М. В. Кочетков

Традиционная и адаптирующая парадигмы обучения как неотъемлемые составляющие инновационно-ориентированного образования будущего

Введение. Традиционное обучение нередко противопоставляется иным подходам как некая неприемлемая крайность. Вместе с тем, традиционное обучение отражает природу творческого потенциала человека, где значимы и репродуктивная его сторона, и креативная. Задача инновационно-ориентированного образования обусловлена балансом отмеченных сторон творческого потенциала в контексте содержания образования, его темпоральных и иных ограничений, а, самое главное, реального, а не декларируемого запроса общества на творческие качества гражданина, прежде всего его способность к прорывным инновациям. Целью исследования является обоснование теоретических и практических оснований инновационно-ориентированного образования.

Методология исследования. В качестве методологических основ подготовки инновационного специалиста используется наследие Я.А. Коменского, парадигма «перевёрнутое обучение» в её эволюционном развитии согласно творческим и сотворческим методологическим основаниям авторской технологии и парадигмы «адаптирующее обучение», модель образования в дискурсе элитаризирующейся социокультурной реальности.

Результаты. Раскрывается авторская технология «адаптирующее обучение». Она предусматривает организацию обучения в виде нетрадиционной последовательности проведения занятий. При этом практическое или семинарское занятия, проводимые до лекции, нацелены на самоактуализацию обучаемым проблематики учебного материала. Адаптирующее обучение может рассматриваться как современная разновидность технологии «перевёрнутый класс» («перевёрнутое обучение»), которая в условиях смешанного обучения становится доминирующей парадигмой образования. Рекомендуется широкое внедрение технологии (парадигмы) адаптирующего обучения, базирующейся на методологии творчества и сотворчества.

Заключение. Присущая традиционному обучению академическая лекция в будущем будет выступать в системе высшего образования значимым признаком передового учебного заведения. Ключевые признаки инновационно-ориентированной образовательной деятельности связаны с гармонично сочетающимися репродуктивно-креативными проявлениями процесса обучения, обусловлены поисковой, самоактуализированной, «проблемно-назревшей» познавательной деятельностью обучаемого, детерминированы согласованным изменением преподавателя и студента. Указанные признаки характеризуют перспективную технологию (парадигму) «адаптирующее обучение».

Ключевые слова: цифровизация, дистанционное образование, смешанное обучение, Я.А. Коменский, классификация Б. Блума, студентоцентрированное образование, творчество, адаптирующее обучение, перевёрнутый класс, перевёрнутое обучение, упреждающее обучение, национальное образование, элитаризация, лекция.

M. V. Kochetkov

Traditional and adaptive learning paradigms as integral components of the innovation-oriented education of the future

Introduction. Traditional education is often opposed to other approaches as some kind of unacceptable extreme. Meanwhile, traditional education represents the nature of a person's creative potential, where both reproductive and creative aspects are significant. The task of innovation-oriented education is due to the balance of the noted aspects of creativity in the context of the content of education, its temporal and other limitations, and, most importantly, the actual as opposed to the declared demand of society for the creative qualities of a citizen, primarily his or her capacity for breakthrough innovations. The purpose of the study is to substantiate the theoretical and practical foundations of innovation-oriented education.

Methods. The legacy of John Amos Comenius, the “flipped learning” paradigm in its evolutionary development according to the creative and co-creative methodological foundations of the author’s technology and the “adapting learning” paradigm, a model of education in the discourse of an elitist socio-cultural reality are used herein as a methodological basis for the training of an innovative specialist.

Results. The author’s technology of “adaptive learning” is revealed. It provides for the organization of training in the form of an unconventional sequence of classes. At the same time, practical or seminar classes held before the lecture are aimed at self-actualization of the educational material problems by the trainee. Adaptive learning can be perceived as a modern version of the “flipped classroom” technology (“flipped learning”), which, under conditions of blended learning, becomes the dominant paradigm of education. It is recommended to widely introduce the adaptive learning technology (paradigm) based on the creativity and co-creation methodology.

Conclusion. In the future, the academic lecture inherent in traditional education will act in the system of higher education as a significant feature of an advanced educational institution. The key features of innovation-oriented educational activity are associated with harmoniously combined reproductive and creative manifestations of the learning process, being determined by the coordinated change of the teacher and student. They are conditioned by the search, self-actualized, “problematically matured” cognitive activity of the student. These features characterize a promising technology (paradigm) of “adaptive learning”.

Keywords: digitalization, distance education, blended learning, John Amos Comenius, B. Bloom’s classification, student-centered education, creativity, adaptive learning, flipped classroom, flipped learning, proactive learning, national education, elitism, lecture

For Reference:
The number of educational models increases continuously, both in their theoretical and practical interpretation. This trend is unlikely to lose momentum. The foregoing is quite understandable, since the requirements for the creative qualities of a specialist as a source of breakthrough industrial and social innovations are expanding, the sociocultural reality is becoming more multifaceted and complex, the criteria for the effectiveness of education are increasingly contradictory, and specific pedagogical practice is becoming more difficult to comprehend and generalize.

In this regard, in the paradigm approach to the analysis of pedagogical phenomena, an understanding of the fundamental polyparadigmality of the description of education that reflects modern realities, which is characterized by multi-level integration on difficultly comparable bases of significantly different models, has developed [1, p. 312].

Some paradigms in their opposition deserve noting.

One side of the opposition can be represented by the traditional paradigm of class-lesson teaching that has become widespread in practice [2, p. 17] (hereinafter referred to as the traditional education paradigm, traditional education). One of the hallmarks of traditional education is that first there is an academic lecture followed by a practical or seminar session (various combinations are possible). According to Tarasova, the educational resource of the traditional education paradigm, "this pedagogical model, pedagogical technology is completely exhausted" [2, p. 19], since it brings "the dominance of information versatility, the standardization of thinking, ... semiconductor translation of ready-made knowledge, ... information and mental consumerism" [2, p. 19], the absence of "living knowledge" [2, pp. 25–27]. Tarasova not only sees exclusively "information-reproductive, translational" [2, p. 17] aspects in traditional education but also for some reason correlates them with John Amos Comenius, the creator of the "Great Didactic" [2, p. 17; 27].

The other side of the opposition can be represented by a number of paradigms, in the context of different angles, which in one way or another are opposite to the information-reproductive, translational, standardizing, and "immobilizing" characteristics attributed to the traditional learning paradigm.

The student is emphasized in the consumer model as a consumer of educational services [3; 4]. The co-production model, value co-creation model [7; 8], transformation model [9; 10], and student engagement model [11; 12] are called upon to individualize and humanize the educational process [5; 6]. The student engagement model, the co-production model, as well as the transformation model paradigm [9; 10], are designed to "revive" knowledge in the "student – education content – teacher" chain. The meta-integrating role in Western education in relation to the above and other paradigms (for example, the "flipped learning" paradigm) is increasingly being played by the student-centered model [14; 15], which is designed to increase the student's involvement in literally all manifestations of educational activities, including those that go beyond the actual learning process [15] (interaction with the employer, choosing one's own educational trajectory and the subjects of education that influence it, determining the conceptual priorities for the development of education, student government, etc.). As for the Russian educational scientific discourse, many of the paradigmatic ideas of the listed range of Western models, in the author’s opinion, are reflected in the competency-based...
paradigm [16; 17], given its generally recognized dominant and integrating role in modern Russian theory and practice [18; 19].

The presented opposition of the traditional teaching paradigm to the outlined range of paradigms is focused on the didactic aspect of education. In other guises, the marked models themselves are opposed to each other. Thus, the consumer model paradigm in various contexts is opposed to co-production, value co-creation, student engagement, transformation, and student-centered paradigms (models, approaches, theories) [20].

In the author’s opinion, the technology of "flipped learning" or "flipped classroom" (flipped learning, classroom flip, inverted classroom) occupies a separate place in the opposition under consideration [21; 22], which has become super popular in Western education [23; 24]. Currently, it is rightly considered as an educational paradigm [25] in its advanced practical implementation and corresponding theoretical understanding, as the methodological basis of education, given its confident course towards mixed formats, as well as the growing need of society for creative specialists.

The described polarization of educational models in the form of opposition to traditional education attributed to Comenius with some other modern approaches is a semantic vector of search for an answer to the question of the effectiveness of the educational process, which is quite common in Russian scientific discourse.

However, the author undertakes to assert that traditional education cannot be opposed to anything as some kind of unacceptable extreme, as it reflects the nature of a person's creative potential, where both its reproductive and creative aspects are significant. Another issue is the balance of the noted aspects of creativity in the context of the content of education, its temporal and other limitations, and, most importantly, the actual as opposed to the declared demand of society for the creative qualities of a citizen, primarily his or her capacity for breakthrough innovations. It should be noted that the demand of society for an innovative specialist is directly linked with the demand of society for an innovative teacher.

Methods

This research proceeds from the dialectical reproductive and creative nature of the creative cognitive activity. It is intended to reveal the key driving factors in the training of an innovative specialist, which are determined by a real request from society for a significant creative potential of a student (teacher) in the course of the implementation of nationally oriented education, as well as adequate conceptual foundations (Comenius's heritage, the "flipped learning" paradigm in its evolutionary development according to the creative and co-creative methodological foundations of adaptive learning technology, education as a component of an elitist socio-cultural reality).

The study unfolds in the discourse of educational paradigms as a methodological approach to the analysis of educational processes (paradigms of "flipped learning", blended learning, traditional learning, globalization, nationally oriented, elite, adaptive education, etc.). The definition of emerging paradigm trends is considered as a kind of factorial analysis of the study of the contradictions of modern education, since the paradigm approach is implicitly associated with a certain generalized vector of the evolution of educational ideas, theories, and concepts. Moreover, a paradigm is perceived as a modeling complex of fundamental ideas and achievements generally recognized by the scientific community. The presented definition of a paradigm just gives the paradigm discourse of research
the potential of factor analysis, when the objectivity of the discovered cause-and-effect relationships is determined by the authority of the opinion of those scientists whose achievements are correlated with certain paradigms.

Results

Features of adaptive learning technology

The wide practice of teaching is still characterized by the fact that the study of a new educational topic begins with an academic lecture, after which practical or seminar classes are held. In this sense, the dominance of the traditional teaching paradigm in education seems obvious.

An academic lecture involves a systematic presentation of the theoretical and methodological basis of the academic subject, including those problematic and controversial aspects that outline and define the area of knowledge under consideration. Thus, in traditional education, at the beginning of studying a new educational topic, a student is immediately offered a certain model that allows him or her to explain the problems and contradictions presented.

At the same time, the patterns of search, self-actualized cognitive activity that are significant for the formation of an innovative specialist are associated with the effect of "inventing the wheel", namely, with the "rediscovery" of the issues that determine the structure and content of the subject, with the advent of motivated, "ripe", and "escalated" request both for the specified range of problems and for the knowledge that partially or completely "solves" this problematicity. Only such an "inventor of the wheel" will be able to bring the theory and practice of his or her professional activity to a significantly different level of development. After all, such a person considers the answers to the questions that arose for him or her in the process of learning as one of the possible options for a modeling explanation, and not as a kind of dogma, which is all the more difficult to abandon in subsequent professional activities, the more diligently the student treated his or her studies.

Thus, the traditional sequence of conducting classes, when an academic lecture is a start-up discipline for a full-time student, prevents his or her search, self-actualized development of a new field of knowledge, and as a result, the preparation of a unique specialist capable of innovation, with great creative potential (a key sign of the effectiveness of modern higher education). A part-time student in a number of cases may be quite "ready" for the problematic level of an academic lecture. However, even in this case here a lot of reservations should be made, which will not be considered in this article – hereinafter, only a full-time student will be implied.

Given the above, the author proceeds from the fact that the main criterion for the effectiveness of training is the search, self-actualized cognitive activity of the future specialist, determined by the "rediscovery" of the subject matter, the overdue comprehension of the corresponding system of knowledge. Non-satisfaction with the presented complex criterion on the part of mass higher education has always caused rejection among the student community. In this regard, the memoirs of Leo Tolstoy about the time of his studies at the university [26, pp. 43–44] can be noted as an example. However, the legacy of Comenius, whose name is associated with the formation of the current class-lesson system of education in its exclusively "information-reproductive, translational" [2, p. 17] practical implementation, deserves special comments.
According to the author, the results of the abovementioned formation and the way it was conceived by Comenius are characterized by a significant discrepancy. Thus, the meaningful discourse of the "Great Didactics" excludes the academic lecture as a start-up stage of teaching students on the academic topics of the discipline.

According to Comenius, a lecture may mark the beginning of the study of an academic discipline or any of its large sections. However, in this case, for full-time students, it should be of an overview-orienting nature. Thus, in the explanation of Fundamental VI (Chapter 16) "Formerly general", it is noted: "it would be wrong to teach science from the very beginning with all the details, instead of first prefixing them with a simple general outline of all knowledge". In the comments to Fundamental IX (Chapter 16), it is stated: "The one who begins to learn from the discussion of contradictions will never know the foundation of truth" [27, p. 58]. The comments to Fundamental II (Chapter 18) emphasize the need to "first of all make students inquisitive and attentive" [27, p. 67].

Fundamental II (Chapter 16) prescribes the course of educational activities in the form of a laconic setting "Material before form". Section II (Chapter 20) says: "... one should start teaching not with a verbal interpretation of things, but with real observation of them. And only after getting acquainted with the thing itself, let it be discussed, clarifying the matter more comprehensively; ... let there be things, and not shadows of things, things, I say, solid, genuine, useful, good for the senses and imagination" [27, p. 71].

It follows from the foregoing that for students who have not actualized the problems of those fundamental questions, systematized answers to which are taught in a ready-made form at lectures, seminars and practical classes should precede academic lectures. This is the peculiarity of the adaptive training developed by the author (in the form of various non-traditional sequences of lectures, practices, and seminars). The technology is disclosed in the collection of conference materials [28; 29], where there are links to earlier and detailed publications, in which the technology is called "non-traditional sequence of classes", "non-traditional organization of training", etc. Comenius should rather be considered the founder of adaptive learning than of the "information-reproductive, translational" aspect of educational practice, which received the dominant influence [2, p. 17], and which is attributed to the creator of the "Great Didactics".

The essence of the author's technology of adaptive learning is that the seminar (practical) classes are carried out not only after the lecture but also before it [28; 29]. At the same time, it is not necessary to increase the number of seminars and practical classes, since their educational goals can be achieved "with a time shift" [28; 29], about which explanatory comments will be given below. The existing qualitative structure of teaching a subject, consisting of types of training sessions (i.e., a set of lectures, practices, seminars) in adaptive learning, as a rule, is also not subject to revision.

The didactic goals of practical (seminar) classes held before the lecture, which are designed to adapt the student to a new field of knowledge, are of fundamental importance. Didactic goals consist in self-actualization by the student of the problems of the educational topic of the discipline, the creation of practice-oriented conditions so that the corresponding field of knowledge becomes "actually conscious", the student is "puzzled", imbued with those questions, the answers to which are systematically disclosed in the lecture.

The objectives of the practical (seminar) classes held after the lecture correspond to the didactic tasks of the practice and seminar, which are familiar to the Russian teacher, not so much self-actualization by the student of the problems of the studied field of knowledge as in-depth comprehension and practical development of that systemic
description of the field of knowledge under consideration, which was proposed by the teacher at the lecture.

The lecture itself in adaptive learning can be of a character familiar to everyone, namely, an academic lecture, that is, the variety that has become most widespread in the mass practice of Russian higher education and which is largely rightly criticized [2; 29], since when implementing the traditional sequence of conducting classes, the previously indicated patterns of search, self-actualized cognitive activity are really poorly taken into account.

Thus, the matter is not the academic lecture itself, in which, for example, Shestak does not see any special prospects in connection with the emerging distance learning opportunities [26], and N.N. Gubanov and N.I. Gubanov, on the contrary, adhere to the opposite position for the same reason [30]. The main integrating condition for the effectiveness of classical lectures, practices, and seminars is the satisfaction of the educational process with the logic of search, self-actualized, "problematically matured" cognitive activity (for example, as it is implemented in the author's adaptive learning technology). If the noted logic is observed, then the academic lecture, although it is a characteristic feature [2; 26] of the criticized traditional education, turns out to be not only appropriate, but can also become the leading manifestation of the higher education of the future, which will be discussed separately.

**Blended learning and creativity**

The leading message of this study is connected with the understanding that only a creative teacher can develop the creative potential of a student. The key to this study is the understanding of the creative and reproductive nature of the individual's creative potential. Both aspects (reproductive and creative) are important for the development of the student's creative abilities, including in the course of search, self-actualized, "problem mature" cognitive activity.

The reproductive aspect is due to the dependence of the cognitive performance of the individual on his or her skills, habits, style of activity, following detailed instructions, on actions according to the model, productive memorization (without deep understanding), the influence of traditions, rituals on this process, factors of trust in the source of information, respectful attitude toward a teacher, a comfortable environment, etc. The creative aspect is determined by a deep understanding of the educational material by the trainee, the implementation of the dialogic nature of education, the principle of problematic learning, the use of project, experimental and research teaching technologies, open tasks by the teacher, "getting" into the "zone of proximal development", often a significant potential training time, significant physiological resources of the individual (it is known that both creatively saturated training and exclusively reproductive training lead to rapid fatigue in the first case due to intellectual fatigue, in the second – apathy, lack of novelty activities).

Thus, learning technologies that provide for the initial stage of proactive learning (they will be discussed later) are characterized by the predominance of "creative" educational methods at their final stages. However, the noted manifestations are, primarily, the result of the initial, proactive training, when its "reproductive" side prevails. In this regard, the authors note the often underestimated time factor for thinking about incoming information, as well as activities with the subject of knowledge as a source of a motivated attitude to learning ("appetite comes with eating"). After all, a person is characterized by a natural desire for novelty, curiosity; it is difficult for him or her to act solely according to the regulations, model, without interest. As a result of the proactive stage, with its largely superficial and strictly regulated cognitive activity, the subsequent effects of "problem maturation", self-
actualization, and a search attitude toward the field of knowledge arise, which, in turn, are fertile ground for "creative" teaching methods.

The COVID-19 pandemic has intensified the trend of changing the education system around the world in the direction of blended learning formats, which requires separate comments on the relevant features of the implementation of search, self-actualized cognitive activity in the context of the author's technology (paradigm) of adaptive learning.

Blended learning involves distance and classroom components. Naturally, during periods of pandemics, the distance component acquires absolute priority, which became possible due to the digitalization of education.

After pandemics, the audience component "returns" some of its positions in the specified balance. What these positions are, what balance provides the most effective training – these problems are the subject of perhaps the most fierce dispute today.

The "flipped classroom" technology ("flipped learning") is one of the varieties of blended learning: it provides for proactive self-training of a student using distance learning opportunities (video materials, various kinds of remote tasks). The adaptive learning developed by the author in the implementation of distance education can be considered as a kind of "flipped classroom" technology in its modern formats [31, p. 76]. However, the converse statement will no longer be true, since the "flipped classroom" is a type of blended learning, the distinctive features of which are due to the means of providing distance learning.

The author believes that the original distinctive features of the flipped classroom technology are due only to the emphasis on self-study in the context of audiovisual remote technological opportunities for demonstrating pedagogical experience. This technology, which today rightly claims to be an advanced educational concept [25], appeared due to the fact that two chemistry teachers began to give out video cassettes with lectures first to students who missed classes, and then as a proactive self-preparation [25, p. 88]. The educational product of advanced specialists, as a rule, is distinguished by the effectiveness of self-actualized perception by the student of a new field of knowledge. Moreover, the trainee, completing the tasks of self-training in an individually comfortable mode, gets time to comprehend the material, to think about the relevant problematic points. Otherwise, the "flipped class" technology, including its modern variations [31, p. 76], was not marked by any fundamental innovations; all of them were borrowed from the already known pedagogical experience as this technology was rapidly spreading and developing in the global educational space.

At this rate, it is difficult to consider the know-how effects of "preemptive" learning of the "flipped classroom" technology: by the time this technology appeared, for example, the mentioned technology of adaptive learning already existed. In foreign education, in this regard, it is difficult to ignore the innovation as early as the beginning of the last century. This refers to a technology that bore such a name consonant with modern "flipped learning" as "reverse learning", "reverse instruction" [32, p. 29]. A relatively recent example of a "proactive" pre-digital Western pedagogy is the technology of Mazur (1997), which provides for advanced self-training that facilitates a lecture with elements of a seminar, and with the work of students in mini groups [25, p. 88].

At present, as already noted, the "flipped learning" technology claims to be a concept, a paradigm of modern education [25].

The "flipped learning" technology as a methodological basis of education is far from its holistic design, which, in the author’s opinion, is due to the lack of an integrating conceptual
core associated with the laws of the dialectical reproductive and creative nature of creativity in the context of the proposed complex criterion of search, self-actualized, "problem mature" cognitive activity of the student, as well as with an understanding of the co-creative essence of the educational process.

The theoretical substantiation of the author's "adaptive learning" technology in contrast to "flipped learning" was initially based on the mechanisms of creativity and co-creation. The author believes that co-creation implies not only the joint creation of educational coexistence by a teacher and a student (in the form of a didactic context of the learning process, joint solution of open problems, design and research activities, etc.) but also a coordinated consideration of the change of a student and a teacher. Let us dwell on some co-creative effects of the teacher’s professional adaptation to distance-oriented educational activities through the use of relatively easy-to-understand didactic possibilities of the types of training sessions in their non-traditional sequence, that is, as a result of the use of adaptive learning technology.

The effectiveness of students’ self-training is considered by many scientists as the main factor in the productivity of distance learning. With "adaptive learning", including within the framework of a blended education format, the effectiveness of self-study is not critical for the effectiveness of teaching a new educational topic at its initial stage. Note that in many variants of the implementation of blended education, access to subsequent content blocks of the training course is often restricted (by software and hardware) if the tasks of the previous stages of education are not completed. With adaptive learning, the teacher fundamentally does not insist on independent preparation at the initial stage of studying a new topic. This is done in order to ensure the formation of the student in his or her self-actualized search attitude toward the area of knowledge under consideration. This is one of the aspects of the effectiveness of education in the context of adaptive learning technology.

The other side is due to the fact that the goals of the practical (seminar) lesson, which is held before the lecture, as noted earlier, are precisely aimed at activating the activity mechanisms of the emergence of interest, mobilizing the student’s life experience, his or her natural desire for novelty, at the "maturation" of the cognitive request regarding the opening field of knowledge.

If the teacher decides to apply adaptive learning, then he or she naturally asks the following questions that determine the course of his/her design activity: what tasks to give for independent training and how to conduct the practical (seminar) lesson itself in conditions when the student is not yet familiar with the corresponding system knowledge (the lecture has not yet been held), how to consider educational issues in order to remain within the framework of the meaningful discourse of the academic discipline, on the one hand, and to activate the student’s cognitive interest based on his life experience and competence, on the other hand. As a result, if one is talking about a seminar, then, as many years of experience show, the teacher successfully designs the most relevant practical tasks in the context of blocks of educational material adequate to them, which are often distributed among groups of students in order to ensure the cooperation of students in preparing for the seminar, work in groups at the seminar itself. Many modern distance-learning tools are more than ever useful in this case.

If one is talking about a practical (laboratory) lesson that precedes a lecture, then the situation itself pushes the teacher to carry out some kind of general review of the most relevant theoretical material, corresponding to the information support of distance learning. The same evolutionary nature of pedagogically competent actions is also
characteristic of tasks for working with equipment – tasks are naturally constructed in the logic "from simple to complex", activating the development by the teacher of appropriate methodological support.

The search-oriented, self-actualizing effects of adaptive learning technology are due to the fact that the student feels unencumbered by the mandatory comprehensive preparation for the lesson, he or she freely asks questions (including those that go beyond the scope of this academic subject), in turn, "prompting" to the teacher the actual course of learning both in the current lesson and in the future. The very activity of solving understandable tasks, working with laboratory equipment, other educational and practical means, even if at the beginning it did not arouse interest, leads to this due to the creative essence of a person, for whom, as noted earlier, it is extremely difficult to do routine work, but who is always striving for something new for understanding the prospects of one's activity.

A lecture session held after practice (seminar), even in its academic version, in the case of adaptive learning is characterized by a qualitatively different level of the student’s cognitive interest. After all, the student is ready to systematize a number of problematic issues; he or she already perceives part of the theoretical material again, albeit in a more in-depth form, the teacher remains open to answer questions and builds the lecture itself, taking into account the feedback that took place in previous classes. However, the most important thing is that the system of knowledge on this topic is perceived by the student not as a dogma, something once and for all certain, but as one of the approaches to describing the patterns of the subject of study under consideration. This means that the student is formed as an innovator, that is, one who is able to look at established knowledge and technologies from a fundamentally new point of view.

Experience shows that self-study with adaptive learning naturally becomes the leading factor in student learning, while distance learning opportunities begin to do their best.

One of the problems that often arise among teachers mastering adaptive learning is related to the possible shortage of teaching time. After all, there is not always a resource of study time for conducting a practical (seminar) lesson both before the lecture and after the lecture. In this case, classes are implemented with the previously mentioned "time shift". That is, in a practical (seminar) lesson, which precedes the study of a new educational topic, the first part of the lesson ends with the study of the previous topic, deepening the student's understanding of its content. In the second part, the study tasks of a new educational topic are considered in order to develop a student's self-actualized, "problematically matured" cognitive interest in the corresponding section of the field of knowledge.

Classes with a "time shift" are characterized by dynamism and a variety of cognitive activity, which reduces the tiring effect of learning activities; students who missed classes for some reason quickly restore gaps in learning.

Focusing on the search, self-actualized, "problematically matured" cognitive activity of the student, one should not oppose the reproductive manifestations of learning to creative ones; they constituted an organic unity. At the same time, the "flipped classroom" technology ("flipped learning"), which is significant for this research, is often revealed in the context of Bloom’s classification [25, p. 87; 31, p. 89] with its logic of designing education "from reproduction to creativity".

It should be noted that no field of knowledge, no search, self-actualized cognitive process in relation to any modern field of knowledge can be carried out exclusively at a creative level, which is associated with a shortage of study time, priorities for mastering the material, which in turn is determined by restrictions associated with the content of
educational programs, the potential of the teaching staff, the material and technical base of
the educational institution, the level of training and motivation of the student, the specific
features of a particular field of knowledge. Moreover, the authors proceed from the fact that,
taking into account the tasks of the interconnected study of not only various educational
topics (including "running ahead") but also various academic disciplines, the corresponding
effects of anticipatory learning with their characteristic "reproductive" manifestations can
characterize all stages of studying the current educational topic. Therefore, the author sees
significant limitations in the logic of designing educational activities from the position of
Bloom's classification, believing that advanced pedagogical practice is a practice that is
temporally "balanced" in its reproductive and creative aspects.

Thus, at the present stage of the study, the solution to the problem of training an
innovative specialist in the context of the dominance of blended education should be
seen in the development and implementation of regulatory requirements for the wide
popularization of the paradigm (concept, technology) of "flipped learning", taking into
account the author's comments. The widespread introduction of the adaptive learning
technology (paradigm) based on the methodology of creativity and co-creation should be
recommended.

Discussion

What is the secret of the viability of traditional learning

The best pedagogical experience is always characterized by exploratory, self-actualized
manifestations of the learner's cognitive activity. There are many relevant examples,
including those based on the "flipped class" technology. One can even say that there is
no acute deficiency in the theory of training an innovative specialist in the corresponding
pedagogical practice. In this regard, it seems somewhat paradoxical that mass education
does not strongly seek to adopt it.

The reason for this lies in yet another seemingly paradoxical phenomenon – the
absence of a real, and not mostly formal, request from the institutions of society for the
emergence of creative specialists capable of breakthrough innovations (hereinafter referred
to as innovative specialists). Such a request in the history of the development of states
existed only for relatively short periods, after which the training of innovative specialists
was actually curtailed through the bureaucratization of educational activities, and emerging
innovative specialists, if they were not massively persecuted, often became non-systemic
figures, including in the field of education and science.

The fact is that the phenomenon of creativity is so complex and unpredictable when it
comes to the upbringing and education of a professional and a citizen that the successful
formation of a person capable of innovation-oriented professional productivity is very often
associated with his/her destabilizing influence on the social and professional environment:
recognized in their spheres, extraordinary personalities often turned out to be openly critical
of the arrangement and management of the corresponding professional activity, sharply
opposed to those in power. One of the Russian examples is the Tsarskoye Selo Lyceum. Its
appearance was due to the state request for, as they would say now, an innovative specialist
of the highest qualification. At first, largely due to the first director, there was a unique
environment for the development and harmonization of those typological manifestations of
a creative personality, which Comenius wrote about, revealing the corresponding potential
of collective education [27, pp. 23–27, 40–43]. The result of creating such an environment is that five of the first thirty graduates are considered outstanding historians, scientists, and statesmen. However, three of them became Decembrists.

Given the above, it is not surprising that over the years, the effect of the production of large-scale creative personalities by the Tsarskoye Selo Lyceum has increasingly decreased as many aspects of the originally democratic, freedom-loving and pedagogically accomplice educational environment (factors significant for the manifestation of talents) have been formalized. It is quite understandable that representatives of any institutional forms of society almost always prefer predictable graduates of educational institutions socialized for their current needs to their extraordinary comrades (at least in their large numbers). The same is true for the teaching staff.

As a result of this disinterest of the powers that be in the emergence of a large number of extraordinary personalities, the latter arose at all times not due to, but in spite of the education system and other institutions (with rare exceptions). In relatively stable periods of the development of society, this completely suited everyone, except for the extraordinary personalities themselves. The author was unable to find inconsistencies with this thesis as a result of acquaintance with the biographies of quite a few recognized creators in various fields of professional and socio-political activity. Upon closer examination, it was precisely the area in which a person succeeded that, for one reason or another, was associated with the stage of its deep self-actualized comprehension, contrary to the established practice of mass education (the factor of a talented teacher in this case is also considered as an exception to the rules).

Does society need creators today? It would seem that the answer to this question is obvious, especially in the context of growing competition between technologies and cultures, the struggle of transnational and national interests – any state needs innovators, otherwise it will lose sovereignty, and the well-being of the people, their mental and cultural development will be subordinated to the will of alien representatives. What has been said is multiple times true in relation to the Russian state with its territories and wealth. At the same time, everything is different in practice. The request for creative people, in the author’s opinion, is more of a declarative nature: in fact, Russian state institutions do not so much contribute to this as hinder it.

Thus, the author proceeds from the fact that the main problem of the formation of innovative higher education (education that produces innovative specialists), both Russian and global, is the absence of a real order for creative people from those in power, supported by the creation of appropriate conditions. Until now, such an order could not be of a mass nature because of the threat to the existence of elites due to the high degree of uncertainty in the behavior of a creative person. A relatively massive order for a creative person has so far appeared only within the elites themselves, this is an "internal" request, given the always-understood need for some kind of controlled renewal of elites from the talented "bottom".

What and in connection with what can change here in the future, primarily in Russian education?

*Is there a future for adaptive learning?*

The social stratification of society into the elite and "official" people was before. However, "the current understanding of 'official' people is associated with robots" [33, *]

* The USSR is no exception to this rule. The corresponding analysis can be the subject of a separate study.
p. 138], with anthropoinnovations (integration with artificial intelligence, cyborgization, genetic engineering, etc.) [34; 35], with the corresponding differentiation of society and the competitive advantages of the elite [36].

It seems that the authorities in power should not be afraid of the unpredictability of the behavior of creative people – unprecedented global control will reduce such threats to a minimum. Anthropoinnovations in the long term are potentially able to "annul humanity itself and its problems", and in the medium term, they create for the elite not only enormous advantages in professional competencies but also unlimited possibilities of control over "official" people [35; 36].

Therefore, as never before, the solution of the fundamental question is relevant: what is a person and whether he or she remains a person as anthropoinnovations develop, what are the strategic guidelines for the existence of humankind in this connection [37; 38]? However, this issue is unlikely to be incited for discussion by those who manage technological progress (against the background of the short-term advantages provided by anthropoinnovations for human control). Most likely, on the contrary, everything will be done so that the general public does not think about this fundamental issue, which, for example, is facilitated by the dehumanization of education, which is also characteristic of Russian higher education.

It is the prospects for the absolute control of a representative of modern society, as well as the objective growth in the volume of professional knowledge, the increased demand for innovative specialists in accordance with the irresistibly technologically more complex world of professions, that determine that the mass education of the future will be more focused on training an innovative specialist than at present.

The world of jobs has really changed a lot. Moreover, it objectively requires a significant number of innovative specialists [39; 40]. The global society elite, which controls finances, power and technological progress, is interested in this. However, its interest is far from altruistic goals. It seems that in the near future, a strict division will be established in the leading countries and in many states supervised by them. It will be determined by three levels of training of specialists, depending on the potential of educational institutions to develop creative qualities, as well as access to advanced technological and social innovations.

The first level of training is associated with the most advanced technological and social innovations. The humanitarian component of the training of specialists is presented here quite worthily, as well as the most advanced industrial and social innovations. In developed countries, this level has long been pronounced; the relevant educational institutions are widely known and recognized by the public as elite. Currently, they directly serve those structures of society that closely interact with transnational corporations and control most of the leading technological know-how [41; 42].

The second level is the "serving" level, which feeds the first (as a result of the selection of talents, for example, at the stage of admission to the magistracy). The requirements for the creative abilities of representatives of the second level are also quite high. However, they, in contrast to the representatives of the first level, have significantly more difficult access to "breakthrough" knowledge, including social technologies for managing society. As anthropoinnovations are introduced, representatives of the second, and even more so, the third levels will be increasingly limited in access to the most significant areas of scientific and technological progress, to the capabilities of artificial intelligence.

The third level is due to less demanding qualification characteristics of a specialist. Given the possible level of detail, it is fair to correlate it with secondary vocational education, as well as the tasks of an applied bachelor's degree in the current higher school. Anthropoinnovations
(primarily merging with artificial intelligence) at the third level will pursue the goal not so much of expanding the professional competencies and anthropological capabilities of a specialist (although this is also to some extent), but of his/her control by the ruling elites.

Thus, elitist differentiation can be accepted as a key methodological basis for the theory and practice of modern education. The Russian targeted policy of multi-level education, as well as the significant long-term foreign influence on Russian education and technology [41; 42] currently exclude here the fundamental features of Russian education in terms of the subordination of the world educational space to its elite segment. It is the elitist methodological basis that also reflects the prospects of the "adaptive learning" paradigm.

Globalization processes in the world are becoming increasingly competitive with nationally oriented development trends. In the context of the division of world education into elite and non-elitist, the preservation of national interests is associated with national elite educational institutions – their presence, their ability to relatively separately exist as producers of new knowledge, as well as the corresponding significant impact on world processes.

The first of the dominant globalization trends in the development of modern education that can be singled out is due to the measures taken by the structures in charge of elite education to ensure control over technological and social progress. In this regard, the second trend is determined by the desire of the elite that leads the world globalization processes to take maximum control of elite educational institutions in intensively developing countries, and the third is the goal-setting to form a person who is not able to oppose the interests of the world elite, which is often associated with his or her inability to think wide, humanitariantly, understand and defend the interests, traditions, culture of his/her people and state.

**Education from a nationally oriented position is directly opposite to the presented trends**

Elite education, concentrated in a relatively small number of educational institutions, in the author’s opinion, will always be distinguished by the predominance of "live" forms of education as the most effective mechanism for harmonizing and developing the universal creative qualities of a person, described by Comenius [27, pp. 40–43]. Moreover, the academic lecture here will retain its presence almost unchanged, but in the search, self-actualized, "problematically mature" conceptual logic of the technology (paradigm) of adaptive learning, which, in particular, constitutes the prospects for the development of the "flipped learning" paradigm (when considering mixed education formats).

It should be noted that the author’s rather superficial acquaintance with teaching in recognized elite educational institutions allowed developing a judgment that at present, teaching in these institutions is fully consistent with the logic of search, self-actualized cognitive activity. The unconditional merit here is of the teaching staff. Its creative potential is undeniable.

How will mass education become more creative? After all, it is known that only creatively extraordinary teachers can train creatively extraordinary specialists. Where will teachers suddenly come from who are able to compete in skill with colleagues from elite educational institutions? How to meet the need for them in the context of the growing need for innovative specialists?

Creative teachers in mass education are already expanding their presence, but more and more in an implicit form – as developers of distance and blended learning programs, in
particular, authors of video lectures. As a result, learning is characterized by more and more self-actualized manifestations, including due to the "flipped classroom" blended learning technology.

The authors believe that in the near future, the classroom lecture in its inextricable connection with other types of classroom forms of organization of education will become one of the most indicative criteria for an elite educational institution, in contrast to the dominant distance education with erased edges of the usual forms of organization of education in its non-elite segment.

Thus, the problem of effective training of an innovative specialist in the future will be solved, but it will be solved in a very peculiar way, if one is talking about the second and third levels of training – by expanding the implicit presence of a creative teacher in the educational process. This trend is already destroying the current potential of implicit knowledge of Russian non-elite universities, as a result, their innovative potential [43; 44].

Regarding the first level of training, little will change. Here, the centuries-old demand of the elite of society for a creative teacher and a comprehensively creatively developed graduate has formed vivid examples of existing pedagogical systems that are disgusted by "optimization" and permanent reforms. Cultivation of a non-distance innovation-oriented academic environment is a scrupulous, from generation to generation, process of establishing and maintaining student and teaching traditions, scientific schools, public and youth associations, anti-frustration domestic and professional environment.

Conclusion

Thus, it should be emphasized that, based on the dialectic of the reproductive and creative aspects of the creative nature of human cognition, it would be incorrect to oppose traditional learning to its other models as some unacceptable extreme: traditional learning is closely related to the reproductive aspect of the individual's creative potential, and this is an integral manifestation of innovative specialist productivity. In addition, the society's demand for an innovative specialist carries with it significant challenges to the sustainability of public institutions, since a creative person is often critical of professional activity, its organization and management, and many social aspects of social life. The consequence of this in the field of specialist training is its formalization, bureaucratization, leveling the capabilities of a creative teacher, favoring established formats of education, in particular traditional education.

Therefore, traditional education, in any case, its characteristic features, will always be preserved in educational activities. In the context of the paradigm approach, it is fair to say that in the polyparadigm space of the education system, traditional education will always occupy a certain niche. Moreover, the classical classroom lecture, characteristic of the traditional paradigm, will increasingly become a sign of elite education against the background of the fact that education as a whole will tend to reduce the role of the teacher in his "live", professionally and personally unique influence.

The Russian state is in dire need of "breakthrough" production and social innovations, relevant innovative specialists. The necessary condition for this is the correspondence of the educational process in its reproductive and creative logic to the developed criterion – search, self-actualized, "problematically matured" cognitive activity of the student (in the context of methods and means of teaching at the university). This criterion is satisfied by the
author's technology (paradigm) of adaptive learning (based on the legacy of Comenius, the mechanisms of a temporally harmonized learning process in its reproductive and creative manifestations; patterns of search, self-actualized, "problematically mature" cognitive activity of the student, the coordinated change of the teacher and student).

Another condition, given the aggravated relevance of mixed education formats, is the implementation of the "flipped learning" paradigm, taking into account the methodological potential of the author's "adaptive learning" paradigm.

One more condition is that in society, not a formal, but a real, that is, supported by effective measures, request for an innovative specialist should be implemented. With regard to Russia, these measures are related to the implementation of nationally oriented education, the expansion of its humanitarian component, the provision of wide access for the population to a high-quality advanced educational product, primarily due to the teacher’s role as a carrier of implicit knowledge, as well as a potential source of breakthrough innovations in the social and industrial spheres of society, a source of education in the unity of its teaching and educational functions.

REFERENCES

38. Kolesnichenko, E.A., Radyukova, Y.Y., & Pakhomov, N.N. (2019). The role and importance of knowledge economy as a platform for formation of industry 4.0. Studies in Systems, Decision and Control, 169, 73–82. DOI: 10.1007/978-