Transformation of Classroom Teaching in Modern Russian Schools: State of the Art

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Education is getting more informed, digitalised and person-centred. The transition to active learning blurs the boundaries of traditional classroom teaching and encourages the development of new teaching formats. As a result, more and more teachers are turning from "rigid" teaching formats to ones that are more flexible. However, new teaching formats and their role in achieving the goals of education remains little studied. New teaching formats in Russian school education emerge due to the awareness of the need to establish a proper subject-object relationship between the participants of the educational process. Another factor is the growing profile of electronic resources and technologies as means to train effective approaches to information processing (both textual and non-textual). The article aims to analyse advantages and disadvantages of the new formats of teaching and their possible application in a school (evidence from teachers of biology). It will also determine the readiness of teaching community to grasp and implement new formats in teaching practice in a school.

Keywords: educational format, training format, innovative forms of education, art, classroom

INTRODUCTION

Modern socio-cultural dimension is witnessing "tectonic shifts" in education due to globalisation and the transition to information society. Educational systems follow different development paths, however, all of them tend to transform into a socio-cultural

institution with a student-centered paradigm. In this context, education is seen as an interaction of community members in different social situations. Its mission includes socialisation, civic engagement, *partnership, and dialogue (Boichenko & Kundozerova,* 2016*). Worldwide, socialisation of students is integral to democratic education (Ipek & Ziatdinov,* 2017*). In view of this trend, the relationship between a teacher and a student is also subject to changes. A school student has a new role as an active participant of learning, while teachers* of our days must be permanently concerned of presenting lessons attractive for the school childre*n (Petruţa,* 2013*).*

Along with that, systems of school education undergo constant changes, and the approaches that proved effective in the past are inadequate for the present. School systems have been continuously improving. They have learned how to overcome field-related challenges and how to benefit from current educational environment (Murshed, 2011).

Despite growing public awareness of the new agenda of modern education, schools are still, largely, "translational". To innovate fundamentally, Russian education will have to replace the "translational" model by the model of active learning where a teacher is a subject expert with a mission to navigate a school student in their field of knowledge and a capacity to find information necessary to solve a particular task (Lubimov, 2011). Moreover, schooling is more effective when teachers allow for active engagement of students in the organisation of teaching and learning (goal setting, evaluation of results, self-assessment, types of reward, etc.) (Rohrbeck, 2003).

New teaching formats in Russian school education emerge due to the awareness of the need to establish a proper subject-object relationship between the participants of the educational process. Another factor is the growing profile of electronic resources and technologies as means to train effective approaches to information processing (both textual and non-textual).

Now we have a plethora of educational information resources that combine technical, telecommunication, and teaching means. They allow the effective use of modern information technologies in teaching and learning as well as their implementation in all possible areas and formats of training and education.

These teaching means facilitate the implementation of cognitive and constructivist aspects of teaching. Besides, they result in a more balanced relationship between the development of theoretical knowledge and practical experiences. Their role is more about facilitating learning than controlling *(Ipek & Ziatdinov,* 2017*).* Along with that, educational content should have a capacity for individualised knowledge management. Knowledge adopts different formats that develop competences in line with the information behavior of digital generations *(Noskova,* 2016*).*

Therefore, today the effectiveness of teaching and learning is dependent on the possible extension of technical, temporal, and spatial boundaries of education and effective self-realisaiton of teachers and students alike. This necessitates the "reformation" of classroom teaching as a key format of school instruction. The transformation of a school lesson, awareness of teachers about the change and their readiness to embrace

new formats of teaching in a school—all these issues are gaining momentum.

The purpose of this article is to find out how " sensitive " the Pedagogical community is to the problem of transformation of the lesson, as well as how it is ready and able to diversify the range of forms of the educational process. Despite the relevance of the issues, so far Russian scholars have not run any comprehensive large-scale studies in this respect.

LITERATURE REVIEW

Dictionaries provide numerous definitions of the word "format". In most cases, definitions describe structural characteristics of an object, e.g. paper format, data format, communication format, the format of meetings, events, etc. The development of science and technology as well as new social challenges give rise to new formats while other formats become obsolete (Pavlova, 2011).

Books in pedagogy do not clearly define the concept of the "format of teaching". When it comes to the word "lesson", scholars focus on the "new format of classroom teaching" or "lesson in the format of ..." Publications discussing "lessons in the format of..." tend to describe particular teaching practices (a lesson in the format of a business game, conference, etc.).

Scholars view the "new format of classroom teaching" as a new ideology grounded in conceptually validated ideas; the format of classroom teaching is in line with the systemic activity-based approach (Stefanosvkaya, 2014). Obviously, these transformations happened in the wake of social and cultural changes. The world is getting more dynamic and more information-saturated which entails uncertainty, chaos, and fragmentariness. Hence, there is a growing demand for skills adequate for the new environment (Ignatieva, 2017). Modern classroom teaching (subject-class-lesson) fails to achieve the results that live up to the modern understanding of aims and objectives of school education, and we fail to disenthrall ourselves from the current model. A possible solution is to modernise all structural components of the system—curricula, functions of a class, formats of teaching and classroom teaching in particular, assessment (Lebedev, 2013).

General, modern education can be divided into three types of education – formal (formal), non-formal (non-formal) and informal (informal). Formal education is usually provided by government licensed organizations and results in a diploma or qualification for the profession. The largest representative of this group is classical (usually public) education (formal) - from primary school to University. The second type – non-formal education (non-formal), which is traditionally understood as all targeted education that does not lead to appropriate certification. At the intersection of formal and non-formal education are non-formal (informal) courses, which are organized by the legislative framework and the professional community (Cerny, 2015).

Modern educational strategies are based on active engagement of learners and include different formats of individual and team work aimed to solve educational tasks, develop good question-asking skills, and make relevant forecasts (Singer, Nielsen, &

Schweingruber, 2013). Now, pedagogy is witnessing common trends—unlike before, the teacher now is primarily concerned not with mere presentation of new educational material, but with encouraging the student's learning activity, creating ambitious tasks for each student, and building a motivating educational environment that generates positive emotions. Students become "owners of the process", while teachers act as mentors. Teaching is research-based: the student specifies the task, collects information, presents the results, determines assessment criteria and, together with the teacher, evaluates his/her performance (Frumin, Dobryakova, Barannikov, Remorenko, 2018).

In modern pedagogical research articles so-called "21st century skills", main focus of the educational system, are defined by a number of definition. They, as a rule, are consistent with the skills that are required from students in order to cope with the realities and conditions of modern time, which in turn are distinguished by a focus on technology and digital work. Therefore 21st century skills include the following basic abilities: critical thinking, problem solving, creativity, communication, collaboration, innovation, teamwork, decision making, leadership, applying knowledge, self-direction and learning how to learn (Anagün, 2018). C. 3.

In a modern school, the ability to motivate students to self-education is seen as the most important skill for a teacher (Setiani, 2019).

The emphasis of education has shifted from analytical and synthetical generalisations to forecasting. This has developed a brand-new way of thinking in modern school students. Future thinking among school students is the awareness of different time spans, and the ability to discover, examine, and suggest futures and future scenarios to certain issues and situations (Vidergor, Givon, & Mendel, 2019). Educational practices are destined to form a new learning behaviour for the 21st century. Traditional teaching and learning practices have to incorporate digital educational tools with a key role given to designated electronic network environment (Noskova, 2016).

Today's educational standards promote active learning. At the same time, they offer a range of educational means, formats, and environments, including information educational environment (IEE). In many countries across the world, the implementation of information and communication technologies in education has become part of a strategic commitment and a key issue on educational agenda (Juhaňák, Zounek, Záleská, Bárta, & Vlčková, 2018). The growing popularity of electronic forms of education is supported by the following provisions:

− Internet is a convenient repository of educational materials available anytime, anywhere;
− The Internet greatly facilitates the process of interaction between remote students with teachers and among themselves, regardless of time and location;
− opens up the possibility of forming student groups for educational interests;
− makes possible the continuous improvement of the educational process: forms and methods of its organization.

− contributes to the implementation of complex training projects that are hardly feasible

by other means (Hubackova et al., 2015). *Today, teaching and learning is not limited to a classroom or a lecture hall—teaching can take place in a library, a media hall, or any other educational facility (e.g., a university lab), etc. E-learning takes different formats: blogs, network encyclopedia, online discussion clubs, online games and simulations, online courses as part of Learning Management Systems (LMS), massive open online course (MOOC), tablet apps, to name but a few. European and US educational systems effectively use digital tools to develop Immersive Learning Simulations (ILS), which embrace all possible aspects of teaching and learning with "virtual mentors" to provide information and "inquisitors" to test students' knowledge (Santos, Figueiredo, & Vieira, 2019).*

Modern ICT-based trends in teaching and learning include individualised curricula, interactive teaching and learning, growing network communication, gamification of education, etc.

Modern technology has had a dramatic impact on the typology of information: transition from a linear text to hypertext, simultaneity of perception (simultaneous use of text "windows"), constant "decomposition" of a text with the "copy & paste" feature, etc. (Shmidt, 2005). The "meta-media" generation has created a new written culture manifested in the development and exchange of images; visual communication offers an environment for young people to learn independently, by watching online classes on YouTube (Manovich, 1999). In fact, digital culture of the young generation shows an unprecedented readiness for self-study, when students independently choose a subject, time to complete an assignment, format and means of cognitive work. Digital storytelling is the practice of making short films, videos, audio tracks, etc. on a particular topic. It is a popular educational tool for projects run by European schools. Moreover, it shows how visual communication integrates in modern teaching and learning (Schmoelz, 2018).

The development and use of mobile applications as innovative learning tools is a new trend in modern education. Currently, almost all students have smartphones, but as a rule, they are mainly means of communication and entertainment, rather than education. However, competent work in this direction can give positive results. An example is Computer Assisted Instruction (CAI), developed for an Android system (Hendikawati et al., 2019).

Now, it is time not only to merge real and virtual learning environments, but to commit to this task as part of current educational agenda (Koroleva, Mitina, & Ryzhova, *2011*).

Recent Russian and international practices have shown that distant learning has a substantive impact on the format of teaching and learning. Interestingly, distant learning technologies (credit-distant technologies, flipped classroom approach, gamification, educational social networks) are based on constant interaction between a teacher and a student. This opens up new learning and teaching opportunities for teachers and students alike (Mudrakova & Bindyukova, 2015).

However, uncontrollable use of new information technologies to the detriment of traditional tools may disrupt educational, cognitive, and creative efforts and affect

motivation to learn. This, in its turn, may suppress civilised formats of communication and even affect language development and speech functions (Gotskaya, Kotova, & Snegurova, 2014). Moreover, today's learners experience a shift in motivation and values: a search for information is coming to the fore, which diminishes the importance of a specific learning outcome and its originality (Skorkin, 2008). The Report of Kishore Singh, Special Rapporteur on the right to education, says there is no evidence to prove that digital education guarantees more effective learning outcomes (Report of the Special Rapporteur on the right to education, 2016). The progress of digital educational technology is essential, yet, humanistic principles are still the cornerstone of pedagogy (Zaslavskaya, 2018).

Let us consider the extracurricular meta-subject course as an example of a new "reformed" type of teaching and learning. It is a new format of integrated teaching that overarches traditional disciplines. Meta-subject and research training facilitates effective knowledge acquisition and experimental learning in a team of peer competitors (Andreeva, Azizova, & Levchenko, 2013). Meta-subject courses develop argumentation, analytical skills, sequencing, logic, hypothesising, inferential thinking, judgment-making—i.e., thinking (Gromyko & Polovkova, 2009). This format of classroom teaching may extend its boundaries if teachers with different levels of expertise "join their efforts to teach a particular class: subject teachers, meta-subject teachers, teachers on additional educational programmes, research advisors in educational projects and student research initiatives" (Vorovschikov, 2018). The transformation of didactic interaction models in education as well as wide use of information and communications technology in education has formed a concept of distributed teaching and learning where instruction occurs independent of time and place. It ensures flexibility as instructors, students, and educational content are located in different, noncentralized locations. The pedagogical system of distributed learning puts a priority on team learning. Teams, being a collective actor of learning, engage in thinking, decision-making, evaluation, planning and problem-solving (Boichenko, Kundozerova, 2016).

To support a student who uses information technology to independently solve a task or finish a project, an instructor has to develop new expertise similar to that of an academic or a technical advisor or a coordinator. At the same time, self-study with the use of e-learning materials turns students into instructors for their own sake (Belova, 2015); the resource content adjusts itself to match individual knowledge, interests, aims and objectives, and illustrates progress in learning (Zhelezovskaya, Gudkova, Abramova, 2014; Sharshov, 2004).

According to Tikhomirov, smart education is the new philosophy in education. "Smart education is flexible education in an interactive learning environment which offers open-access content from across the world. The key to understanding smart education is the availability of knowledge in blogs and open educational resources. We can raise people's awareness of an issue only if we provide information about this issue. Active use of new knowledge laid the foundation for a new philosophy" (Tikhomirov, 2010). Smart education is a logical follow-up to distant and e-learning.

The theory of student-centered learning (Yakimanskaya, 2000), which is the basis of the study, postulates the development of the student's personality in the learning process in accordance with his abilities and needs. The creation of conditions for the disclosure of the potential of the individual is possible when the teacher creates a specially organized educational environment that goes beyond the lesson. One of the most important factors in the formation of such an environment is the readiness of teachers for its organization and development.

Modern technologies make it possible not only to change the subject didactics and teaching methods and to introduce elements of e-learning into the educational process, but also to determine the need for a fundamental transformation of education Interdisciplinary teaching cooperation, interdepartmental interaction of institutions of General and additional education, the output of the educational process abroad, as well as the emphasis on the importance of non-formal and non-formal education, of course, are trends that reform not only the role of students and their teachers, but also the organizational learning system (Cerny, 2015).

The main issue to be addressed is the need and the possibility of transformation of the organization of the process of teaching biology in the Russian school in the conditions of student-centered learning.

METHOD

Biology teachers from St Petersburg as well as Leningrad, Murmansk, Samara and Moscow regions (101 people in total) have been surveyed by the questionnaire method The choice of the target audience was prompted by a number of considerations—specifically, the content of biology as a school subject (its worldview forming and practice-oriented specifics); the ongoing debate about several natural science disciplines being brought together into the Natural Science general integrated course; and the way of learning biology in Russian schools as part of science education or, in PISA terms, of the Living Systems subject area (Pentin et al., 2018).

The purpose of the survey was to find out attitude of biology teachers to the necessity of and possible reasons for transformation of a lesson as the main type of teaching activity in a school. The surveyed were asked questions grouped into three topics in logical sequence: evaluation of situation by teaching staff → context of situation → development of situation (Table 1):

- Evaluation of a lesson as a type of teaching activity in a modern school.

- Judgements about the impact of the Federal State Educational Standard for General Education (FSES GE) on the types of educational process organisation.

- *Understanding of the need for transformational changes in the process of biology teaching.*

Table 1

Questions about Teachers' Attitude towards a Lesson as a Main Teaching Mode in a School

Topic of questions	Content of questions
evaluation of a lesson as a type of teaching activity in a modern school	- Do you consider a lesson both main and effective type of teaching activity in a modern school? - What are, in your opinion, disadvantages of a modern lesson as a type of teaching activity? - What challenges are you faced with while preparing a biology lesson?
judgements about the impact of FSES GE on types of educational process organisation	- What difficulties are you faced with in meeting the requirements of FSES GE on your lessons? - Which types of teaching activities, in your opinion, can be successfully used in a modern school and meet the requirements of FSES GE at the same time? - What is your attitude towards integrated modes of teaching biology?
understanding the need for transformational changes in the process of teaching biology	- Do you think that a lesson ceases to be both the main and effective type of activity for teaching biology? If you do, what are the reasons for this? - Which ways of transformation of a biology lesson seem the most promising to you under current conditions? - Are you ready to use new types of teaching activities?

The survey was conducted on the GOOGLE platform in 2018. Most questions involved both multiple choice and giving personal judgement. The average age of the surveyed is 40 years old.

In determining the pragmatic validity of the research tool, one of four types of external criteria was chosen: "subjective criteria" (including various types of answers that reflect a person's attitude to something, his opinions, views) research (Tiffin J., McCormick E., 1968).

The types of questions-tasks were selected (tasks with a choice of one answer; several answers; to the subject's free answer; to assessment). Each type is uniform by its nature.

One method of contact with the subjects was used (the questionnaire questions given in electronic form they answered) in comfortable conditions.

Instructions were clearly formulated for presenting the technique to subjects, etc.

There was the same presentation of instructions and encouragement to answer questionnaire questions.

The sample of respondents is homogenous in age, level of education, and additional training (all respondents had higher pedagogical education, systematically attended advanced training courses).

Constancy, i.e. the relative independence of the results from the personality of the experimenters (constancy coefficient) is ensured by the prohibition of acquaintance and personal contact of the subjects with the researchers.

Elements of subjectivity in the methods of evaluating and interpreting the results were minimized (each author independently analyzed the responses of the subjects and interpreted the degree of completeness of the answers. Then, work was followed by a thorough coordination of the assessments by all authors of the work).

FINDINGS

Evaluation of the Lesson as a Type of Teaching Activity in a Modern School

The answers to the questions belonging to **the first topic** have allowed us to find out how teachers evaluate the lesson as a type of activity for teaching biology in a modern school.

The question of whether the surveyed consider it the most effective type of activity for teaching biology in a modern school was answered positively by most teachers (79.2%) (Figure 1).
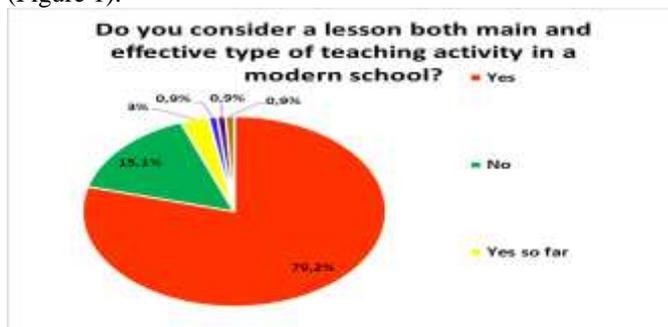

Figure 1
Teachers' Attitude towards a Lesson as both the Main and Effective Teaching Activity

Only 15% of respondents gave the absolutely negative answer. 3% of teachers believe that today the lesson remains the main form of schooling, but in the near future new forms will appear that are alternative to the lesson. At the same time, these teachers do not specify exactly what forms of training will appear. Only few (0.9% each) answered positively, but with various clarifications (that this is one of several effective forms of education; that the lesson will remain the main form of education, provided that it is supplemented by extracurricular activities. 0.9% did not prefer to give answers to this question, which is apparently connected with their uncertainty.

As for the second open-ended part of the question "If you believe that lesson has seized to be the main and effective type of teaching activity, what are the reasons for this?", none of the teachers suggested an alternative type of teaching activity aligned with current educational trends.

As for the disadvantages of the modern lesson as a type of teaching activity in a school, 50% of respondents named potential challenges in organizing teamwork among students that mostly stem from discipline, communication and cooperation issues, as well as the challenge of involving all the students in the activity and assessing results (Figure 2).
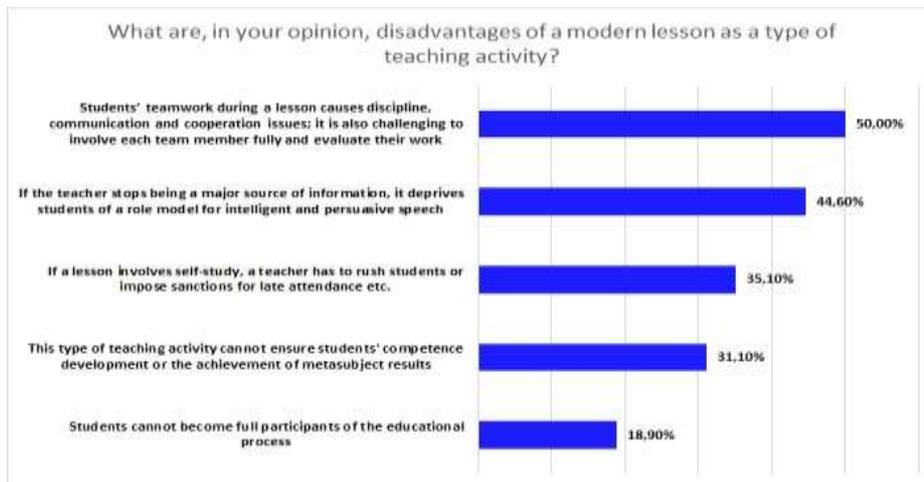
Figure 2
The Disadvantages of Lesson as a Type of Teaching Activity in Biology Classes as seen by Teachers

Organisational framework, strict time limits and occasional constraints on the content of the lesson significantly *restrain* the teacher and make the interaction between students more difficult. For this reason, teachers are faced with difficulties when integrating teamwork into the structure of a modern lesson. The aforementioned issues are both objective and hard to solve, and each teacher employs their own tools for guiding students' teamwork.

Slightly less than half of the respondents (44.6%) remarked that one of the disadvantages of a modern lesson is that many teachers try to withdraw from managing in-class activities explicitly so as not to be reprimanded by school authorities or guests because "they were too prominent during the lesson." According to the surveyed, a teacher who stops being a major source of information deprives students of a role model for intelligent and persuasive speech. Apparently, these teachers advocate returning to the outdated lesson format where the teacher is the speaker, the enlightenment figure, the source of cookie-cutter truths. These days this opinion is commonly believed to be false, since the teaching process itself should encourage non-linear and open dialogue, establishing direct feedback loops in the course of problem solving.

It is also surprising that many teachers' answers explicitly reflected their authoritarian mindset that "students cannot become full participants of the teaching process". Answering the open-ended question about the challenges biology teachers are facing while preparing a lesson, the highest number of respondents (49.5%) picked the "Determining methods for not only evaluating results, but also the academic process (students' independence, interest, activity, etc.)" option (Figure 3). Today, this is indeed a major challenge for a teacher.
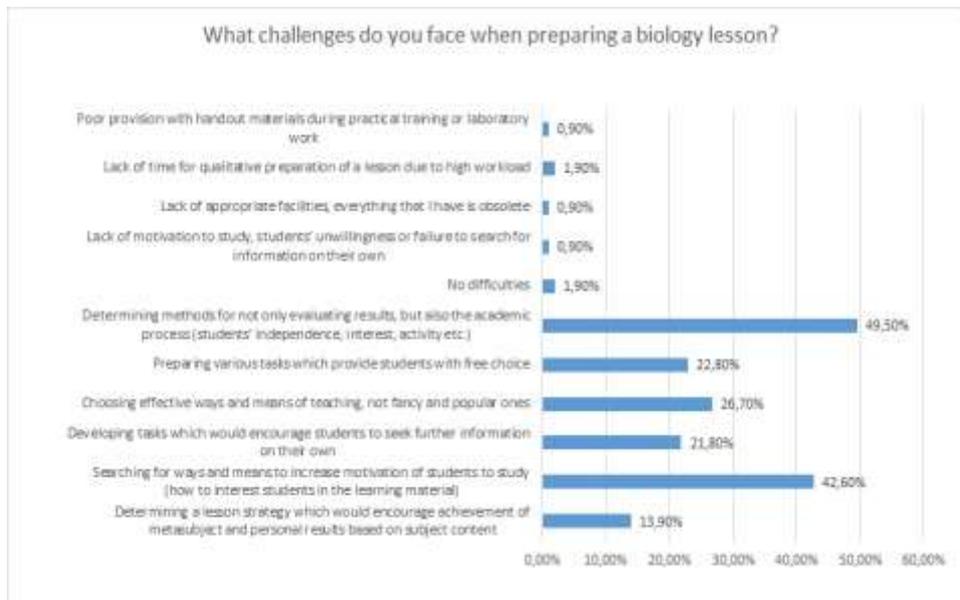
Figure 3
Answers about the Challenges the Respondents Face while Preparing a Lesson

Slightly less than half of the surveyed (42.6%) considered it difficult to find ways to increase students' motivation ("How to make studying interesting for students so that they became initiative and active participants of the teaching process?"). Biology teachers associated their difficulties with selecting effective methods (26.7%), sourcing or developing various tasks which facilitate students' free choice (22.8%).

Impact of FSES GE on the Educational Process

The answers to the questions belonging to **the second topic** have allowed us to find out the teachers' opinions on the impact of FSES GE on the educational process.

The main difficulty the respondents face is the time constraint of the lesson, which is reflected in their answers (Table 2).

Table 2
Distribution of Answers about Difficulties in Meeting the Requirements of FSES GE

Difficulties faced with when meeting the requirements of FSES GE during lessons	Number of answers (% of the total number)
Lack of time during the lesson	59.3
Lack of clear understanding of how universal learning skills (ULS) are formed	25.9
Lack of teaching and learning materials dedicated to the achievement of meta-subject and personal results	44.4
Lack of teaching experience	17.3
No difficulties	9.9
Personal opinions of the respondents	
Giving an efficient lesson and carrying out all the planned activities within the time constraints of a single lesson requires more thorough and long preparation...	1.2
FSES GE is basically a skill that allows students to identify the problem and draft its solution, determining the strategies and tactics. But this is a challenging task...	1.2
Lack of time for preparing a lesson strategy at the high enough level	1.2
Lack of facilities to provide conditions for ULS exercise	1.2
The difficulty is motivating students	1.2
Students have different levels of socialization and require individual approach, but it takes up time during the lesson	1.2
Not enough time because there is a single one-hour lesson per week while the amount of information to be taught is enormous	1.2
Internationally, what FSES offers is called the strategic problem-solving skill. So, FSES requires teachers to possess strong intellectual capabilities themselves. This is difficult to teach	1.2

Lack of teaching and learning materials dedicated to the achievement of meta-subject and personal results as well as lack of clear understanding of how ULS are formed are considered to be substantial challenges for biology teachers.

Biology teachers have outlined their opinions about the difficulties in meeting the requirements of FSES. This is caused, first of all, by insufficient facilities, lack of students' motivation to study, and different socialisation levels among them.

The results of the survey also helped to find out teachers' opinions regarding possible ways of transforming the lesson in accordance with FSES GE requirements (Table 3).

Table 3
Distribution of Answers about Effective Modes of Teaching Biology in a Modern School in Accordance with FSES GE Requirements

Modes	Percentage of the total number
practical training	96
conference (real-time and media)	21
remote education (for example, the moodle system)	19
homework	83
excursion	86
seminar	85
elective course	91
project	96
self-study out of the class	81
consultation	85
hobby club	14

Among the preferred teaching modes which could be applied in a modern school along with a lesson, the overwhelming majority of the respondents listed practical training and *project activities*, as well as elective courses, excursions, seminars and consultations, homework and self-study. (Note that the teachers mistakenly include project activities and self-study into the list of modes for teaching biology).

As for implementing other modes, opinions differ. The teachers' preferences are primarily divided between the real-time (or media) conference, remote learning (for example, the moodle system) and a hobby club. Such division of opinions can be explained by the peculiar aspects of teaching biology which require application of natural teaching methods.

Difficulties for teachers are primarily related to organising a lesson in compliance with FSES GE requirements in an era of IT penetration into education.

Out of the proposed teaching modes based on the integration of several modes, the teachers preferred (Figure 4) a seminar that blends into a laboratory practical training, self-study accompanied by a real-time or media consultation, and a class project combined with a media conference.
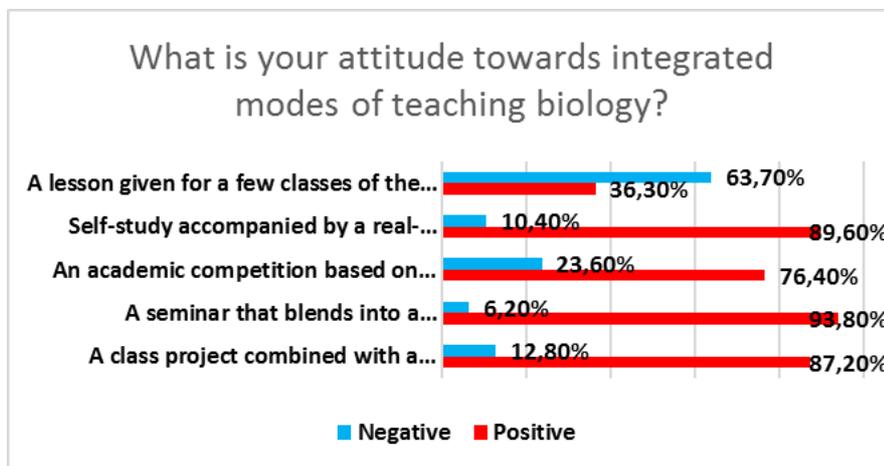
Figure 4
Attitude of Biology Teachers towards Integrated Teaching Modes

Teachers suggest transforming a lesson into a consultation which allows them to accompany students' self-study, either cancelling strict time limit of a 45-minute lesson or without making any changes to lesson duration. Some teachers considered it possible to transform a lesson in such a way so that it could be conducted not in a classroom, but at home (for example, using the Internet).

The answers to this question are closely related to the fact that teachers recognize lesson's disadvantages as a type of teaching activity in a modern school. We believe that the feeling of the lesson's inferiority can also be connected with teachers' understanding of necessity to shift focus to meta-subject and personal skills which would require fulfilling the personal potential of students.

A lesson given for a few classes of the same age got a negative evaluation of the respondents. Their rejection of such lessons as one of integrated teaching modes is likely to be due to the teachers' insufficient knowledge about them.

Note that opinions of the surveyed regarding all the proposed types of teaching activities are divided and no unanimity in acceptance or rejection of a particular type has been observed.

Transformational changes in the process of teaching biology: possibility and necessity

The answers to the questions belonging to **the second topic** have allowed us to find out to what extent the teachers understand the need for transformational changes in teaching biology and how they assess their readiness for such changes.

The question whether the teachers believe that a lesson is ceasing to be both the main and effective type of teaching activity, was answered in the affirmative by 27% of the surveyed.

Table 4

Attitude of the Surveyed towards the Statement about Lesson's Unpopularity and Lack of Potential

Lesson transformations	Percentage of the total number
A lesson does not ensure individual approach to teaching modern students	
• there are difficulties with taking students' individuality into consideration; strict time limits do not allow either the students or the teacher to achieve their full potential • each student needs a different amount of time to learn particular information while a lesson has strict time limits • it is difficult for a teacher to find strengths of poor students and praise them for what they manage to do • a teacher's attention is captured by bright students and those students who are willing to cooperate • large number of students per classroom, high workloads for teachers • there are other activities which are more attractive for students	27.4
A lesson cannot fill students' needs for learning	
• other innovative sources may contain incomplete information • there is an excessive amount of unreliable information on the Internet, scientific information in study books is not updated fast enough, parents allow their children become Internet addicted. • IT is developing rapidly so students can find all the necessary information themselves. • self-study of subject topics is EFFECTIVE if students are motivated enough • the school biology course is overloaded with scientific information	13.7
A lesson does not meet requirements of the new generation of educational standards	
• it is difficult to use the systematic activity approach and individual approach within a lesson • there are fewer study hours for learning biology in a school • excess of information, one lesson per week is not enough • final examinations have major shortcomings • abundance of tests causes students to speak less • not enough time is spent on learning topics during a lesson which requires studying during non-school hours or additional classes • some technologies cannot fit into the time limits of 40-45 minutes, etc. • a change in teaching methods	25.5
A lesson is an effective type of teaching activity which has not run its course yet	
• I consider a lesson an effective teaching mode • currently there are no other modes for competence development • we cannot entirely reject a traditional lesson, it should be combined with unconventional modes	33.3

More than half of the surveyed (66.6%) agree that a lesson has no potential as the main type of teaching activity under current conditions, but they name absolutely different reasons for it. Most teachers believe that the reason the lesson is not as important now as it used to be is that it is dominated by the teacher, everyone has to learn at the same pace and it is impossible to use individual approach. Many teachers think that the current state of the lesson can be explained by the popularity of new information technologies in

learning. Fewer teachers noted that the excessive amount of material makes it more difficult for students to learn if it is done only during lessons.

Many teachers (33.3% of the answers) advocated for the preservation of the lesson as the main type of teaching activity because, in their opinion, a lesson has not run its course yet and there is no acceptable alternative.

As part of the questionnaire, the teachers were asked to share their opinion about the ways biology lesson can be transformed (Table 5).

Table 5

Teachers' Opinions Regarding the most Promising Ideas for Lesson Transformation

Lesson transformations	Percentage of the total number
To remove strict time limits of 45 minutes	45.6
To transform a lesson into a consultation which would accompany students' self-study	42.4
To transform a lesson in such a way so that it could be conducted not in the classroom, but at home (for example, using the Internet).	18.2
Personal judgements of the surveyed	
It is advisable to sometimes give out-of-class lessons, visit other educational and cultural institutions connected to the lesson topic during school hours (lessons at museums, in the wild, in a botanical garden, in a nature reserve). To conduct lessons not only at home, but at universities where it would be possible to use special equipment. Perhaps, bulk task units would solve this problem and lessen the load for both the students and the teacher. The question of a place remains unanswered, but there are resource centres as another solution	6.5
There is no need to transform age-old and time-proven types of teaching activities. Leave the lesson and the teacher alone. Leave the structure of the lesson unchanged. The lesson cannot be replaced by the activities listed above.	5.2
There is a need for types of teaching activities which would allow us to organize interactive learning, immersion into a situation, when a good mark stops being an end in itself, while the activity is directed at learning through performing a task.	1.3
Beginning from the 8th form, lecture-and-seminar classes would work well for topics which require deep knowledge of students, as well as for new learning material which is not included unto textbooks	1.3
It is advisable to nurture students' practical activities, perhaps out of class	1.3
To reduce a number of students per classroom, improve equipment in biology classrooms. To create physical environment for practical activities during a lesson	2.6
Individual approach in teaching	1.3
Intersubject technologies	1.3
Not sure	1.3
Excursions into the wild should be obligatory	1.3

These were the two most frequent personal judgements: 1) rejection to transform a lesson as an old-established and time-proven type of teaching activity, and 2) conducting lessons out of class—in museums, in the wild, in a botanical garden, in a nature reserve as well as in universities and resource centres.

In general, the results of the survey of biology teachers show their high readiness to use new types of teaching activities (Figure 5).
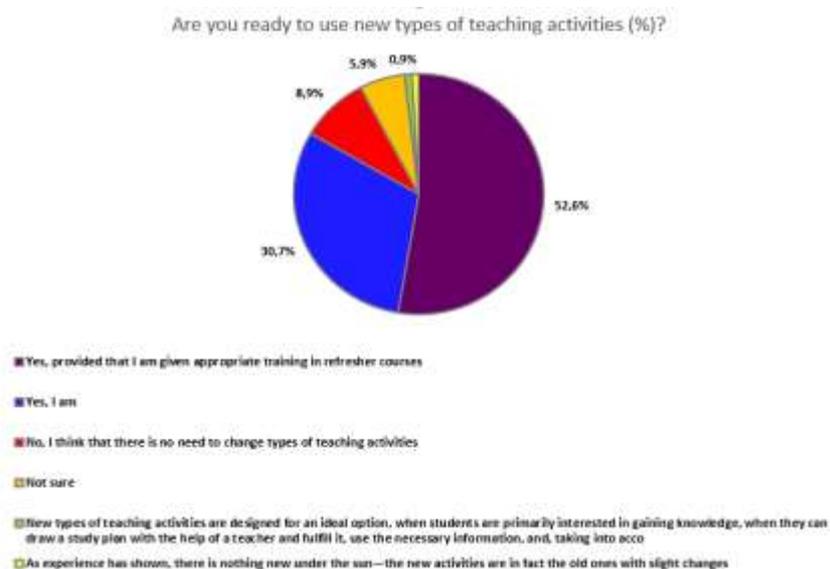
Figure 5
Attitude of the Surveyed towards New Modes of Teaching Biology and Assessment of
Their Readiness to use New Types of Teaching Activities

Alongside with that, most teachers noted that they need to get additional training, i.e. to
take appropriate refresher courses.

We believe that our findings show that teachers understand the need for the lesson's
transformation as the main type of teaching activity in the current socio-cultural
environment.

DISCUSSION

The survey conducted among the teachers showed their high demand for scientific
research on effective techniques for teaching biology. It also raised the issue of the
transformation of the lesson as the main mode of teaching biology.

Our summary of the results of the survey conducted among biology teachers from
different parts of Russia allowed us to pin down a number of contradictions between the
following:

- between the teachers' opinion that the lesson is a highly effective mode of teaching
  activity, on the one hand, and their readiness to transform it, on the other hand;

- between the FSES GE requirements to ensure meta-subject and personal teaching
  results (the requirements which are time-consuming to meet), on the one hand, and
  the time constraints of the lesson, on the other hand;

- between the potential that integrated types of teaching activities have in respect of
  achieving personal, meta-subject and subject teaching results, on the one hand, and

the current organisation of educational process where the traditional lesson is the main type of teaching activity, on the other hand.

- between the demand for research on the development and implementation of innovative types of teaching activities, on the one hand, and the absence of the same in teachers' training and refresher courses, on the other hand.

- At the same time, we could argue that:

- FSES GE, the law of social conditionality of education requirements drive transformations in the organisation of the teaching process. The methodology of the system-activity approach laid down in the standards strengthens the activity component of the content, which, in turn, entails the emergence of new formats, including integrated forms of teaching the subject.

- Teachers show their understanding of the need for transforming time an accordance with the requirement of the integrity and system of the teaching process and content constraints of a lesson and express their readiness to use new types of teaching activities. Conceptual basis of environmental approach define as the most important conditions of creating educational environment of interaction of participants of educational process and the attitude of the teacher is one of the factors that control its development process.

In accordance with the theory of personality-oriented learning, the requirements of the unity of learning, education and content conditioning goals, objectives of biology *training teachers* are increasingly expected to use the subject content of their disciplines to develop personalities of students. This requires updating types of activities used by teachers. New types of activities can be developed through system shifts, in particular, through a combination of two (or more) different teaching modes or their elements, and a combination of lessons with additional learning.

CONCLUSION

It is now becoming apparent that academic potential of the school lesson as the main mode of teaching activity has almost exhausted itself. The evolution of a school system is needed—such evolution will cause transformation of other components, from the educational environment to the tools used by the teacher and the roles played by him/her: a consultant, a moderator, a tutor, and an organiser of educational environment.

The results of the study can be a "starting point" for working with the pedagogical community in the system of advanced training of teachers of biology in the regions, information for decision-making in the Russian education system, the development of methodological training of students of biology in higher education.

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