior is not so consistent. Prior to the theory of A. Bandura, according to the theories of J. Piaget and others, it was believed that abilities and attitudes were formed as they grew up [17]. Therefore, as we are accustomed to believe, some consistency is inherent in actions. A. Bandura believes that human behavior is not so consistent. Rather, it depends on the circumstances. Human behavior is more determined by the existing situation and its interpretation by a person than by the stage of his development, character traits or personality types. From A. Bandura's theory of social learning, one can conclude that education is figurative, discrete, can be carried out eventually, situationally.

In the environmental approach, information and energy become important categories. During the lesson, there is a dynamic exchange of information, knowledge, and energy between the teacher and the student. In our opinion, the basis of the synergetic approach in pedagogy is manifested here. According to the theory of self-cognition, according to Mukazhanova, the value of "love" is understood as the energy exchanged between people [18], for example, mother and her child. Positive attitudes in study and occupation, the positive energy generated by the teacher, set a special positive spiritual atmosphere. It is interesting that here one can turn around to the Academy of Plato history. As you know, the word "platonic love" comes from "spiritual communication between teacher and student." Therefore, in didactics, it is better to use more developing, positively motivating methods and technologies of education, which will create a development environment that is positive for development. The teacher becomes the facilitator of the child development. Therefore, art-pedagogical, creative methods of teaching are recommended.

Moreover, the environment must be saturated with both information and positive energy. The teacher himself plays a big role if he is a significant personality for the student.

This scientific direction in pedagogy connected with the social environment and the socialization of the individual has resulted in a new disciplinary science—social pedagogy. It deals with other mechanisms of socialization—imprinting, imitation, identification. Thanks to the development of psychology, the theory of upbringing develops coping strategies, coping behavior, and the concept of a lifestyle.

### 3.3. Digital generation

In the modern school, we observe serious changes related to informatics and the introduction of multimedia in the educational environment. Modern scientists—teachers, sociologists, futurists also reflecting—speak about a new generation of students, that is, schoolchildren of the twenty-first century. This generation is "Next", generation Z (theory of generations developed by Neil Hove and William Strauss), the digital generation, the social-digital generation (developed by L. Hietajärvi, K. Lonka).

Let us consider the foreign studies of scientists who demonstrate modern changes and new approaches in the development of didactics. Scientists D. Tapscott, D. Oblinger, B. Brdička [19] note serious changes in perception and learning process (**Table 1**).

Twentieth century generation	New generation
- Books → reading	- Display—visual perception
- Current step, gradual movement	- Nonlinearity
- Single tasking	- Multitasking
- Linear approach	- Hyper media
- Perception through reading	- Iconic perception
- Independence	- Connection
- Ambiguity	- Cooperation
- Passive school, as requirement	- School as game
- Discussion	- Warning
- Reality	- Fantasies
- External technology	- Internal technology
- Fact awareness	- Know how to find something necessary

**Table 1.** Generation development [19].

Hietajärvi et al. [1] echoes it and so articulates changes in the new generation, called the “social-digital generation” (**Table 2**).

Note the importance of all the changes. Let us dwell on the fact that “The educational space is expanding beyond the classroom” [20]. At present, having agreed in advance with the students, we can use the Internet video resources during the explanation and during the group work assignments, and we can allow students to use smart phones and phones when preparing a group solution.

Hietajärvi et al. call the modern generation as a generation with “social and digital participation” and write that “social and digital technologies are integrated systems of technology,

Socio-digital participation	School practices
- Flexible use of digital media	- Traditional media, e-mail
- Multitasking	- Linearity and sequence
- Intellectual ICT tools	- Pure mental performance
- Internet searches	- Limited textbook content
- Socio-digital networking	- Off line working, F2F
- Working on screen	- Paper and pencil
- Making and sharing in groups	- Individual performance
- Extended networks	- Closed classroom community
- Knowledge creation	- Knowledge acquisition

**Table 2.** Differences between the modern practice of teaching at school and the new “social-digital generation” [1].

social media and the Internet that provide a constant and intensive online interaction with information, people, and artifacts"; Social and digital participation is "a new concept of the practice of informal, socially-digital mediated participation" [1].

According to Soldatova's and Zotova's research, changes occur in the memory, attention and thinking of the digital generation. "The accessibility of almost any information at any time from an early age changes the structure of mnemonic processes. First of all, it is not the content of any information source in the network that is remembered, but the place where this information is located, and more precisely the 'way', method how to get to it. The average concentration duration of attention compared to that which was 10-15 years ago, decreased ten times. A new phenomenon is clip thinking. It is based on fragments processing of visual images, rather than "on logic and text associations" [20].

Teachers have diametrically opposed opinions on how to respond to changes: from conservative (leaving everything as it is, schoolchildren need to be taught as in the last century) until the need for a complete restructuring of the education system. Our position is based on the principle of ambivalence, the continuity of "tradition → innovation," the need for active research of the phenomenon of electronic and visual culture, and the study of the influence of visual culture on the personality of a schoolboy. Digital technologies change our way of life, ways of communication, way of thinking, feelings, channels of influence on other people, social skills, and social behavior [21].

Schoolchildren and students have more short-term memory; therefore, new methods of fixing knowledge in long-term memory and development of competencies are needed. Educators are aware of the problem of forming school children's cogency of thinking. It is interesting to understand the "superficial" and "deep"/"deep" approach in obtaining knowledge. "Learning the text by heart, ignoring the meaning, understanding - is known as a superficial approach, and an integral and critical assessment, the study of the material is known as a deep approach." "Superficial learning is a superficial approach; it is the reproduction of knowledge, the teacher-regulated training, passive epistemology, dual vision, and the consumption of knowledge. Deep approach, knowledge transformation, self-regulatory learning, active epistemology, relativistic views, and knowledge building approach can lead to deeper levels of learning" [1].

These issues put forward new requirements for the teacher and his professional activities. Teachers need to learn new information and digital technologies more actively. In addition, new research is needed in the field of the psychology of perception and thinking with the active use of e-learning. Practical training of teachers for the use of ICT and digital resources, the formation of digital literacy, the inclusion of such courses in educational programs for teachers is necessary nowadays.

When formulating courses, it is possible to demonstrate the continuity of the development of didactics on the concepts "behaviorism → cognitivism → constructivism → connectivism." Brdička systematized the development of didactic bases of the twentieth century in 2011 (**Table 3**) [19].

As is known, the theory of behaviorism as a behavioral approach appeared in the 1920s. It has been used in education for a long time. Schools of the eighteenth and nineteenth centuries relied on the foundations of a behavioral approach (although the theory of behaviorism has not existed yet). In the 30s of the twentieth century, the formation of the cognitivism process



	<b>Behaviorism</b>	<b>Cognitivism</b>	<b>Constructivism</b>	<b>Connectivism</b>
Knowledge source	Experience	Mind and experience	Reason	Connection
Principle	Black box—external behavior reflection	Knowledge in the brain	Activity, individualization	Knowledge as collective product
Motivation	Positive/negative support	Signs, diploma	Own interest	Interest supported by community
Process	Revision sensitive experience	Knowledge interpretation	Knowledge structuring	Active net cooperation
Direction reps	Skinner, Thorndike, Pavlov, Watson	Vygotsky, Bruner, Gagne, Ausubel	Bandura, Piaget, Bruner, Dewey, Papert	Siemens, Downes

**Table 3.** Connectivism as a new didactic basis in the foreign theory of education [19, 22].

began in Soviet education. The Soviet didactic system was mainly built on the use of both theories. Further in the second half of the twentieth century, the theory of constructivism (social constructionism) was formulated. Social reality has a dual nature. On the one hand, it has objective meanings, while on the other hand, it has subjective meanings. Each person builds a social reality around himself. An important tool of social reality is language. Through language and communication, a person builds for himself a field of knowledge and understanding. The processes of socio-psychological construction of the society through personal activity and activity are considered.

In education, the course of social constructivism is associated with the socialization of the individual in society, the formation of socialization skills in each person, and the learning of self-structuring of knowledge by students. The approach is connected both with the construction of the learning environment, including communicative and construction of knowledge through it. Currently, the theory is actualized by the use of active and innovative teaching methods in education (brainstorming, case study, group teaching methods, etc.). We emphasize that the sequence of the appearance of theories, in principle, does not disprove the previous one, but complements, as it were, built on the previous ones, then penetrates into the previous ones and partially changes their use. This understanding is illustrated by the modern methodological principle of the science—the principle of addition and complementation. As in school, at the university, we use these trends when building the learning process. Note that the course of social constructivism echoes the environmental approach in pedagogy.

A new direction for the emerging theory was put forward by Siemens and Downes in connection with the development of communication network and new opportunities for their use in teaching [22]. Knowledge is obtained through interaction with the network community. Of course, such a process of obtaining knowledge, on the one hand, can be characteristic of an already prepared or adult person who is able to critically evaluate, analyze, choose, and construct knowledge [21]. That is, it has some foundation of knowledge. At the same time, the students of secondary schools themselves demonstrate active assimilation of knowledge and skills in this way—through networks. Therefore, in our opinion, we predict that there will be



a penetration of this theory gradually into lower-level classes (even initial ones). For junior high school students and teenagers, networks have become commonplace, so their networking skills are much better developed than those of educators.

In Kazakhstan, which has Soviet traditions in didactics, the content of education was built on the basis of theories of encyclopedism, formalism, copyism (in Russian—ekzempliarizm), and others. They are described in the textbook of didactics [23]. In the Western science of education, the transition from behaviorism to cognitivism and constructivism is considered. The transition to the dominance of theories of constructivism requires the active use of innovative teaching methods. It is clear that changes in reality dictate the need to move away from encyclopedism and cognitivism in learning.

In education, the understanding of learning outcomes has shifted from knowledge, or knowledge and skills, to the formation of competencies. If knowledge is formed consistently, then competencies develop in a complex manner. Competencies are difficult to form in one lesson, so we can talk about “learning strategies” implemented for a certain length of time. The learning strategy integrates both approaches and principles, the direction of development, and the methods and types of instruction. Training strategies are aimed at competence—the expected results of education. Strategies for active, innovative teaching, project-oriented, and playful learning can realize the concepts of constructivism and connectivism.

### 3.4. Innovation in training

According to Volov, “In the Middle Ages in educational institutions the ratio of the number of pupils to the holders of knowledge was about ten ( $I \approx 10$ ); With the introduction of the pedagogical system Ya.A. Comensky, the ratio of the number of pupils to the teacher reaches hundreds ( $I \approx 100$ ); modern innovative technologies increase the factor of educational technologies in tens of thousand times ( $I \approx 100,000$ )” [24]. The development of innovations in education is served by the scientific discipline “Pedagogical innovation.” It helps in the development, implementation and dissemination of innovations in teaching practice. We give several of its provisions.

Innovation is a phenomenon that carries in itself the essence, methods, techniques, technologies, and content of the new. Innovations (from Latin in - in, nove - new) - the introduction of a new, the introduction of novelty. According to Taubaeva and Laktionova: “The innovative process is a complex activity in the formation and development of the content of education and the organization of a new” [25].

Innovative methods of teaching are methods of teaching that involve new ways of interaction between “teacher-student”, “teacher-student”, a certain innovation in practical activity in the process of mastering educational material.

There are two types of “new”: “purely new” - first created, is at the level of adequate discovery, the establishment of a new truth; “new”, having a mixture of the old, more precisely, consisting of a layer of the old, a layer of the new, and so on [25]. We propose one more typology of innovations in learning (technologies, methods, and techniques):

- an absolute innovation (absolutely new technology);
- a modernized innovation (significantly improved technology);
- a modified innovation (slightly improved technology);
- an innovation, technology introduced to a new territory (e.g., trainings for the RK, credit technology of training for Kazakhstan);
- an innovative technology of a new field of application [26].

Features of innovative training: (1) work on anticipation, anticipation of development; (2) openness to the future; (3) constant inconsistency, in other words, the non-equilibrium of the system, in particular the person himself; (4) focus on the personality, his development; (5) the obligatory presence of creativity elements; and (6) partnership type of relations: cooperation, co-creation, mutual assistance, and so on.

All innovations in pedagogy, according to I. Derizhan, unite:

- the belief that the human potential is unlimited;
- the pedagogical approach is aimed at mastering reality in the system;
- stimulation of nonlinear thinking;
- they are based on the hedonistic principle that is, based on the enjoyment of learning, the joy of achievement, the pedagogy of success.
- the mobile role-playing field of the teacher—the teacher simultaneously teaches and learns from the student [27].

Firstly, the very **methodology of innovative learning** is built on a personal-oriented approach. In the Western literature, it is called student-centered learning. Secondly, it synthesizes synergistic, systemic, competence, dialogical and activity-oriented, culturological, information and technological, environmental, and other approaches. Third, it is possible to determine the laws and principles of the innovation process in education and the basis of the innovative culture of the teacher. The methodology of innovative teaching is reflected in the training manual.

According to Podlasy “The teaching methods set the pace of development of the didactic system - the training progresses as quickly as the methods used allow it to move forward” [11]. In practice, there is a transition from reproductive methods of teaching to innovative ones.

We have collected more than 300 innovative teaching methods and technologies for more than 20 years of experience [26, 28]. Traditionally, ITM (according to M. Novak) is divided into nonimitative (brainstorming, pedagogical exercises, and discussions) and imitative (nongame, e.g., case study, training, etc., and gaming—business role-playing, blitz games). The collection includes a didactic description of the algorithms for applying the methods and the most interesting examples of student fulfillment [29]. They include: brainstorming, training, role-playing and business games, blitz games, various methods such as “Puzzles”,

then "Domino", "Historical picture", "Fish bone", "Spider online", "Car", "Basalt Columns", "University - 2050", "School-2030", "School - 2050", lessons "Creativity hour", "Talk show", "TV digest", in the "Walt Disney Circle", "Walt Disney's Three Stools"; On "soap bubbles", "Conceptual fan", "Collective record", "Palm", "Train", "My Constellation", "I - it me," critical thinking techniques, "Six pairs of action shoes" and "Six hats of thinking" by Edward de Bono, an educational project, a fairy tale creation, etc.

For example, the method "Historical picture" was born after a trip to Dresden and acquaintance with the famous wall tile panel "Procession of the Princes", created in 1904–1907. It depicts 35 Margraves and Kings of Saxony, who lived from the twelfth century to the beginning of the twentieth century and in the procession they are presented consistently. Students are invited to study the historical information about this panel and to come up with their own version of the historical picture of the collection of the procession, for example, the scientific school of the theory of behaviorism with brief "reference signals" about the positions of scientists. The student does not need to possess special artistic skills; he is allowed to use any improvised material such as copies of biographical references with photos, glue, paper, markers, etc. The work can be performed in groups, as an independent work, or at a seminar (with a given homework to study the theory of behaviorism). In conclusion, presentations are made. Students not only learn the sources as much as possible but also learn to generalize, logically and artistically, visually, creatively represent solutions, present their decisions, work in a team.

In 2010, UNESCO recommended the following teaching strategies for the twenty-first century: experiential learning, storytelling, values education, enquiry learning, appropriate assessment, future problem solving, outside classroom learning, and community problem solving [30].

The active use of innovative teaching methods by teachers is a necessity nowadays. The greater the strategies and methods of teaching the teacher has, the more interesting, diverse it conducts classes, better motivates the student's cognitive activity, shapes the experience of solving nonstandard problems, promotes in-depth training and the steady assimilation of technology of practical activity.

A good teacher constantly improves his didactic skills, selects, and develops new methods and technologies of teaching.

A change in the teaching of pedagogy can be observed in the gradual addition of subsections of textbooks on the pedagogy topics on innovative methods of teaching (comparative **Table 4**).

These textbooks were used in universities to train teachers on the territory of the USSR and post-Soviet countries, recommended by the Ministry of that time. The analysis of the content was carried out on the basis of comparing the names of topics in the section "Didactics" of textbooks on pedagogy of the twentieth and twenty-first centuries (textbooks representing the decade). It shows the relative stability of the subjects of the section "Didactics" by keywords: "the process of learning," "the content of education," "methods and means of teaching," and "forms of education." Textbooks include the topic "Innovative Learning Technologies" in the 21st century. Thus, modern students are studying innovative methods and technologies of teaching.

Criteria analysis	Textbook 1 (1950–1960s)	Textbook 2 (1980s)	Textbook 3 (1990s)	Textbook 4 (modern twenty-first century)
Textbook	“Pedagogy” [31]	«Pedagogy» [4]	«Pedagogy» [11]	«Pedagogy» [32]
Content of “Didactics” section	<ol style="list-style-type: none"> <li>1. Fundamentals and principles of teaching</li> <li>2. Education content</li> <li>3. Methods of teaching</li> <li>4. Teaching at school</li> </ol>	<ol style="list-style-type: none"> <li>5. Subject, main categories and didactic tasks</li> <li>6. Learning process, its methodological and theoretical basis</li> <li>7. Education content</li> <li>8. Methods of teaching</li> <li>9. Forms of education</li> </ol>	<ol style="list-style-type: none"> <li>10. Essence of teaching process</li> <li>11. Didactic systems and models of teaching</li> <li>12. Teaching aims</li> <li>13. Classification of teaching regularity</li> <li>14. Content of teaching process.</li> <li>15. Using computer in education process</li> </ol>	<ol style="list-style-type: none"> <li>16. Essence of teaching process</li> <li>17. Regularities, laws and principles of teaching</li> <li>18. Education content</li> <li>19. Methods and means of teaching</li> <li>20. Forms of teaching</li> <li>21. Diagnostics and control in teaching</li> <li>22. Innovative pedagogic technologies of teaching</li> </ol>

Table 4. Comparative table of the section “didactics” of textbooks on “pedagogy” for pedagogical universities.

For teachers of the older generation who have graduated earlier from universities, advanced training is carried out (according to the Law of the Republic of Kazakhstan “About Education” at least once in 5 years) [33].

Currently, most schools in Kazakhstan are actively pursuing reforms, including the active use of innovative teaching methods by teachers. Next, we turn to the consideration of the results of the questionnaire of teachers on the use of innovative teaching methods.

## 4. Results and discussion

### 4.1. Survey of teachers on the use of innovative teaching methods

Many scientists study the active implementation of innovations in training. According to Isayev, only 14% of teachers have an actively positive attitude to innovation, they initiate the introduction of new technologies in the educational process and promote them. Twenty-three percent are positively attuned and 9% have an emotionally positive attitude to pedagogical innovations [34]. While 18% of teachers have frustration-negative, 26%—passive-negative, and 10% actively negative attitude toward innovation. T.I. Shamova divides teachers in terms of the degree of motivation for innovation in the school into leaders from 1 to 3%, positivists from 50 to 60%, neutrals—30%, and negativists from 10 to 20% [35]. The introduction of innovative teaching methods is actively conducted in Kazakhstan. Let us conduct a survey among teachers—whether they use innovative teaching methods, which see the strengths and weaknesses of ITM application.

In the joint questionnaire held by K. Esenova, 66 teachers participated in the qualification improvement institute, and up to three priority answers were allowed.

*(R1) Do teachers apply ITM?* 92.42% of the teachers admit that they use innovative teaching methods. In our opinion, this is a high figure. At the same time, it can be assumed that since teachers came to improve their qualifications from different regions of Kazakhstan, they were a priori motivated to update the teaching methods, to apply ITM, and have some experience in applying them. In addition, the promotion of the ITM application is widely conducted in the Kazakhstani education system. Therefore, we can assume that this result is in part similar to Shamova’s data on the existence of teachers due to various reasons that are negatively related to innovations in training.

*(R2) Advantages and disadvantages of ITM.* Teachers recognize the strengths of teachers recognize the strengths of the application of innovative teaching methods (ITM): the activity of students in cognition and activity (51.52%), students’ interest and practical orientation (39.93%), meaningfulness and strength of the acquired knowledge and competences (36.36%), the feasibility of fulfilling the tasks of the students (33.33%), development of creativity (30.30%), support of interest and direction in depth for strong students (15.15%).

The risk zones indicated by teachers: a reduction in the amount of knowledge for a limited time of the lesson (54.55%), training and material support/equipment, markers, stickers .../(48, 48), class

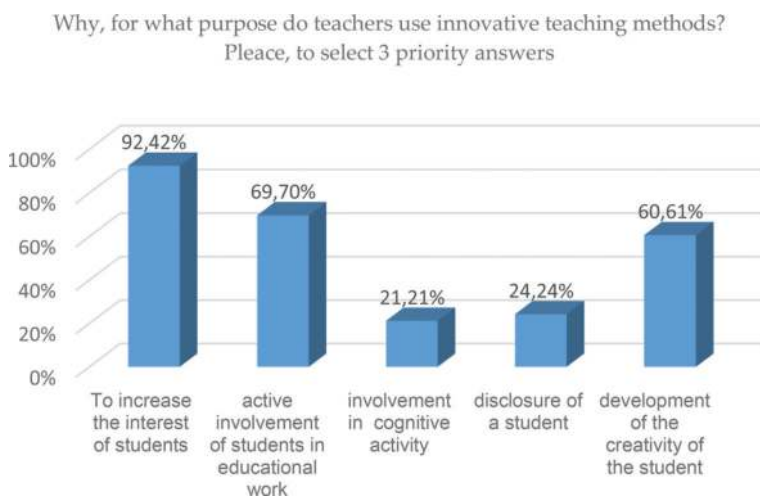
noise, reduced discipline (42.42%), and labor time of training (36.36%). Note that in urban schools, the usual class consists of 25–33 schoolchildren, and the teacher does not have an assistant.

These indicators are a good illustration of the teachers' understanding of the sampling of existing difficulties in the application of ITM.

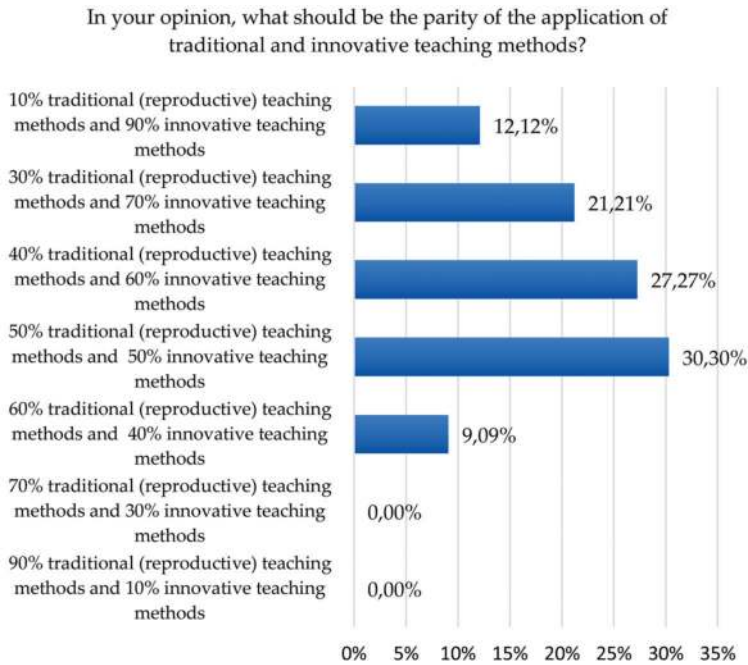
(R3) *The purpose of ITM application.* The main goal of the ITM application, according to the teachers' evaluation, is to increase the interest of students—92.42%, active involvement of students in educational work—69.7%, development of the creativity of the student 60.61% (**Figure 1**). As a result of ITM application, the students develop personality qualities—activity, communicativeness, competence, oratorical ability, democracy. The constant use of innovative teaching methods develop in pupils, according to teachers' assessments, activity (78.79%), communicative (69.7%), competence (66.67%), oratory (30.3%), and democracy (15.15%).

(R4) *Training of IMT teachers.* Most teachers were trained in innovative teaching methods (81.82%). Methodical updating took place through qualification improvement courses (78.79%) and special courses at universities (54.55%). Besides, teachers attend training at their own expense (45.4%) and are engaged in self-education (30.3%). Indirectly, these results show the systematic nature of the state's work on updating the methods of teaching. At the same time, 30–45% of the selected teachers independently update innovative methodological competence, which also shows the active position of teachers in improving the skills in this sample. The results are in accordance with the data on the studies of Isaev and Shamova (46% positively related and 50–60% positivists enter the data area).

(R5) *The parity of applying traditional and innovative teaching methods.* On the question of determining the parity of accepting traditional (reproductive) and innovative methods of teaching, teachers responded as follows (**Figure 2**).



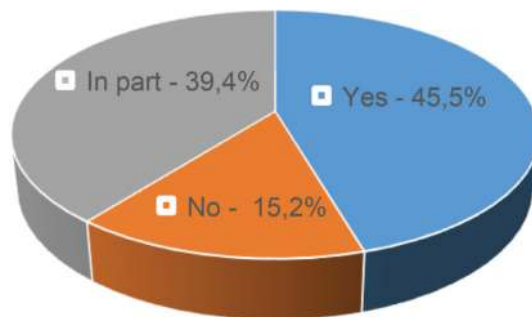
**Figure 1.** Why, for what purpose do teachers use innovative teaching methods?.



**Figure 2.** Determining the parity of applying traditional and innovative teaching methods.

It is gratifying to note that there has been a turn to the need for more innovative methods of teaching to be used by 90.91% of teachers. This is the result of reforming the system of Kazakhstani education as well as the work of courses for improving the qualifications of teachers.

To the last question: “Did you have a meaningful structure for updating the methods of teaching-an innovative teacher culture?” 45.5% of teachers answered “Yes”, 39.4% in part, and 15.1% answered “No” (**Figure 3**). This system includes both participation in advanced training courses, participation in ITM training, self-education—reading books, attending classes of innovative teachers.



**Figure 3.** Teachers answer.



In our opinion, it is the innovative culture with the motive and the ability to update the pedagogical tools, competences, knowledge, and values that should become the component of the skill of the modern teacher. Such a system can be multicomponent, as teachers themselves point out, associated with the reflexive methodological competence of teachers.

## 5. Conclusion

Changes in didactics and pedagogy of Kazakhstan and post-Soviet countries have two major directions. The first is associated with a change in ideology and the acquisition of independence by countries. The second is connected with the world trends in the development of education: the introduction of a competence approach, informatization, internetization, globalization, and diversification of education.

Teacher, on the one hand, subjectively decides on the design of the content, methods, strategies, and technologies of education, but the implementation of educational reforms depends on him. On the other hand, the state and society broadcast the pedagogical culture, the value aspects of teachers' thoughts through professional, vocational training, and the system of raising teachers' qualifications.

The subjectivity of consciousness and professional activity is one of the principles of modern pedagogical science. That is, the application or nonuse of innovative methods depends on the personality of the teacher, his methodological competence, pedagogical skills. The task of the teacher training system is to actualize such a need, to form methodological competence. The task of the school and universities is to encourage and stimulate the development of teachers' and students' creativity. An important task of the teacher is to constantly reflect and develop his pedagogical potential; then the student influenced by the example of the teacher will be an active and competent person.

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## Author details

Aigerim Mynbayeva<sup>1\*</sup>, Zuhra Sadvakassova<sup>1</sup> and Bakhytkul Akshalova<sup>2</sup>

\*Address all correspondence to: umo200709@mail.ru

1 Al-Farabi Kazakh National University, Almaty, Kazakhstan

2 International Education Corporation, Kazakh leading Academy of Architecture and Civil Engineering, Almaty, Kazakhstan

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