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# Philosophy of Liberal Education: The Principles

**V. Kurennoy**

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**Abstract.** This article lays out systematically the principles of modern liberal philosophy of education by explicating the foundations of the Humboldtian/European model of liberal education. Conceived over two centuries ago, those foundations have never been presented fully and coherently in Russian literature on pedagogy and philosophy of education. Ten principles of the model are identified in terms of modern liberal education theory: (1) lifelong learning, (2) academic freedom, (3) importance

of practice and experience, (4) critical thinking and civic competence, (5) competency development instead of knowledge accumulation, (6) priority of general education over specialized education, (7) the concept of learning to learn, (8) self-directed learning effort, (9) political neutrality, and (10) interaction and Socratic dialogue. The second part of this article (release upcoming) sheds light on the key sources and socio-historical contexts that have shaped attitudes towards the liberal education theory since conception until the present day.

**Keywords:** liberal education, philosophy of university education, history of pedagogy, Immanuel Kant, Johann Gottlieb Fichte, Wilhelm von Humboldt, Friedrich Schleiermacher, Friedrich Carl von Savigny.

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The concept of liberal education<sup>1</sup> has been widely discussed and used as substantiation for various initiatives to establish institutions or design learning programs based on the liberal model<sup>2</sup>. In present-day Russia, the liberal education agenda is mostly represented by the American version of liberal arts education, a prestigious and high-

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<sup>1</sup> Liberal education is usually associated with the postsecondary level. This study mostly draws on that perspective; however, as we are going to see, the original liberal model did not rigidly attribute its specific elements to school or university. At the same time, we are not focusing on the distinctive features of the so-called Humboldtian model of research university, as liberal theories can take other organizational forms as well.

<sup>2</sup> See, in particular, the special issue of *Voprosy Obrazovaniya / Educational Studies Moscow* dedicated to the liberal model (no 4, 2015).

end segment of the U.S. education market. (Liberal arts colleges have been consistently ranked in the top ten most expensive U.S. educational institutions.) A number of basic concepts of the liberal model have lately been commonplace rhetoric in the Russian pedagogical discourse; in addition, they are abundantly dispersed throughout the key regulations and applicable laws of Russia that define the fundamental public policy guidelines in the field. Liberal education principles were inherited from the Soviet pedagogical discourse, which they had permeated discretely from various German sources, Neo-Kantian and Marxist in the first place—to the extent that the latter involved elements of the broader traditions of Enlightenment and classical German philosophy. In the second part of this article, we are going to look at how some of those principles infiltrated the Russian education and cultural policy discourse.

By the beginning of the 20th century, a few consistent conceptions of liberal education had been designed independently by educational researchers and policy makers. The authors include, first of all, Konstantin Venttsel, whom we owe not only a series of declarations and manifests that are part of the great heritage of Russian liberal thought—such as *The Declaration of the Rights of the Child* [Venttsel 1917; 1918]—but also a systematic philosophy of evolution [Venttsel 1911; 1912]<sup>3</sup>. However, this liberal trend in child education, tracing its origin to Leo Tolstoy's early writings, did not have any perceptible impact on the Soviet pedagogical discourse and is basically bygone today. As for the conceptual elements of the German tradition of liberal education that sedimented little by little in the Russian pedagogical discourse, they have either been substantially reinterpreted or lost their fundamental relation to primary sources and become merely ceremonial commonplace in the discourse of education and culture policy. This contrasts with the American educational culture, where modern liberal education theorists recognize that universities offering liberal arts and sciences education are “embedded in European/Humboldtian systems.” [Becker 2015:34] However, the nowadays constant criticism of Humboldt's model, just as the proposals for improving it, rather indicates loss of coherence in the ideas of what this model is actually about and how it works. Bill Readings, a modern educational thinker who is hard to agree with on a number of other points, described the situation as follows: “Most projects for the University of the twenty-first century bear a striking resemblance to the University projects of the nineteenth century. The reason it is necessary to reread Humboldt, Schiller, Schleiermacher, Fichte, and Kant is that the vast majority of contemporary “solutions to the crisis of the University are, in fact, no more than restatements of Humboldt or Newman, whose apparent aptness is the product of ignorance of these founding texts

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<sup>3</sup> For analysis of Venttsel's conception, see [Kurennoy 2009].

on the history of the institution.” [Readings 2010:103] This judgment, however, is only true for the principles of liberal education, which, just as the narrower and specialized Humboldtian ones, represent a *normative* model of education, whereas specific implementation mechanisms may differ greatly, as the liberal education system needs to be reviewed and updated on a permanent basis in order to keep up with the ever-changing circumstances of time and place.

This article seeks to lay out the principles of the “European/Humboldtian” philosophy of liberal education in their entirety and systemic cohesiveness (something that has never been attempted in Russian literature so far) by briefly outlining the theoretical and pragmatic implications of its fundamental ideas and commenting on the specific historical contexts as well theoretical and philosophical sources behind those ideas. Methodologically, this is the result of historical research and fundamental hermeneutics of the relevant text corpus. Following the analytical tradition of the liberal education model, we are going to rely on Wilhelm von Humboldt’s texts in the first place, elaborating them through the lens of the whole corpus of classical German philosophy<sup>4</sup>. In defining the principles of the liberal model, its contemporary systematizations [Blaich et al. 2004; Gutek 2009:214–248; Winter, McClelland and Stewart 1981]<sup>5</sup> are also taken into account to keep the definitions up to date.

As we elaborate on liberal philosophy of education, it will also become clear why we refer to it as “liberal” instead of “classical liberal” or otherwise, thereby emphasizing that the numerous solutions for its improvement emanate largely from ignoring or misinterpreting its principles.

## Lifelong Learning

According to Humboldt, education is the highest end of human existence: “The true end of Man, or that which is prescribed by the eternal and immutable dictates of reason, and not suggested by vague and transient desires, is the highest and most harmonious development of his powers to a complete and consistent whole.” (*Bildung seiner Kräfte zu einem Ganzen*) [Humboldt 2003 (1851):13]<sup>6</sup> The school already must “seek the harmonious education of *all* abilities in its pupils”

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<sup>4</sup> The notion of “classical German philosophy” will be developed in the second part of this article.

<sup>5</sup> However, some of the most popular U.S. publications on philosophy of education dilating on Marxist, post-modernist, and other conceptions do not address the liberal model specifically (e.g. [Ozmon 2012]). At the same time, Bruce A. Kimball’s extensive commented anthology on the liberal arts tradition glosses over the German and nearly all of the European literature in the field produced since the 17th century, limiting itself to the American context [Kimbal 2010]. Therefore, the disciplinary field of philosophy of education is politicized and highly fragmented by country-specific traditions.

<sup>6</sup> Here and elsewhere, the year in round brackets is the year of publication of

(*harmonische Ausbildung aller Fähigkeiten*), he underlined (*On Organization*<sup>7</sup>). Another formulation of this principle — education as the main purpose of human life as such — is given by Johan Adam Bergk in his pamphlet on the art of reading: “The only true perspective on our earthly existence is to understand it “as a school of upbringing.” (*als Schule der Erziehung*) [Bergk 1799:90]

The closest source this fundamental observation stems from is Immanuel Kant’s *Idea for a Universal History with a Cosmopolitan Purpose*, which was well-known to Humboldt and had an immense impact on the subsequent German philosophy of history and historiography. Its first thesis, from which Kant moved toward finding a clue to world history, postulates the following: “*All natural capacities of a creature are destined to evolve completely to their natural end.*” However, there is an essential difference between the Kantian and liberal interpretations of this principle. For Kant, it flows out naturally from the teleological theory of the organic world, where an organ that is of no use or a capacity that does not achieve its purpose would contradict the very “conception” of nature, turning history into an aimless game of chance. The liberal principle is free from teleological assumptions of this kind, yet it serves the sociopragmatic purpose first of all, as we are going to see in the second part of this article. Furthermore, the second thesis states that natural capacities “are to be fully developed only in the race, not in the individual.” [Kant 1998 (1784):13–14] Thereby, Kant opened the door to the type of theoretical modeling of world history that was taken further in Fichte’s writing and took its final shape in Georg Wilhelm Friedrich Hegel’s philosophy of history. In terms of liberal education, this thesis gives rise to a series of implications that were fully explored, for instance, by Fichte in *Some Lectures Concerning the Scholar’s Vocation*: as soon as the human species is in contact with nature and historically develops as a whole, the most reasonable strategy for the man is to seize upon some particular speciality for which they are best prepared by nature and society. “The cultivation of his other talents he leaves up to society, while at the same time he intends, strives, and wishes to contribute to the cultivation of society within his own speciality. In making this decision, he has selected a class, and this choice, considered in itself, is perfectly legitimate.” [Fichte 1995 (1794):502]<sup>8</sup>. As we can see, Kant’s all-ca-

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public distribution; where necessary, comments on the date of text creation are given in footnotes.

<sup>7</sup> *On the Internal and External Organization of the Higher Scientific Institutions in Berlin*, written by Humboldt in 1809, including the chapter *On the Principle of Subdividing Higher Education Institutions and the Different Kinds of Them*, is shortly referred to in this article as *On Organization*.

<sup>8</sup> For Fichte, such professional-class self-identification should constitute the individual’s free choice. Here, this idea of class stratification differs from the conventional one, where social classes are ascribed at birth.

capacities approach, when given a holistic societal interpretation, fosters a theory of education that is diametrically opposite to the liberal model: an individual should confine themselves to cultivating a limited set of abilities and thereby choose a “class”—or, as we would say today, a narrow specialization. Contrariwise, the liberal principle of lifelong learning is individualistic and universal (applying to all). The Kantian-Fichtean idea of selective capacity cultivation consolidates the principle of class (later—occupational) stratification of society, whereas the liberal idea of comprehensive lifelong learning is focused on eliminating social inequality.

**Academic  
Freedom**

The concept of freedom is central to the liberal model of education. Describing the prerequisites for making development the unfailing purpose of human existence, Humboldt wrote: “Freedom is the grand and indispensable condition which the possibility of such a development presupposes.” [Humboldt 2003 (1851)<sup>9</sup>:13]. In the liberal model of higher education, academic freedom can be interpreted as the freedom of professors to teach (and do research) and students to study. Friedrich Schleiermacher’s 1808 essay *Occasional Thoughts on Universities in the German Sense* remains an unrivaled apologia of academic freedom in both aspects<sup>10</sup>. Here, we will only dwell on the most important and some of the not immediately obvious aspects of this two-fold principle. In what concerns the freedom to teach, Schleiermacher went beyond repeating the central thesis of the whole modern European liberal tradition that allowed no substantial restriction of the mind in choosing the subjects for research and teaching. What he also suggested was that the very process of teaching should be liberated from the forms of ossification. Such forms were typical of the pre-modern university and could be defined as feudalization of teaching—where subjects are strictly assigned to specific professors and faculties, virtually turning into fiefdoms, and students are obligatorily required to take a predetermined set of courses. The liberal model of education assumes that this process of parochial crystallization should be counterposed with an educational model that has two distinctive characteristics. First of all, he talks about research mobility

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<sup>9</sup> Written in 1792.

<sup>10</sup> Friedrich Carl von Savigny, in his review of Schleiermacher’s *Occasional Thoughts*, underlined: “No one has spoken so honestly and wittily about the nature and value of the academic freedom.” [Savigny 1850 (1808):266] No one, it should be added, except Savigny himself, who succeeded to this tradition consistently in his *On the Nature and Value of German Universities* [Savigny 1832]. The concept of academic freedom is also elaborated in Fichte’s rector’s speech [Fichte 1905 (1811)]. Yet another key text proving loyalty to the tradition of advocating the academic freedom was the solemn speech delivered in 1853 by August Böckh [Böckh 1859], the closest associate of Schleiermacher and Savigny since the foundation of the University of Berlin.

of teachers based on their dynamic research interests and naturally leading to variation in the content of their courses. As for demarcation between the subject areas of teaching, Schleiermacher warned that “even private agreements among teachers on this point would be undesirable”: “All of this would inevitably promote stagnation. On the contrary, life is breathed into any branch of science when it is re-invented by others, particularly those drawing on other branches to the fullest extent.” (This statement can be considered the first formulation of the imperative of interdisciplinarity, seen as the movement of researchers into other fields of research.) Schleiermacher called the aspiration of faculties to jealously guard their territory against professors from other faculties as well as the boundaries of their subject areas “obsolete and ridiculous.” “But why,” he asked rhetorically, “get in the way of professors willing to enter the domain of another faculty?” This academic freedom is what opposes university to school. Moreover, Schleiermacher also demanded that the university be as open as possible to visiting professors and that the regular professors provide maximum variation in their course content: “Therefore, overestimating too much the significance of nominal professorships is certainly more typical of the school than of the genuine university spirit. Prescribing a teacher to deliver the same material over and over again for a while would mean propelling him to hate what he is doing and thus to exhaust his talent soon.” [Schleiermacher 1964 (1808):262–263]. With a view to ensure research and teaching mobility, Schleiermacher also formulated two rules that have survived either formally or informally as standards in Western European academic culture: (1) professors should quit teaching upon reaching a certain age and devote themselves, say, to research in the academy of sciences alone<sup>11</sup>; (2) mobility of scholars between universities is necessary to avoid inbreeding<sup>12</sup>.

Second, in order to implement the principle of academic freedom, the liberal model seeks to create a competitive research and learning environment at the university. This follows from the understanding of scientific knowledge as an open and ever-moving frontier: “When it comes to the internal organization of the higher scientific institutions, everything depends on preserving the principle of seeing science as something that has not been and can never be entirely found, and to constantly pursue it as such.” (*On Organization*) This epistemological

<sup>11</sup> “Honestly, there is no sadder role than a university teacher who has become obsolete, who feels it and still has to keep teaching in order not to sink into poverty!” [Schleiermacher 1964 (1808):271].

<sup>12</sup> “...it would be really bad if a university renewed itself completely from within. No good fruit can be produced by a soil in which self-reproducing seeds are sown, in the same way that manners petrify and the spirit fades away in families that only communicate and marry within themselves. A university like that would become one-sided for good and eventually perish.” [Schleiermacher 1964 (1808):269].

argument has its social implications. Specifically, if science can never rest on its claim to be true and complete, competing approaches should be applied by a research university willing to promote research. However, if the teaching community is left to its own devices, it will spontaneously strive for homogenization — due to its social inclination to deal with the like-minded: “But freedom is threatened not only by the state, but also by the institutions themselves, which, as they begin, take on a certain spirit and like to stifle a different one from arising.” (*On Organization*)<sup>13</sup> In the organizational model proposed by Schleiermacher and implemented by Humboldt in the 19th-century German university system, the government was expected to prevent such like-mindedness and clanship in academia: the Minister of Education had the final say on the issue, while faculties could only nominate candidates for professorships<sup>14</sup>. In case members of academia should disagree on the candidates due to the differences in their theoretical or practical views, Friedrich Carl von Savigny recommended that the nominating officers be guided by the principle of political neutrality: “If acute contradictions arise between researchers in a science, those who care about the school development will avoid taking the position of any party and keep going solely by <...> the universal and reliable indicators of the teacher’s value, irrespective of which party he belongs to.” [Savigny 1850 (1832):295] Therefore, the first mechanism of ensuring competitiveness in academia suggested by the liberal model was to assign the decisive role in personnel policy to an external agency. In the case of Germany, this role was played by the government; however, it is the functional principle that matters, while implementation may take diverse forms.

The German institution of *Privatdozent* was the second mechanism included by Humboldt into the university system and designed to make the academic environment competitive (fiercely and devastatingly so, since very few, naturally, would win the first prize — the rank of *professor ordinarius*). *Privatdozent* was an adjunct professor who was not salaried by the state and only earned his income from tuition

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<sup>13</sup> Cf.: “... the universities are so notorious in general for the spirit of petty intrigue that in such an institution everyone is likely to fear the worst consequences arising from partisanship, passions evoked by literary feuds, and personal connections.” [Schleiermacher 1964 (1808):269]

<sup>14</sup> At first glance, it may seem that such a mechanism could only inhibit the promotion of scientific knowledge, but that would be a rash judgment. For example, such philosophical movement as phenomenology would have hardly gained momentum if career paths had only depended on the professor community. Edmund Husserl, the principal founder of phenomenology, was appointed as *professor ordinarius* at the University of Göttingen in 1906 solely due to the decision of Friedrich Althoff, the Prussian Minister of Education, in spite of the unanimous opinion of other faculty members (mostly experimental psychologists), who referred to the insignificant “scientific value” of Husserl’s works to justify their position [Husserl 1994:42 (Anm.)].

fees paid by students willing to attend his course. A Privatdozent was permitted to teach by the formal qualification of *venia legendi*, granted upon completing habilitation. The title was conferred by the university faculty, not the state (and can therefore be regarded as some kind of a relict of a medieval corporate tradition). This corporate aspect made the institution of Privatdozent a citadel of the freedom of teaching amidst the rigid censorship of the German government, and at the same time an asylum for academic dissent from *professores ordinarii*. Its role is described by Edward Erdmann as follows: “The novel fields, unanimously opposed by official university science, can only gain recognition if there are self-devoted Privatdozents willing to take advantage of their freedom of teaching to advocate those fields for quite a long time. <...> If Privatdozents thereby play an important role in scientific progress, they can be a no less important driving force for the freedom of scientific teaching. Because they are not civil servants, they do not obey any disciplinary governmental power, only faculties being entitled to take action in their regard. Existence of such free scientific teachers would guarantee freedom of teaching for professors themselves, since if the government strips a professor of his position, it will not be able to prevent him from doing his research as a Privatdozent, so the government is thus ripped of a solid motive for persecution.” [Erdmann 1898:28]<sup>15</sup> If the abovementioned functions of the institution of Privatdozent were to be described in terms of sociology of knowledge, it could be said, using Thomas Kuhn’s terminology, that it was an organizational mechanism of creating the opportunity for scientific revolutions<sup>16</sup> and changes in the scientific paradigms<sup>17</sup>.

<sup>15</sup> The German government made regular attempts to eliminate the autonomy of the institution of Privatdozent. An incident with the physicist and socialist Leo Arons is one of the most notorious examples. To deprive him of his right to teach, which Wilhelm II himself insisted on, the parliament passed an emergency act, the so-called *Lex Arons* (1898), which ultimately made it possible for the Prussian authorities to remove Arons from his teaching post at the University of Berlin [Ringer 2008:172–173]. However, when Fritz K. Ringer observed that “the German academic community bowed to Lex Arons “without protesting too much”, he (a) contradicted his own description of the perennial resistance of Berlin professors to this pressure and (b) exaggerated the role of this law, which was only used once against Arons. Erdmann’s article that we cite here, by the way, is a shining example illustrating that the German academic community opposed to this law to the bitter end, being guided by the maxima, “It is absolutely necessary that Privatdozents be completely guarded against any ministerial attack.” [Erdmann 1898:30]

<sup>16</sup> The concept of scientific revolutions is not that revolutionary for modern philosophy of science as it might seem. In fact, it was used in its contemporary sense in Schleiermacher’s *Hermeneutics* in the context of discussing the issue that modern philosophers refer to as the problem of commensurability of conceptual schemes [Schleiermacher 2004 (1838):119] (The first draft of this work was made in 1805).

<sup>17</sup> This mechanism remained functional until the national socialists came to power. Helmuth Plessner in his article in *Problems of a Sociology of Knowledge*—

Freedom of students to study is the other aspect of academic freedom. In university education, it means first of all that students are free to choose and organize their classes as they like. Friedrich Schleiermacher, again, was the most consistent proponent of granting students complete freedom in those matters: “They are not subject to any kind of constraint; nowhere are they urged on, and nothing is closed to them. Nobody orders them to attend a specific class, and no one can blame them if they neglect or fail to do so. There is no oversight of any of their activities, except to the extent that they voluntarily allow.” [Schleiermacher 1964 (1808):275–276] A freedom like that fosters responsible decision making and a taste for scientific inquiry, as interest for research can only arise in a situation of complete freedom. According to Schleiermacher, the freedom of students cannot be restricted even if chances are high that many of them will misuse it and waste the best years of their lives. A quarter of a century later, Savigny would describe the actual state of affairs relative to academic freedoms in German universities as follows: “Our teachers enjoy an almost unlimited liberty as to the choice of their topics of instruction and the arrangement of their lectures; and the students are equally at liberty as to the choice of teachers and lectures. This liberty brings respect, honor (*Ehre*), and the spirit of competition (*Wetteifer*) into the teaching relationship, which results in every improvement of science, either as to form or substance, bearing immediately upon the business of instruction at the university.” [Savigny 1850 (1832):286]

### **Importance of Practice and Experience**

In history of pedagogy, the American practice-oriented model of education, owing its existence to Joh Dewey in the first place, has been commonly opposed to the European tradition of cognitive-based learning. Meanwhile, the liberal theory of education is far from underestimating the diversity of personal experience and orientation towards active transformation of the world. This idea was formulated explicitly by Humboldt as he elaborated on the abovementioned point of seeing freedom as the grand and indispensable condition of human development. “Besides freedom,” Humboldt continued, “there is an-

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a collection of essays under the editorship of Max Scheler, which demarcated the rise of modern sociology of knowledge as a discipline—defined the functions of the institution of Privatdozent in a manner that was similar to Erdmann’s description: a Privatdozent may either follow the strategy of clientele loyalty vis-à-vis *professores ordinarii*, which is the social mechanism of creating stable science schools, or choose the path of constructing “new science”. Although this latter path lies outside the buffer of patronage, it fosters evolution in the relevant academic field [Plessner 1985 (1924):24–25]. Global research policies of the second half of the 20th century were focused on derailing the patron-client relationship in universities as effectively as possible, thereby blocking the mechanisms that lead to the formation of science schools [Schnädelbach 2012:8–9].

other essential,—intimately connected with freedom, it is true,—a variety of situations.” [Humboldt 2003 (1851):13] The same argument, a little while after being proposed by Humboldt, was developed further by his closest friend and intellectual companion Friedrich Schiller: “in proportion as man gains strength and depth, and depth and reason gain in freedom, in that proportion man takes in a larger share of the world, and throws out forms outside himself.” [Schiller 1957 (1795):291–292] Schiller saw the enrichment of personal experience as a prerequisite for existence in the ever-changing world and the understanding of self as inseparable from creative activity of the man in the outside world—from creating forms “outside himself”. Therefore, the liberal model of education certainly cannot be boiled down to the development of “internal” capacities. While acknowledging the diversity of experience—along with freedom—an indispensable condition of education, this model also requires practice and active transformation of the world: “At the convergence point of all particular kinds of activity is man, who, in the absence of a purpose with a particular direction, wishes only to strengthen and heighten the powers of his nature and secure value and permanence for his being. However, because sheer power needs an object on which it may be exercised and pure form or idea needs a material in which, expressing itself, it can last, so too does man need a world outside himself.” [Humboldt 1903:283]<sup>18</sup>

### **Critical Thinking and Civic Competence**

Critical thinking is first of all the ability to think independently and make autonomous judgments based on rational rules. Critical thinking is release from “tutelage”, which Kant defines in *Answering the Question: What is Enlightenment?* as “man’s inability to make use of his understanding without direction from another.” [Kant 1998 (1784)] The relationship between freedom and personal autonomy was explored from all angles by German Enlightenment thinkers<sup>19</sup>. In particular, Christian Wolff provided some extensive arguments on this point. His *Introductory Treatise on Philosophy in General* even contains a chapter—the final one—called *On Freedom of Philosophizing*. This is how Wolff explained the concept of such freedom, based on the principle of autonomous judgment: “He who philosophizes in compliance with this method will only accept what others say to the extent that it can be proven and understood by virtue of his own fundamental convictions; he will only defend the trueness of what has been deduced from sufficient ground of evidence; he can discriminate between what is probable and what is true, and certainly expends effort to perceive clearly what other say and raise it to the level of trueness where its relationship with other truths can be experienced.” [Wolff 2006 (1728):119]

<sup>18</sup> Written in 1793.

<sup>19</sup> For an exhaustive review, see [Zenker 2012].

Kant, afterwards, would only follow Wolff's tradition, as in defining reason in *The Conflict of the Faculties*: "Now, the power to judge autonomously—that is, freely (according to principles of thought in general)—is called reason." [Kant 1994 (1798):70] The autonomous judgment requirement, systematically elaborated in Wolff's philosophy, can be traced, in its turn, to the foundations of modern European theories of consciousness, in particular the first rule of René Descartes's method: "never to accept anything for true which I did not clearly know to be such; that is to say, carefully to avoid precipitancy and prejudice, and to comprise nothing more in my judgement than what was presented to my mind so clearly and distinctly as to exclude all ground of doubt." [Descartes 1989:260]

In the context of the problem of autonomous judgment development, classical German philosophy devotes a lot of attention to the aspect of solitude (*Einsamkeit*), which Humboldt considered to be a critical—along with freedom—principle of university life. The social implications of this principle have been extensively described by Helmut Shelsky [Schelsky 2013; Schelsky 1963]. Taking this idea a little bit further, the principle of solitude manifests the social and civil aspect of liberal education. From this perspective, the liberal model of university can be called the nursery garden of the contemporary civil nation<sup>20</sup>, an environment that fosters numerous individuals capable of reasoning autonomously and bearing responsibility for the "common good"—that is, formulating and resolving problems beyond the narrow self- and group interests and rather acting in the common interests of nation and, further, humanity. This social and civil aspect manifests itself most clearly in Fichte's *Deduced Scheme for an Academy to be Established in Berlin*: "The desire to have school and university very near home and to spend the rest of one's life in the district where one has grown up dull and unconscious is first and foremost humiliating to man. Some day or other, one must leave all the strings attaching him to the support of his family, neighbors, and fellow countrymen and start a new life of his own in a circle of strangers to whom he is nothing more than what he is personally (*persönlich*) worth, and this right to start an independent life one day should not be denied to anyone. It would conflict, in particular, the nature of the man of science whose views ought to be free and go beyond time and place—whereas stick-

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<sup>20</sup> The modern conceptualizations of the liberal model define this implication as "education for general citizenship", or "citizenship education" [Gutek 2009:237]. Here, we only mention one of the most important aspects of this social, civil, and political dimension of the liberal model without going into details. Humboldt, however, saw this dimension as paramount, which follows from his definition of "higher scientific institutions" as "the pinnacle where everything that happens directly for the moral culture of the nation comes together." (*On Organization*) Thereby, the university, in addition to its direct educational function, also exerts the fundamental external function of cultivating "civic competence by means of education." [Lübbe 1989:173]

ing to the patch of land where one was born, inexcusable except for artisans residing in cities, is dishonorable. In the end, this even prevents the organic ingrowth of all into one citizenship, and this is the only reason why individual provinces and cities get separated from the great whole of the state <...> None of those who grew up amidst such restrictions will ever become a capable person or a great statesman.” [Fichte 1971 (1817):170–171]<sup>21</sup> Such a statement of the problem, proposed by Fichte, leads to the practical issue, widely debated in classical German philosophy, of university location — whether it should be an isolated campus (the model broadly applied in the United States) or a location within a big city. That same Fichte, who originally gravitated toward the former, still opted for the latter in his 1811 rector’s speech *On the Only Possible Disturbance of Academic Freedom* [Fichte 1905 (1811)]: “thanks to his peculiar sociological farsightedness, he came to the conclusion that isolation of students from the civic life is easier to achieve in big cities than in small towns. Otherwise speaking, big cities allow for a more solitary lifestyle.” [Shelsky 2013:78–79]

This digression into history demonstrates that autonomous, critical thinking based on independent reasoning is even more fundamental than the liberal philosophy of education as such — in fact, this is a cornerstone of modern society, which rests upon the premise of individual rationality and a certain type of civic consciousness. Such a perspective on this principle sheds a totally different light, for instance, on the problem of plagiarism and paper mills in postsecondary education. This is not so much about copyright violation — there may be nothing wrong with it even at the level of expanding our knowledge and experience; at the very least, a commissioned piece of writing may be an original and independent scientific inquiry. What this is rather about is that the modern society depends in its existence on people capable of thinking autonomously, i.e. critically, instead of simply following someone else’s opinions. A formal certificate of university graduation, let alone academic degree, should at least certify that the person holding it is able to make judgments independently and freely — *Einsamkeit und Freiheit!* The absence of such ability is by far not only the problem of the current state of science or a defect in the system of professional education. This is a universal concern, as modern societies rest upon the premise that they consist — in their active citizenship part at the least — of such capable individuals. Therefore, one can fully agree with John Dewey saying that “the future of democracy is allied with spread of the scientific attitude,” [Dewey 1968:165] if the scientific attitude is interpreted as a required minimum of civic competence that consists in the ability to think critically. The problem of plagiarism and paper mills is not limited to university education; rather, it is universal to the civil society.

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<sup>21</sup> Written in 1807.

**Competency  
Development  
Instead of Knowl-  
edge Accumulation**

Comprehensive education does not imply “learning of many things”—which, according to Heraclitus already, “does not teach understanding” (40 DK)—or encyclopedism, but rather development of what is referred to as competencies<sup>22</sup> in modern educational terms. Motivation for such learning should not be external (disciplinary) but should be free and primarily based on the aesthetic inspiration for learning: the school must “exercise its strength on the smallest possible number of objects from all sides, where possible, and implant all knowledge in the mind only in such a way that understanding, knowledge, and intellectual work become attractive not through external circumstances but through their inner precision, harmony, and beauty.” (*On Organization*). Therefore, the liberal theory of education is inherently opposed to misinterpreting diversity as a propensity toward encyclopedism that manifests itself in studying as many subjects as possible.

**Priority of General  
Education over  
Specialized  
Education**

General education plays a more significant role for personal and civic development of a human being than specialized or vocational instruction: “All schools <...> that are recognized as such, not by a single social group, but by the entire nation or the state, must aim only at the general development of the human being. Whatever is required for the necessities of life or for one of its particular occupations, must be acquired separately and upon completion of general instruction.” (*Lithuanian School Plan*, [Humboldt 1920 (1910)]) Therefore, the liberal model of education has a distinctive feature of universality, which modern authors refer to as *the distribution requirement* and consider to be the hallmark of liberal arts and sciences education [Kudrin 2015:63].

In his treatise on the university, Schleiermacher elaborated the idea of the primacy of general education, frowning upon “the old mischief of determining children for a certain business almost from the cradle” and arguing that all new students must devote their first year at the university to studying the pure idea of science at the faculty of philosophy in order “to strengthen their principles and get a general understanding of all truly scientific disciplines <...> it is the best time for them to develop their views, their love, and their talent; they will discover their right occupation infallibly, thereby gaining the great advantage of having found it independently.” [Schleiermacher 1964 (1808):260–261]

Therefore, an additional dimension to the priority of general education emerges: it is only after the completion of general (philosophical,

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<sup>22</sup> The concept of “competency”, which is key to classical German philosophy, was borrowed from the then generally accepted theories of philosophical psychology. In the 19th century, the theory of innate abilities was criticized and deconstructed in the psychology and pedagogy discourse—first of all, in the works of Friedrich Eduard Beneke and Johann Friedrich Herbart.

in this case<sup>23</sup>) instruction that a young person is able to decide on their future occupation freely and independently, otherwise their self-determination is the unfree “old mischief” (*das alte Unwesen*) typical of the traditional society where children ascriptively inherited not only the social status but also the occupation of their parents. By virtue of this, the perceptions of present-day liberal arts and sciences researchers about Humboldt’s model and the innovative capacity of modern approaches stem from the loss of the idea of what the liberal theory of education is actually about<sup>24</sup>.

### Learning to Learn

Learning to learn is defined as the key competency to be developed by graduates of schools (Humboldt) or universities (Schleiermacher). “The student is ready to graduate once he has learned so much from others that he is now able to learn by himself” (*Königsberg School Plan* [Humboldt 1920 (1910)<sup>25</sup>]). This fundamental criterion of educational institution performance flows out from the meta-principle of the liberal theory that proclaims education the ultimate mission of a human being, saying that learning should not be restricted to a certain stage of formal education or program but should be perceived as a life-long journey. This position was shared by all classical German philosophers, regardless of disagreements they might have on any other issue. The principle of defining the purpose of university education as “cultivation of the ability to learn”, instead of knowledge acquirement, is pivotal to Fichte’s *Deduced Scheme* [Fichte 1971 (1817):102]. Likewise, Schleiermacher referred to the university as the organization in which the man masters the skill of “learning to learn” (*das Lernen des Lernens*) [Schleiermacher 1964 (1808):238]. Finally, this thesis even assumed a poetic form during the period of establishing the new campus. “We want to teach ourselves to learn,” goes the ode written by Clemens Brentano on the opening of the University of Berlin [Brentano 1963 (1810):227]. Disagreements, as we can see, revolve

<sup>23</sup> Whether it is a course in philosophy or any set of disciplines functioning as an orientation course is certainly a debatable point in terms of principle implementation.

<sup>24</sup> For instance, Jonathan Becker repeats essentially word by word a quote from Schleiermacher on the need to let students choose their major after admission, yet he sees it, erroneously, as a fundamental difference from the Humboldtian model: “one of the most important but underappreciated elements of LAS education is the rejection of the Humboldtian notion that seventeen and eighteen year olds should be expected to choose their area of specialization (or major) prior to being exposed to learning within the context of the university classroom. Trust is put in the student to explore different possibilities and to make an informed choice of specialization based on real-life experience, rather than depending on impressions from secondary school or guidance from (often ill-informed) parents.” [Becker 2015:51]

<sup>25</sup> Written in 1809.

around whether students must develop self-learning skills at school (Humboldt) or university (Fichte, Schleiermacher). Today, as we are observing some elements of higher education spreading to the school (content variability, which provides a certain degree of freedom to study; “diversity of situations” in student projects; etc.), it can be said that this process activates the inherent mobility resources of the liberal model of education.

**Self-Directed  
Learning Effort**

Learning, particularly in higher education, is never about just passing knowledge from teacher to student — it is always based on the individual’s free autonomous effort alone: “The university is reserved for what the human being can find by and within himself: insight into pure science. For this self-activity in the fullest sense, *freedom* is necessary, and *solitude* is helpful.” (*Lithuanian School Plan*) The idea that true learning is not the processing of what is taught but always a self-directed learner’s effort has been expressed most prominently by Friedrich Wilhelm Joseph Schelling: “It is not when students acquire specific knowledge — the only type that can be taught — but when they become able to autonomously produce and reproduce knowledge that education is completed. Education is only a negative condition, whereas true learning (*Intussuszeption*) is impossible without inner transformation. All rules for study are summed up in this one: learn only in order to create (*Lerne nur, um selbst zu schaffen*). Only by his divine capacity for production (*Vermögen der Produktion*) is man truly man; without it, no more than a tolerably well-devised machine.” [Schelling 2009 (1803):30] In terms of philosophy, this effort-based approach to learning was arranged by Fichte, whose theory was centered around the concept of *Tathandlung* — the so-called “deed-act” — the main characteristic and an active form of the subjective *I* (interpreted as an effort-based action), which always precedes the essence.

**Political  
Neutrality**

Political neutrality, or “freedom from indoctrination”, is a key principle of liberal education [Gutek 2009:243]. It is normally dated back to Max Weber’s lecture *Science as a Vocation* [Weber 1990 (1919)], but earlier sources are also available, including Leo Tolstoy’s policy article *Training and Education* [1936 (1862)]. Weber and Tolstoy premised their theories of political neutrality in education on the classical German philosophy principle of political neutrality and its extensive criticism of “partisanship” at the university. This tradition has its roots in Schleiermacher’s argument on preventing the university from turning into the state’s political instrument. As long as scientists become increasingly more allied with the state, noted Schleiermacher, some of them “begin to prioritize politics over science” and “tolerate the state’s interventions” more and more. As a result, “this part of the broader national scientific community grows ever more isolated from

everyone else who are more committed to their peculiar principles, degrading to a regular agency that the state uses for its own purposes.” [Schleiermacher 1964 (1808):232] Therefore, already Schleiermacher formulated explicitly the need to maintain the depoliticized autonomy of the university and scientific knowledge — a knowledge based on “one’s peculiar principles”.

Savigny elaborated on the problem of “partisanship” among professors and students in his treatise on the university and proposed a set of initiatives to mitigate the effects. Understanding that political neutrality of students and professors can hardly be achieved by regulation alone (as Max Weber would later insist), Savigny suggested avoiding external constraints and using diversity instead to create an environment where partisanship would not play a significant role as compared to research enthusiasm of students and faculty: “Essentially, such false directions can only be counteracted by the power of true ones. If students’ attention is captivated by the zeal and talent of many bright teachers, fewer and fewer minds will be occupied with false intentions. What is needed and lacked most of all is the diversity of student effort stimulation, better motivation for self-directed learning, and closer attention to such learning.” [Savigny 1850 (1832):303–304] Savigny argued against any kind of ideological constraint in higher education as well as against banishing “all freedom and individuality” from universities on the ostensible grounds that such freedom fostered the spread of fallacy and evil, along with truth. This is where his words acquire a homiletic tenor: “Where, in a certain era, false and even evil tendencies arise, they are sent by the Lord as a special ordeal that cannot be overcome but ought to be sustained. In that case, it is unnatural and perilous to destroy or weaken the spiritual power as such only to prevent it from being conquered by the enemy.” [Ibid.:289] To put it in other words, Savigny suggested that uniform neutrality should not be achieved through restrictions but through freedom of opinion — the argument that has been traditionally used to justify the principle of freedom of speech<sup>26</sup>: “All of this, however, should come about without any pressure from the outside, be a matter of honor and moral, and only be driven by the example of capable individuals.” [Ibid.:305]

## Interaction and Socratic Dialogue

Classical German philosophy is also a glaring example of early media studies and of solving the problem of mediation in education<sup>27</sup>. Fichte begins his *Deduced Scheme* by straightforwardly raising this problem.

<sup>26</sup> Classical arguments for the freedom of speech were proposed by John Milton [2001 (1644)] and John Stuart Mill [2012 (1859)].

<sup>27</sup> Johan Adam Bergk’s *The Art of Reading. Including comments on publications and authors* [Bergk 1799], already cited above, is a notable example of early media studies.

A media revolution came about when books, which used to be a privilege of the few, became “absolutely common”. If the purpose of universities is to disseminate pre-existing knowledge that can be learned from text, there is no point in their existence anymore: “they must be immediately closed down, and those who need education must be referred to the existing texts.” Fichte describes numerous advantages that printed text has over the university, such as that students have an opportunity to read anywhere anytime, re-read and reflect on a specific passage, etc. Passive learning in the form of lectures without interaction only results in the student “getting habituated to passive suffering and losing his motivation for self-directed learning” [Fichte 1971 (1817):100; 99]. Responses to this challenge to universities’ existence include rethinking the very process of communication in higher education and what could be referred to as the prototype of modern critical media studies and their deconstructivist strategies.

For interpersonal communication at the university to remain meaningful, it should not consist in passing down information or pre-existing knowledge. A lecture only makes sense so far as it creates or recreates the process of research and knowledge generation: “The purpose of academic teaching consists in reconstructing knowledge genetically. The genuine advantage of live instruction is that the lecturer does not merely communicate results, as the writer normally does, but shows—in the higher sciences at least—how these results were obtained, each time recreating the science as a whole in front of the student.” Such a lecturer, Schelling explained, must be able, “at any moment, to start reproducing, himself,” the scientific logic of research; science can only be delivered “as something that should be discovered, not as a fixed knowledge” by someone who can “reconstruct it himself from the very beginning.” [Schelling 2009 (1803):23–24]

Schleiermacher took this idea of Schilling, which had found credence among all the classical German philosophers, further into a theory of two elements of the new lecture. According to its first, “popular” element, the lecturer should assess the condition in which the listeners find themselves, make clear what the audience lacks and how to eliminate this “insufficiency”. According to the second element, the lecture is “productive”, in that the teacher “must not tell what he knows but rather reproduce his own process of learning (*Erkennen*), the act (*Tat*) itself, so that students do not constantly just collect the facts but rather can immediately perceive and reproduce (*nachbilden*) the activity of reason in the process of knowledge formation.” [Schleiermacher 1964 (1808):252]

The second crucial thrust towards interactive communication, proposed by the liberal model, consisted in increasing the role of direct interpersonal communication, or Socratic dialogue. Fichte provided an exhaustive formulation of this idea: “The teacher only gives the material and stimulates the activity; the student works with this material himself; however, the teacher must be able to see whether and how

the student is working on this material, so as to be able to assess the student's level of skill and offer new material in light of the progress. Not only the teacher but the student as well must constantly speak and communicate, so that their relationship becomes an ongoing conversation <...> whereby the scientific teaching transforms from a continuous flow of words, which it remains in the books, into the dialogic form (*die dialogische Form*) and establishes a true academy in the sense of the Socratic school, which we had in mind when intending to use that particular word here." [Fichte 1971 (1817):103–104]<sup>28</sup> This new idea of interactive, person-to-person communication spiraled into a critical revolution in the German model of research university at the institutional and organizational level. Lectures remained overwhelmingly prevalent up to the late 1700s, but the 19th century was a golden age of university seminars and research centers (institutes), which essentially pushed the monologic lecture method aside. In the humanities of the early 19th century, Socratic seminars were consistently used only in classical philology, where they found advocacy and elaboration from Friedrich August Wolf. The new idea of science and the new model of university that arose in Germany at the beginning of the 19th century laid the groundwork for the progressive adoption of the seminar method by all the humanities and the conception of modern research institutes and centers [Brocke 1999; Erben 1913] In his treatise, Schleiermacher formulates a thesis on the need to provide broad availability of seminars and "practical classes" at the university and makes a stand against seeing seminars as a privileged form of teaching reserved to the most senior professors [Schleiermacher 1964 (1808):241; 264–266].

The arguments for developing personal student-professor interaction in the form of Socratic dialogue prompted the first elaborations of critical media studies in classical German philosophy. Criticism followed from the new media situation that the university was thrust into by the invention of mass printing, which made books and other texts accessible to individual readers. The individual learner now had the text all to himself, being left one on one with the book. That conceptual model already outlined the directions for criticism of the written text that can be observed these days in phenomenology [Husserl 1996], deconstructivist theories [Derrida 1996], and contemporary media studies [Kittler 1988]. Recent findings and theoretical reflections have revealed the complex and even dramatic problem of medi-

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<sup>28</sup> This statement of Fichte leaves no doubt that liberal philosophy of education is intrinsically based on the principle referred to as "student-centered academic advising" in modern liberal arts conceptualizations. All of the early philosophers of liberal education would certainly agree with a modern theorist that "the advising relationship, properly conceived, is a student-centered instructional relationship and so ought to be considered a feature of liberal arts and sciences." [Schein 2015:138–139; 132]

ality affecting our beliefs about the world and shaping a peculiar type of subjectivity<sup>29</sup>. Already Hegel emphasized, in *Encyclopedia of the Philosophical Sciences*, the relationship between reading and writing, on the one hand, and a particular configuration of subjectivity, on the other: “What has been said shows the inestimable and not sufficiently appreciated educational value of learning to read and write an alphabetic character. It leads the mind from the sensibly concrete image to attend to the more formal structure of the vocal word and its abstract elements, and contributes much to give stability and independence to the inward realm (*Innerlichkeit*) of the subject.” [Hegel 1977 (1817):300] Effects of this kind, generated by textual experience, are taken into account in media criticism practices developed by philosophers of higher education.

Let us consider the example of Savigny analyzing the difference in the effects generated by an author of a written text and a teacher interacting with students directly. The former addresses indefinite, undifferentiated audiences of the present and future, so what he writes is also largely “general and indefinite”, being only so far valuable “as it contributes to establish or develop the science”. Thereby, the author himself is “only, as it were, an organ of the ideal spirit, by which this science is progressively improved. Thus everything conspires to remove the personality of the author, and the peculiar manner of his development, from the eye of the reader.” Contrastingly, the teacher at the university deals with individuals personally known by him, to whom the science which he teaches, so far as it has advanced, will naturally appear, “as it were, personified” in their teacher: “Whilst the teacher thus gives a vivid representation of the genesis of scientific thought, the kindred spiritual power is awakened in the student, and excited to re-production. He will not only learn and understand, but also vitally re-produce, what he has been so vividly presented before him, in its living realization.” [Savigny 1850 (1832):275–276] Therefore, personal interaction in education essentially amends our writing-mediated understanding of the world, which is not a product of the ideal spirit

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<sup>29</sup> Cf.: “The possibility of *writing* will assure the absolute traditionalization of the object, its absolute ideal objectivity — i. e. the purity of its relation to a universal transcendental subjectivity. Writing will do this by emancipating sense from its actually present evidence for a real subject and from its present circulation within a determined community.” [Derrida 1996:108] To put it otherwise, the discursive experience of writing and, hence, reading makes the subject develop a very peculiar perception of the world and of itself. The world is thereby structured as an objective and constant reality, while the subject perceives itself as being outside the world and capable of changing it through purposive-rational actions. This worldview, a product of written culture, caught the breathless attention of Husserl in the 1930s, as the power of ideologies considered by their followers to be based on a clear scientific understanding of how the world worked and what people were supposed to do about it was gaining a huge momentum.

anymore — free of failure, inconsistency, and fortuity — but rather implies perception of a particular individuality, hence imperfection, contingency, and factuality of how science develops and the world works.

Dialogic interaction, an important element of the liberal model, is acquiring a new meaning as university education has been undergoing waves of massification. Classical philosophy of higher education was designed for institutions with a small number of teachers and students. Massification has put a new twist on university education, turning it into an industry. A number of the liberal model principles have not been undermined. For example, freedom to study can be achieved by providing a wide variability of curriculum modules, and so on. The greatest challenge, in our opinion, consists in applying the principle of dialogic interaction, in terms of the liberal model, as a possibility of live, direct dialogue between the teacher and the student. The new wave of mediatization that has swept over the education system as a result of online courses and other forms of digitization requires thorough analysis of the fundamental anthropological implications of those processes. The classical liberal model of education counterbalanced the dominance of the Gutenberg Galaxy of mass media with a revisited Socratic dialogue and the promotion of seminar classes and other forms of personal interaction. The question is, will such forms remain efficient in the new media context (after all, the previous media revolution, associated with the rise of modern mass analog media, left them almost unaffected), and what are the areas for review and improvement?

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# Why Embark on a PhD Today? A Typology of Motives for Doctoral Study in Russia

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**Abstract.** Data obtained in interviews with doctoral students and their aca-

demical supervisors as well as in doctoral student surveys conducted across six Russian universities is used to explore the motives for embarking on and pursuing a PhD and evaluate their incidence. Drawing on Deci and Ryan's self-determination theory, three basic types of motivation are identified — intrinsic motivation, extrinsic motivation, and amotivation — and described in the context of doctoral education. Even though academic labor has been losing its prestige in Russia, intrinsic motivation associated with interest in research, science and teaching remains the most popular motive for embarking on doctoral study. At the same time, a significant percentage of doctoral students are driven by external non-academic motives, such as specific social benefits or desire to use PhD as an asset in a non-academic career.

**Keywords:** doctoral study, motivations of doctoral students, self-determination theory, effectiveness of doctoral programs, retention of youth in science.

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Doctoral education is undergoing a monumental transformation today, both in Russia and beyond. The prevailing trends include meeting the demands of an employment market wider than academia [Kehm 2006; Nerad 2010; Nerad, Evans 2014] and structuring the doctoral programs so that they develop generic skills as well [Gilbert et al. 2004; Park 2005; Kehm 2006; Halse 2007; Nerad 2010]. In Russia, those trends found their way into legislation in 2012, with the adoption of the Federal Law *On Education in the Russian Federation*, which not only changed the status of doctoral study (making it the third lev-

el of higher education) but also led to an essential reconsideration of the content of doctoral programs [Bednyi 2013; Mosicheva, Karavaeva, Petrov 2013; Shestak, Shestak 2015].

The reform stirred a heated debate in academia, its feasibility and implications being brought up for discussion. Critics have blamed it for the sharp decrease in effectiveness of doctoral programs over the past five years, emphasizing that the transition to the structured model of doctorate was unnecessary and “damaging” to the Russian science. Supporters, on the contrary, observe a “healing” effect of the reform, underlining its consistence with the global trends in doctoral education (for discussion of standpoints, see [Shestak, Shestak 2015; Senashenko 2016; Bednyi 2017; Terentev, Bekova, Maloshonok 2018]). Obviously, the discourse lacks data, the majority of arguments being expert opinions with no empirical standing. For this reason, research on the development of doctoral education in Russia based on statistical and sociological evidence becomes ever more relevant today.

Motivation for embarking on and pursuing a PhD plays a key role in doctoral student success and thus requires the utmost attention [Lovitts 2001; Bair, Haworth 2004; Ivankova, Stick 2007; Spaulding, Rockinson-Szapkiw 2012; Litalien, Guay 2015]. A number of experts consider low motivation to be a major problem of doctoral education in Russia [Shafranov-Kutsev, Yefimova, Bulasheva 2017; Reznik, Chemezov 2018]. However, most of their arguments are based on pre-reform experience of a limited number of universities, which is inadequate for analyzing the current situation.

This study seeks to explore the actual motives of present-day doctoral students. Findings obtained in a mixed-methods study of six universities are used to identify the main types of doctoral motivation in Russia and evaluate their incidence. A typology of motives for embarking on and pursuing a PhD is built within the framework of self-determination theory proposed by American psychologists Edward Deci and Richard Ryan [Deci, Ryan 2012], which became widespread in student motivation research but has been rarely applied to doctoral education.

## **1. Research on the Motives of Doctoral Students in Russia and Beyond**

There is empirical evidence that motivation for embarking on and pursuing a PhD is a strong predictor of successful degree completion and thesis defense [Lovitts 2001; Bair, Haworth 2004; Ivankova, Stick 2007; Spaulding, Rockinson-Szapkiw 2012; Litalien, Guay 2015; Shafranov-Kutsev, Yefimova, Bulasheva 2017; Reznik, Chemezov 2018]. Intrinsic motivation, based on interest for learning and research, was found to be associated with better learning outcomes [Ivankova, Stick 2007; Litalien, Guay 2015]. David Litalien with colleagues observed positive correlations between doctoral students' outcomes and autonomy, the latter being understood in the context of SDT as intrinsic regulation, contrasted with external control [Litalien, Guay, Morin 2015].

Data obtained in interviews with doctoral graduates shows that candidates motivated both personally (achievement, personal goals, enjoying a challenge, and desiring the title) and professionally (career advancement, monetary incentives) are more likely to persist [Spaulding, Rockinson-Szapkiw 2012]. A survey of doctoral students at a South Korean research-focused university revealed that students with high aspirations for working in academia may perceive their learning process in a more positive way and cope better with stress associated with intensive coursework and individual research topic development, realizing that their outcomes will determine their career advancement [Shin et al. 2018].

International studies of motives for enrolling in doctoral programs are largely cross-sectional and focused on measuring the incidence of different types of motivation without looking at correlations with the learning outcomes and various aspects of perceived doctoral experience [Brailsford 2010; Tarvid 2014; Wiegerová 2016; London et al. 2014]. In addition, researchers draw on different taxonomies and use different theoretical frameworks, which makes systematical generalizations even more challenging.

There is little research on the motives for embarking on and pursuing a PhD in Russian universities, and the available findings are inconsistent. A pioneering study was conducted by Sergey Balabanov and his colleagues [Balabanov et al. 2003], who used the results of a survey of doctoral students in Volga Federal District to demonstrate that doctoral candidates are motivated most of all by the desire to defend a thesis and obtain a PhD degree, as well as by the opportunity to set their whole mind on thesis work. Professional research as a motive was mentioned by only one third of the respondents. The answers provided by doctoral students contradicted those obtained from faculty members, who nominated postponement of military service, self-fulfillment, desire to become a highly qualified professional, competitive advantage in the labor market, and prestige to be the most powerful motives. Type of motivation was one of the factors used by the authors to identify four categories of doctoral students: highly resourceful (with a strong propensity for research), deprived (in unfavorable socioeconomic situations), research-motivated (most likely to succeed in doctoral studies), and “deadweight” (those who only pretend working on a thesis). The findings of this study are useful for analyzing the evolution of motivations in PhD programs, as sociocultural characteristics of doctoral students in Russia have changed dramatically since 2002.

A recent study<sup>1</sup> found the most popular motives for engaging in doctoral education to be associated with higher earning capacity, bet-

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<sup>1</sup> This study has a major limitation that renders its findings not entirely applicable to doctoral candidates, as the survey was targeted at undergraduate and graduate students, asking about their academic career intentions: “Which factors *may have an impact* on your decision to pursue a PhD?”

ter qualifications, career prestige or promotion, and making connections [Reznik, Chemezov 2018]. The identified pragmatic motives are classified as “erroneous”, inconsistent with the primary mission of doctoral studies. “Objective” motives — associated with interest in doing research, teaching, and pursuing an individual scientific inquiry — are less widespread, which appears to undermine the sustainable development of doctoral education in Russia.

Partially contradictory findings have been obtained in some concurrent studies [Zamaraeva 2013; Shafranov-Kutsev, Yefimova, Bula-sheva 2017], which revealed that most doctoral candidates are motivated by interest in research and the opportunity for self-fulfillment and professional development. Extensive empirical data is provided on social characteristics of postgraduate students, yet the problem of motivation is glossed over without any theoretical conceptualization.

Attempts have been made in Russian literature to systematize the motives for embarking on and pursuing a PhD [Vedeneeva, Zabelina, Tsiring 2012; Kapshutar 2016; Sizykh 2014]. In particular, Yekaterina Vedeneeva and her co-authors identified three clusters of factors to describe the structure of doctoral students’ motivations and values: “orientation toward achievement and self-fulfillment”, “orientation toward status and comfort”, and “orientation toward relationships”. Marina Kapshutar suggests distinguishing between personal and social aspects of motivation, and Anastasia Sizykh explores the reasons for pursuing an academic career as a function of whether motivation comes from interest, social norm, or coercion<sup>2</sup>.

A major large-scale study was carried out in 2016 on a sample of 14 universities with a special status (Project 5–100 participants and federal universities) [Bekova et al. 2017]. Having grouped the motives into academic and non-academic, the authors observe a noticeable prevalence of the former, associated with doing research at the university or a research institution (56%), teaching (48%), and doing analytical research for businesses (25%). Non-academic motives, though mentioned less often, carried considerable weight as well: 38% of the respondents believed that a PhD would help them build a career outside academia, 33% embarked on a doctoral journey for the sake of professional development, 23% were unwilling to leave academia, and 8% were interested in getting a room in the halls of residence. One in every four male PhD candidates treated doctoral study as a chance to postpone military service.

Russian studies thus show, on various arrays of data, that desire to defend a thesis and build an academic career as well interest in research and teaching are the key motives for embarking on and pursuing a Ph D. Meanwhile, non-academic motives associated with social

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<sup>2</sup> All the publications cited are based on either qualitative research methods [Sizykh 2014] or small-sample interviews [Vedeneeva, Zabelina, Tsiring 2012; Kapshutar 2016].

benefits (stipend, postponement of military service, accommodation, etc.), prestige, and possible financial gains have been found to be important for many doctoral candidates, despite their lower incidence. With some exceptions [Zamaraeva 2013; Bekova et al. 2017], all the studies mentioned above are case studies that use data obtained from individual universities or groups of universities located in the same city or region [Vedeneeva, Zabelina, Tsiring 2012; Kapshutar 2016; Rybakov 2018; Reznik, Chemezov 2018]. As most of them are based on interviews, interpretation and analysis of their results can be a challenge. Besides, studies exploring the motivation for pursuing a PhD rarely feature thorough theoretical analysis at the level of both methodology and interpretation, which makes it difficult to make comparisons and generalizations.

To approach the problem comprehensively, this article presents the results of an empirical mixed-methods study designed to construct a theoretically justified typology of the motives for embarking on and pursuing a PhD in Russian universities and to assess their incidence. The main theoretical framework of the study is built around self-determination theory proposed by Deci and Ryan [Deci, Ryan 1985; 2012; Ryan, Deci 2000], which became widespread in school and higher education research [Gordeeva 2010; Maloshonok, Semenova, Terentev 2015] but has been rarely applied to doctoral education (exceptions include [Litalien, Guay 2015; Litalien, Guay, Morin 2015; Shin et al. 2018]). Available findings, however, demonstrate a high predictive capability of this theory in explaining doctoral students' drop-out intentions [Litalien, Guay 2015] and satisfaction [Shin et al. 2018].

## **2. Deci and Ryan's Self-Determination Theory**

Deci and Ryan's self-determination theory (SDT) of motivation posits three basic needs that determine human behavior: autonomy, competence, and relatedness [Deci, Ryan 2012]. Autonomy is based on voluntary choice, self-directed behavior, and self-control. Competence involves self-importance, self-efficacy, and enthusiasm about taking challenges and solving problems. Relatedness is understood as the need for feeling connected and accepted.

Various types of motivation regulating social behavior are identified based on this universal model. At the most basic level, distinction is made between intrinsic and extrinsic motivation. Intrinsic motivation is associated with inherent interest and enjoyment of an activity (self-regulation), whereas extrinsically motivated activities are done to obtain a reward, receive positive feedback, or avoid punishment (external regulation) [Ibid.]. Intrinsic and extrinsic types of motivation correspond to the opposite poles on the scale of autonomy.

To better understand the motivation process, Deci and Ryan also suggest distinguishing between integrated, identified, introjected, and external regulation within extrinsic motivation [Deci, Ryan 1985; 2012]. External regulation implies the lowest degree of autonomy and a com-

pletely external perceived locus of causality. With introjected regulation, behaviors are partially regulated by external norms and performed to avoid emotional discomfort (i. e. guilt) caused by failing to comply with them. Regulation through identification occurs when an individual consciously engages in an activity, understanding and accepting it as a means of achieving a personally important yet external (to the activity itself) goal. Finally, integrated regulation is the most autonomous form of extrinsic motivation, where the values determining involvement are fully assimilated to the self and brought into congruence with one's needs.

The five types of motivation identified (intrinsic and four types of extrinsic) form a continuum on the scale of autonomy, producing a distinction between autonomous vs. controlled motivation. The autonomous category includes intrinsic, identified, and integrated regulation, and the controlled one, introjected and extrinsic. Besides, Deci and Ryan identify amotivation, which has no regulation at all. Amotivated people go through the motions with no sense of intending to do what they are doing; they are not aware of their goals and do not seek to achieve any outcome with their actions. That is, their behavior is regulated neither extrinsically nor intrinsically. Amotivation results from feeling either that one is unable to achieve desired outcomes because of a lack of contingency, or a lack of perceived competence, or that one does not value the activity or the outcomes it would yield [Deci, Ryan 2002:17].

The model described above is regarded by the authors and their followers as universal, so it is important to assess its explanatory potential regarding specific cases and avenues of research. In this study, we are going to adapt Deci and Ryan's model to develop a typology of motives for enrolling in doctoral programs and assess its predictive capacity on a sample of PhD candidates in Russian universities.

### **3. Methodology and Data**

The article is based on the results of a mixed-methods study carried out in six Russian universities in 2018–2019. The sample included universities with a special status (three Project 5–100 participants) as well as regular ones (three universities). Two institutions were located in Moscow, and four in provinces (regions). Three were classical, one specialized in engineering and natural sciences, one in social sciences, and one in education and pedagogical sciences.

The qualitative portion of the study consisted in performing a series of semi-structured interviews with doctoral candidates (N=18) and their academic supervisors (N=24). In most cases, students and supervisors were interviewed in pairs independently of each other. Respondents were selected using the maximum variation sampling method. The structure of the sample is presented in Appendix 1. Interviews were focused on academic supervision, but some questions concerned the motives for embarking on a Ph D. In particular, aca-

demographic supervisors were asked about the relatively low effectiveness of doctoral programs (high attrition rates, low thesis quality, etc.) and the distinctive features of successful and unsuccessful doctoral students.

Interview data was used to develop quantitative research instruments. In addition, using qualitative data as complementary to quantitative allowed getting a more comprehensive idea about motivation for enrolling in doctoral studies. The topic being highly sensitive, interviews with academic supervisors were of particular importance, as using candidates' self-reports alone would have implied a risk of getting a distorted picture due to social desirability bias. For instance, students may fail to mention some traditionally disapproved motives (social benefits, postponement of military service, etc.), so additional information from academic supervisors may be helpful for building a more nuanced picture.

Interviews with doctoral candidates and academic supervisors lasted 40–50 minutes; audio recording was performed in each case.

The quantitative part of the study involved an online survey of doctoral candidates, who were emailed a link to the questionnaire (participation was voluntary). The questionnaire was completed by 1,097 students, which accounts for approximately 35% of the doctoral students in the selected universities. The questionnaire, designed using EnjoySurvey<sup>3</sup> software, included 72 questions and took about 20 minutes to complete. Some items concerned the motives for embarking on a doctoral journey—they were answered only by first-year doctoral students, who had fresher memories of making the relevant decision and choosing a specific program (N=347). The structure of the sample, broken down by mode of study, type of funding, student gender, and academic discipline is presented in Appendix 2.

#### **4. A Typology of Motives for Embarking on a PhD and Assessment of Their Incidence**

Analysis of interview transcripts allowed to identify a range of motives for enrolling in doctoral studies. Within the framework of SDT, all the motives were grouped depending on whether they were related to intrinsic motivation, extrinsic motivation, or amotivation. Within the group of extrinsic motives, the subtypes of external, introjected, identified, and integrated motivation could be distinguished. Below, we are going to dwell on each type of motivation and describe them using the interview and survey data.

##### **4.1. Intrinsic Motivation: Interest in Research, Teaching, and Learning**

Intrinsic motivation [Deci, Ryan 1985] is characterized by the highest level of autonomy and an internal perceived locus of causality associated with interest in and/or enjoyment of learning and work. Interviews revealed three groups of motives in the intrinsic motivation category related to different aspects of doctoral study: interest in research, interest in learning, and interest in teaching.

<sup>3</sup> <https://enjoysurvey.com/>

## 4.1.1. Interest in Research

A number of interviewees reported that their decision to embark on a PhD had mostly been motivated by interest in research as the core component of doctoral education. Research-motivated students regard doctoral study as inherently valuable, irrespective of the benefits it might bring (for their future career, for example). They are self-regulated and thus enjoy the highest degree of autonomy. Their narratives revolve around the concept of pure interest as a driver of their motivation:

“What were the motives? <...> my *interest* for inquiry and research.”  
(doctoral candidate, male, 3rd year, chemistry)

“I actually *like* digging into science... I’m *very interested*, it’s true.”  
(doctoral candidate, female, 3rd year, jurisprudence)

Doctoral students with this type of motivation tend to mention not just an abstract interest in science but an intention to elaborate a specific research question and contribute to a particular scientific field as their motive. Entirely consumed by their topic, they truly enjoy doing research:

“I was *genuinely interested* in international relations, which I chose as my PhD program <...> That was when I chose economic integration to be my specific area of *interest* within international relations.” (male, PhD degree awarded in 2011, international relations)

Some students are intrinsically driven by a desire to complete a previously initiated research project and present their findings to a broader audience, not just academic supervisor and reviewers. Eighty-seven percent of the doctoral students reported interest in and commitment to their research to be one of their motives for embarking on a PhD<sup>4</sup>.

Interview data shows that doctoral study often becomes some kind of a solace for candidates as they take comfort in doing what they truly like and enjoy. Many of the respondents contrasted doctoral studies with routine work outside academia (combining work with a PhD has been a widespread practice [Bekova et al. 2017]). Therefore, it is inherent interest that drives involvement in learning and individual research topic development.

“There is a permanent urge to develop, to write articles, to analyze what’s going on, to do something, to dig deeper and expand your horizons. On the one hand, it’s tough, but on the other, it gives you a new

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<sup>4</sup> Questionnaire item: “To what extent do you agree or disagree with the following statements concerning your reasons for doing a PhD?”

— I was interested in my research and wanted to take it further.”

Response options: “Strongly disagree”, “Somewhat disagree”, “Somewhat agree”, and “Strongly agree”.

flow in your life and gets you thinking.” (doctoral candidate, male, 4th year, mathematics and mechanics)

Research-motivated PhD candidates approach doctoral education as a hobby and need no additional external stimuli to spend their time on learning and research, which they enjoy inherently. In their narratives, doctoral study is represented as a higher-order activity as compared to routine work:

“Well, work is work, but doing some thesis-related research in the evening or on weekends is more about enjoyment, like a hobby... I think it’s pretty normal to want something more than just going to work and sitting there from 8 a. m. till 5 p. m. or from 9 a. m. till 6 p. m.” (doctoral candidate, male, 4th year, mathematics and mechanics)

#### 4.1.2. Interest in Learning

In some narratives, intrinsic motivation was manifested not in the interest in research but in the interest in learning, “love for learning”, or “self-improvement”. A drive for development thus regulates internally the involvement in learning:

“It’s that *personal interest in self-improvement* <...> Some kind of a *spiritual need* to move, to evolve, to be on the go.” (academic supervisor, female, philology).

Some doctoral students also regard doctoral programs as an educational level, which contradicts the popular belief in academia that making PhD a stage of formal learning was a failure of education policy as there was no demand for the educational component among PhD candidates [Shestak, Shestak 2015]. According to survey data, nearly one third of the respondents (31%) embarked on a doctoral journey for the purpose of professional development<sup>5</sup>.

Since doctoral programs are less structured than Bachelor’s and Master’s degree programs, a higher degree of autonomy and independence is required for their successful completion [Litalien, Guay 2015]. Intrinsic motivation, which implies internal regulation and self-determined behavior, thus becomes a critical factor of degree persistence. This was emphasized by academic supervisors as they talked about the decisive role of being interested in and committed to research:

“I mean, it is vitally important for a candidate to be truly interested and deeply motivated to do that specific research.” (academic supervisor, male, international relations)

<sup>5</sup> Questionnaire item: “Why did you decide to embark on a PhD?”

One of the response options: “I wanted to continue my professional development.”

Out of 10 possible response options, respondents were allowed to choose as many as applied.

Self-determined and autonomous, this type of motivation is resistant to external factors that can have a negative impact on the probability of enrolling in a doctoral program. According to academic supervisors, learning-oriented motivation remains fairly widespread in spite of the decreasing prestige of academic labor and the relatively low level of faculty compensation typical of the current state of science in Russia:

“As paradoxical as it may seem, there are still people interested in research <...> You may not believe, but some people have a propensity toward scientific inquiry <...> Some really get a kick out of it. They like to live like that.” (academic supervisor, male, chemistry)

- 4.1.3. Interest in Teaching      Interest in teaching and desire to be an educator in the future represent yet another type of intrinsic motivation, which was mentioned by both academic advisors and doctoral students. According to interview data, many PhD candidates have a passion for teaching, enjoy doing teaching internship projects, and willingly engage with students. For some of them, teaching at a university has been a dream:

“I realized that I loved teaching, I’ve been doing this for ten or eleven years now. As a freshman, I would tutor high school students, sophomores, juniors, and seniors <...> I’ve always enjoyed it, so I’ve realized that I *find it interesting to teach*.” (doctoral candidate, male, 2nd year, economics)

“They [doctoral candidates] all *dream* of teaching and giving lectures <...> Well, they *enjoy* doing teaching internships, for example—where they can give lessons and deliver material.” (academic supervisor, female, philology)

Survey results demonstrate that interest in teaching and desire to develop as an educator constitute a popular motive for embarking on a PhD (mentioned by 70%<sup>6</sup> of the respondents), though less popular than interest in the development of research skills (91%<sup>7</sup>). This find-

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<sup>6</sup> Questionnaire item: “To what extent do you agree or disagree with the following statements concerning your reasons for doing a PhD?

— I decided to embark on a PhD to develop my teaching skills.”

The following response options were available: “Strongly disagree”, “Somewhat disagree”, “Somewhat agree”, and “Strongly agree”.

The indicator was estimated as a sum of percentages of the respondents who selected the options “Somewhat agree” and “Strongly agree”.

<sup>7</sup> Questionnaire item: “To what extent do you agree or disagree with the following statements concerning your reasons for doing a PhD?

— I decided to embark on a PhD to develop my research skills.”

The following response options were available: “Strongly disagree”, “Somewhat disagree”, “Somewhat agree”, and “Strongly agree”.

The indicator was estimated as a sum of percentages of the respondents who selected the options “Somewhat agree” and “Strongly agree”.

ing contributes a lot to the debate on the goals and content of doctoral education [Gruzdev, Terentev 2017; Maloshonok, Terentev 2019]. For instance, some educators suggest that doctoral programs should be divided into university teacher training programs and researcher training programs, often questioning the very feasibility of cultivating teaching competencies in doctoral students [Maloshonok, Terentev 2019]. However, survey findings show that many candidates consider teacher training to be an important component of doctoral studies. Moreover, 65% of the respondents reported having been motivated by a desire to develop both research and teaching skills, so the idea of such tracking in doctoral education can hardly be deemed viable.

**4.2. Extrinsic  
Motivation: PhD as an  
Important Step  
Towards Career  
Success, Professional  
Expertise, and Public  
Recognition**

The group of motives that can be attributed to extrinsic motivation under Deci and Ryan's theory also features quiet prominently in the interview data. Extrinsically motivated candidates do not approach doctoral study as inherently valuable but rather as a means to achieve non-academic goals. This type of motivation is characterized by a lower degree of autonomy, as involvement is largely regulated externally. All the types of extrinsic motivation identified by Deci and Ryan—external, introjected, identified, and integrated—can be observed in the interview data. Let us now dwell on each type in more detail.

With *external* regulation, candidate engagement is determined by rewards that will be obtained upon degree completion. Such rewards may include, first of all, various social benefits of doctoral education—postponement of military service and. The opportunity to postpone military service was reported as a motive for embarking on a PhD by 29% of male doctoral candidates, and 7% of the respondents referred to a desire to get a room in the halls of residence. The high incidence of such motives indicates imperfection of the current PhD admissions system and serves as an important argument in the debate on modernizing the PhD selection process, which is blamed for the low quality of candidates admitted [Terentev, Bekova, Maloshonok 2018].

Another salient reward is the doctorate degree as a qualification that opens doors to a variety of career prospects. In this case, candidates are driven by their desire to get a prestigious and high-paying job—not by inherent interest in research, teaching, or learning. Such behavior is nonself-determined and characterized by the lowest degree of autonomy, according to Deci and Ryan's theory. The respondents pointed out that it was often not only the degree as such but also the awarding university that mattered. University name thus becomes a brand that has a certain prestige behind it and functions as a signal in the employment market:

“I wanted to complete a program at a prominent university, you know... In the end, the name of the university you graduate from also plays a role in the job market.” (male, degree awarded in 2011, political science)

Some interviewees also underlined that a PhD may sometimes be wanted merely as a prefix, regardless of the program, research, and thesis content. The same type of motivation is observed in Bachelor's and Master's degree programs, where obtaining a diploma is the only factor regulating involvement in learning [Maloshonok, Semenova, Terentev 2015].

"I just needed to defend a thesis and get a degree. It's something like, you don't have to be a scientist but holding a PhD is a must."  
(female, degree awarded in 2017, political science)

Another type of extrinsic motivation featured in interviews with doctoral candidates and their academic supervisors may be assigned to the category of *introjected* motivation, where behavior is regulated by socially accepted norms, rules, values, and attitudes. The interviewees admitted that prestige and value of research and teaching still remained powerful factors driving youth into doctoral studies even if this choice contradicted candidates' salary aspirations. Besides, a doctoral degree in itself is an indicator of social status, even in the context of major shifts in the academic profession that are often criticized (see, for instance, [Senashenko 2017]).

"So far, the motives are ... some kind of prestige — prestige of teaching, of doing research maybe <...> I guess it's been a generation that shared those values — maybe the value of a PhD, of working at a university was transmitted by families. But now, it's fading away."  
(academic supervisor, male, sociology)

Prestige of holding a PhD is a significant factor affecting the decision to embark on a doctoral journey, almost 78% of the respondents having "strongly" or "somewhat" agreed that prestige had been among their motives.

Apart from doctoral degree diploma, competencies obtained in a doctoral program can also serve as an external regulator. By contrast with professional development — associated with "self-improvement" and "personal demand for development" (intrinsic motivation)—competency-oriented motivation is pragmatic, aimed at enhancing one's competitive edge in the labor market and expanding employment opportunities. In Deci and Ryan's theory, this would be *identified* regulation: embarking on a PhD and engaging actively in the learning process is perceived as a personally important step towards achieving an extrinsic, career-related goal. The degree of autonomy is higher here than with externally motivated behavior, as candidates consciously accept involvement as valuable, but regulation remains external, and behavior nonself-determined.

"Candidates are driven by motivation to acquire new profession-

al skills and expand their professional capacity, including employment opportunities.” (academic supervisor, male, jurisprudence)

“I believe most candidates are motivated by the opportunity to enhance their qualifications and become more demanded by employers in their field.” (academic supervisor, female, biology)

In some narratives, this type of identified motivation was regarded as a “social elevator” that opened additional opportunities for career promotion, especially in academia. Besides, academic supervisors pointed out that doctoral programs sometimes promoted geographic mobility of young researchers, facilitating emigration. Given the attractiveness of such a trajectory for the majority of youth, this type of motivation may exacerbate the problem of “brain drain”, which is still relevant for Russian science [Yurevich, Malakhov, Aushkap 2017].

“And then, they can move to another city, or another country. This sort of mobility-oriented motivation, it’s always been there.” (academic supervisor, male, mathematics and mechanics)

Survey data allowed evaluating the incidence of motives associated with different career orientations. Academic tracks — desire to work at a university or research institution — were found to be the most popular trajectories. Forty-seven percent of the doctoral candidates reported having embarked on a PhD because they had believed it would help them make a teaching career at the university or another educational institution, and 53% had expected doctoral programs to help them build a research career with the university or a research institution. At the same time, substantial percentages of the respondents mentioned better career opportunities at research (28%) and non-research (29%) positions beyond academia as a motive for engaging in doctoral education.

Finally, *integrated* type of regulation implies, in fact, a combination of intrinsic and extrinsic motivation. Although regulation remains extrinsic to behavior, involvement in that behavior is brought into congruence with one’s values, interests, needs, and feelings. In the context of this study, it can be illustrated by situations where thesis completion is interpreted as “summarizing” one’s professional development (external regulation is fueled by the academic community’s principles, and internal regulation comes from personal interest and zeal for self-development in a particular area). Decision to enroll in a doctoral program is therefore naturally assimilated by one’s system of values and interests.

“I hope this is how they want to draw a line under a certain number of years devoted to specific research. To summarize, if you will... their professional development. I mean, well, they’ve been do-

ing something, and someone already knows them, and they know someone too, and they understand something, but this has been all, sort of, dispersed.” (academic supervisor, male, mathematics and mechanics).

**4.3. Amotivation:  
Going Through the  
Motions and the  
Absence of Viable  
Alternatives**

Amotivation occurs when embarking on a PhD is not preceded by careful reflection and the candidate’s behavior is not significantly influenced by any intrinsic or extrinsic regulators. Effectively, this is an absence or lack of motivation. Amotivation is fundamentally different from the categories of intrinsic and extrinsic motivation analyzed above, amotivated behavior being the least intentional and autonomous of all.

A typical context in which amotivated behavior can be observed is where there are no career alternatives to embarking on a doctoral journey. Doctoral education thus becomes a manifestation of the so-called “inertia strategy” of merely proceeding along the current track, meaning that the choice is made either mechanically or as a matter of chance. Some narratives emphasized that such situations were especially typical of particular fields:

“I graduated from the MSU Faculty of Philology, and if you are a philology graduate, doing a PhD is pretty logical because you’re not drowning in job offers, you know.” (male, degree awarded in 2011, philosophy)

In some cases, being nudged by one’s academic supervisor, department, or another university unit appeared to be the deciding factor affecting one’s final decision. If a candidate has no significant reasons against deciding to pursue a PhD, they will agree to do so. In such narratives, agency is assigned to an external agent, not the internal one, and the candidates mostly talk in the passive (“I was advised”):

“Because, well, I was advised by the faculty to pursue a doctoral degree after graduation <...> They saw potential in me and advised that I should embark on a PhD <...> At first, I had no intention of doing so.” (male, degree awarded in 2011, economics)

Survey data indicates that candidates often enroll in doctoral study in the absence of viable alternatives (17%)<sup>8</sup> or regard their choice as a

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<sup>8</sup> Questionnaire item: “To what extent do you agree or disagree with the following statements concerning your reasons for doing a PhD?

— I decided to embark on a PhD because I had no other plans.”

The following response options were available: “Strongly disagree”, “Somewhat disagree”, “Somewhat agree”, and “Strongly agree”.

The indicator was estimated as a sum of percentages of the respondents who selected the options “Somewhat agree” and “Strongly agree”.

concurrence of circumstances (16%)<sup>9</sup>. As the candidate's behavior is nonintentional, nonautonomous, and not regulated extrinsically or extrinsically, amotivation is associated with a high risk of failure. However, interview data reveals the dynamic nature of motivation: in some cases, candidates who were amotivated at the very beginning would become involved in the process and develop intrinsic or extrinsic motives for engagement.

"I chose him as my supervisor when I was in my third year <...> I just liked the way he told about what he was doing, I got really interested. I wasn't going to do a PhD but he insisted, and then I realized I didn't want to leave, I just wanted to keep working here." (doctoral candidate, female, 4th year, chemistry)

An important factor of improving persistence and involvement of doctoral candidates with this type of motivation consists in creating an institutional and learning environment conducive to the development of a strong interest in learning and doing research, academic supervisors playing a critical role in providing such an environment.

## 5. Conclusion

The findings of this study show that academic motives (interest in doing research, teaching, and making an academic career) remain the strongest predictors of deciding to embark on a Ph D. This is in agreement with the earlier findings of a number of studies investigating the motives for doing a PhD in Russian universities [Shafranov-Kutsev, Yefimova, Bulasheva 2017; Zamaraeva 2013; Kapshutar 2016; Bekova et al. 2017; Mironos, Bednyi, Rybakov 2017]. At the same time, survey and interview data indicates that academic motives do not always imply the greatest degree of autonomy typical of intrinsic motivation in Deci and Ryan's terms. Doctoral education is often perceived as a way of developing competencies required for a successful academic career or as a way of enhancing one's qualifications without taking interest in the teaching and research "content" of the doctoral program.

The results also allow assessing the incidence of extrinsic (external to the PhD program) motives to enroll in doctoral study, such as postponement of military service, getting a room in the halls of residence, etc. Even though the percentage of respondents who reported such motives to have played a significant role in their decision to

<sup>9</sup> Questionnaire item: "To what extent do you agree or disagree with the following statements concerning your reasons for doing a PhD?"

— My embarking on a PhD was largely a concurrence of circumstances."

The following response options were available: "Strongly disagree", "Somewhat disagree", "Somewhat agree", and "Strongly agree".

The indicator was estimated as a sum of percentages of the respondents who selected the options "Somewhat agree" and "Strongly agree".

do a PhD was lower than that of respondents who mentioned motives associated with autonomous regulation, it was still fairly high. In addition, it turned out that many doctoral candidates had experienced a lack or complete absence of motivation (amotivation), adopting the “inertia strategy” and embarking on a PhD without careful reflection or viable alternatives.

Just as the survey responses, the interview data indicates that motivation can change throughout the learning process, so monitoring might be advisable [Mironos, Bednyi, Rybakov 2017]. Candidates who are externally motivated or even amotivated at the very beginning often find intrinsic motives in the process and become involved. Such involvement could be promoted by environmental factors conducive to autonomy and the development of intrinsic motivation, or the transition from extrinsic to intrinsic motives. Such factors may include an engaged academic supervisor or a department/laboratory encouraging scientific inquiry and creative thinking. Besides, admission of doctoral candidates to collaborative inquiry teams working on funded research projects is also vital to develop and maintain an interest in professional research [Mironos, Bednyi, Rybakov 2017].

Quantitative data on the incidence of different types of motivation provides new findings that may contribute to the debate on the problems and prospects of doctorate in Russia (see [Shestak, Shestak 2015; Bednyi 2017; Terentev, Bekova, Maloshonok 2018; Maloshonok, Terentev 2019]), particularly on the goals and content of doctoral programs. No substantiation was found for the popular idea of discriminating between the academic and teaching tracks and abolishing teacher training as a compulsory component of doctoral education. The findings obtained call into question the optimality of the existing practices and admission procedures in doctoral education and indicate the need to improve them. Although colleges were allowed in 2017 to consider individual attainment in the subject of major as part of admission tests, a great proportion of universities keep going by the old rules [Maloshonok, Terentev 2019]. Finally, the available data does not allow arguing absolutely for or against the current model where teaching is a critical component and the degree itself is regarded as a level of higher education. The fact that a considerable percentage of doctoral students approach the doctoral journey as an opportunity to continue their education shows that it may be not the model as such but the quality of its implementation that is the source of problems.

This study has some sampling limitations that should be taken into account in order to ensure adequate data interpretation. Both the interview and survey samples consisted of universities alone, which makes it impossible to extrapolate the findings to doctoral programs offered by institutes of the Russian Academy of Sciences and industry-specific research institutions. In addition, given that institutional differences exist even at the level of universities (see, for instance, [Bekova et al. 2017]), these findings should be regarded as a point of

departure for further research, and great caution is advised in generalizing them to doctoral education in Russia as a whole. The online questionnaire was not adapted from Deci and Ryan's model, so there are limited opportunities for theoretical interpretation of quantitative findings (hence the focus on quantitative data in the article). Besides, a research methodology based on self-report questionnaires and interviews is likely to induce social desirability bias, which is especially important in the context of the issue.

This study, therefore, should be regarded as the touchstone for theoretically grounded empirical research on the motivation to embark on and pursue a Ph D. Further research in this area may investigate the relationship between different types of motivation and the educational and research outcomes of doctoral candidates, such as publication rate, awards in competitions, participation in funded research projects, thesis completion, time-to-degree, etc. Particular attention should be given to the development of reliable instruments to measure doctoral motivation. So far, attempts have only been made outside Russia [Litalien, Guay, Morin 2015]. As for Russian studies, findings are limited to school and undergraduate education (Bachelor's, Specialist's, and Master's degrees) [Gordeeva, Sychev, Osin 2013; Semenova 2016]. Apparently, special instruments need to be designed and validated to measure doctoral students' motivational characteristics. Finally, it is important to analyze changes in their motivation and the factors driving those changes so as to elaborate specific, practical recommendations on providing conditions conducive to the development of intrinsic motivation for research and teaching among doctoral candidates.

**Appendix 1. Structure of the interview sample (doctoral candidates and academic supervisors)**

| Characteristics            |            | N  |
|----------------------------|------------|----|
| Doctoral candidates (N=18) |            |    |
| Gender                     | Male       | 6  |
|                            | Female     | 12 |
| Year                       | 1st        | 2  |
|                            | 2nd        | 4  |
|                            | 3rd        | 3  |
|                            | 4th        | 3  |
|                            | PhD holder | 6  |

**Appendix 2. Structure of the survey sample (doctoral candidates), N=354**

| Characteristics    |            | %  |
|--------------------|------------|----|
| Gender             | Male       | 55 |
|                    | Female     | 45 |
| Mode of attendance | Intramural | 93 |

| Characteristics             |                           | N  |
|-----------------------------|---------------------------|----|
| Fields of research          | Mathematics and mechanics | 3  |
|                             | Chemistry                 | 3  |
|                             | Biology                   | 2  |
|                             | Economics                 | 2  |
|                             | Jurisprudence             | 2  |
|                             | Political science         | 2  |
|                             | Education                 | 1  |
|                             | Philosophy                | 1  |
|                             | Philology                 | 1  |
|                             | Sociology                 | 1  |
| Academic supervisors (N=24) |                           |    |
| Gender                      | Male                      | 17 |
|                             | Female                    | 7  |
| Fields of research          | Economics                 | 4  |
|                             | Sociology                 | 4  |
|                             | Mathematics and mechanics | 3  |
|                             | Chemistry                 | 2  |
|                             | Biology                   | 2  |
|                             | Education                 | 2  |
|                             | Philosophy                | 2  |
|                             | Physics                   | 1  |
|                             | Jurisprudence             | 1  |
|                             | Psychology                | 1  |
|                             | Political science         | 1  |
|                             | Philology                 | 1  |

| Characteristics      |  | %  |
|----------------------|--|----|
| Type of funding      | Extramural                                       | 7  |
|                      | State-funded                                     | 86 |
|                      | Self-funded                                      | 14 |
| Academic disciplines | Mathematics and natural sciences                 | 16 |
|                      | Engineering, technology, and industrial sciences | 26 |
|                      | Social sciences                                  | 30 |
|                      | Education and pedagogical sciences               | 7  |
|                      | Humanities                                       | 15 |
|                      | Other  | 7  |

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# Thinking Skills in Teaching Practices: Relationship with Students' Achievement in Mathematics

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**Abstract.** The present-day knowledge society expects school education to ensure the development of higher-order thinking skills, such as novel problem solving. Experimental evidence shows that such skills can be developed in students by using classroom activities enhancing higher-order thinking skills more often. However, the impact of such activities on knowledge acquisition in specific disciplines, mathematics in particular, remains unclear. Data obtained in the longitudinal study Trajectories in

Education and Careers conducted on a TIMSS-PISA sample is used to evaluate the presence of teaching practices that promote higher- and lower-order thinking skills in the classroom and the correlations between those strategies, on the one hand, and teacher characteristics and mathematics achievement at the end of 9th grade, on the other hand. Teaching practices of both types were found to be related positively to student achievement in mathematics. Yet, teaching practices that promote higher-order thinking skills have a stronger positive effect on mathematics achievement gains between 8th and 9th grades, whereas the effects of practices implying lower-order thinking lose their significance or become negative a year later. It is also shown that the use of a specific type of teaching practices is not related to teacher credentials or qualifications.

**Keywords:** higher-order thinking skills, secondary school, mathematics, teaching practices, PISA, TIMSS, structural equation modeling.

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Today, economic transformations and technological progress increase the significance of higher-order thinking skills, classified among skills for the 21st century [Pellegrino, Hilton 2012; Griffin, McGaw, Care 2012]. Historically, education systems were focused on memorization and rote learning. However, as the role and incidence of automated labor and routine tasks have been progressively declining, pres-

ent-day high school graduates already need skills that will help them succeed in the ever-changing world [Froumin et al. 2018].

According to Benjamin Bloom's taxonomy of educational objectives [Bloom 1956], thinking skills required for learning can be represented as levels of thinking complexity. For example, analysis- and evaluation-oriented tasks imply higher cognitive effort and promote higher-order thinking skills, whereas procedural tasks, such as two-variable linear equations, involve lower-order thinking skills. Higher-order thinking skills include analyzing, evaluating, and creating, while lower-order thinking skills include remembering, understanding, and applying [Anderson, Krathwohl 2001].

Effectiveness of individual methods and techniques of promoting higher-order thinking has been widely discussed in literature. Yet, how more exposure to such teaching practices in the classroom will influence achievements in specific subjects is still an open question. Reducing the significance of lower-order thinking skills implies not only using other types of tasks but also shifting the whole paradigm of classroom interactions. Thus, tasks promoting lower-order thinking rather imply instructional influence, as primary focus is made on teacher's instructions on how to solve the task and what the correct answer should look like [Paniagua, Istance 2018; Obukhov 2014]. Tasks targeting higher-order thinking skills have no algorithmic solutions; they usually imply multiple steps and have more than one correct answer to them [Resnick 1987]. To be solved, they require a dialogical teacher-student interaction [Barr, Tagg 1995]. In both cases, a teacher's role in school learning remains pivotal, as teaching practices should seek to structure students' learning activities and encourage their engagement.

This study aims at analyzing the teaching practices promoting higher- and lower-order thinking skills as well as their relationship to secondary school students' mathematics achievements. Data of two international assessments, TIMSS<sup>1</sup> and PISA<sup>2</sup>, served as empirical basis for research. Russia is the only country where the same students participated first in the TIMSS-2011 and then in the PISA-2012<sup>3</sup>. The case of Russia is also very curious because international data shows that Russian middle school students are bad at solving tasks that involve higher-order thinking skills (e. g. matching information in a text

<sup>1</sup> Trends in International Mathematics and Science Study monitors trends in mathematics and science achievement every four years, at the fourth and eighth grades. It includes questionnaires for students, teachers, and school administrators: [timssandpirls.bc.edu](http://timssandpirls.bc.edu).

<sup>2</sup> Programme for International Student Assessment measures 15-year-olds' reading, mathematical, and scientific literacy every three years. It includes questionnaires for students and school administrators: [oecd.org/pisa](http://oecd.org/pisa)

<sup>3</sup> As part of the longitudinal study Trajectories in Education and Careers (TrEC), which involved TIMSS and PISA as its first waves. Detailed information on TrEC can be found in [Malik 2018] and at [trec.hse.ru](http://trec.hse.ru).

with information in a table), while being great at applying familiar algorithms and reproducing rote-learned material [Tyumeneva, Valdman, Carnoy 2014]. This difference in the performance of tasks requiring different levels of thinking skills was demonstrated for mathematics as well as science. Education programs in Russia are mainly oriented at using standard well-structured problems and memorizing algorithms [Bolotov, Sedova, Kovaleva 2012; Kapuza et al. 2017; Larina 2016; Froumin et al. 2018]. According to a national survey, most Russian teachers consider the development of higher-order thinking skills to be beyond the scope of school education objectives [Dobryakova, Yurchenko, Novikova 2018]. Therefore, it appears important and relevant to explore the results of using teaching practices that promote higher- and lower-order thinking skills in the Russian context.

The following research questions are addressed in this study:

1. What is the relationship between the teaching practices promoting lower- and higher-order thinking skills and the professional characteristics of math teachers?
2. Is there a difference in the relationship between the teaching practices promoting lower- and higher-order thinking skills and students' mathematics achievements at the end of secondary school?

### **1. Review of Available Literature on the Relation of Teaching Practices with Students' Thinking Skills and School Achievements**

The relationship between specific teaching methods and techniques and students' achievement in mathematics has been widely studied across different countries and education systems. Research has involved data obtained in large-scale assessments in education as well as experimental classroom studies. Classroom teaching practices are usually divided into two groups. The first one includes tasks encouraging students to memorize facts, formulae, and rules for solving routine problems, while the other one includes tasks requiring students to process information individually, use information technology, work in small groups, etc. International researchers usually refer to practices from the former group as traditional, whereas references to the latter one are less consistent, including "modern" [Bietenbeck 2014; Lavy 2016], "inquiry-based" [Miri, David, Uri 2007], "active learning" [Cordero, Gil-Izquierdo 2018], and others. Given the nature of tasks, these two groups can also be referred to as practices promoting lower- or higher-order thinking skills. Abbreviations "LO practices" and "HO practices" will be used hereinafter in this study to refer to the two types of tasks used by teachers in the classroom. Teaching practices are interpreted here as a set of teacher's classroom activities, including teaching methods, specific techniques, and forms of classroom organization.

Experimental evidence shows that exposure to teaching practices that target higher-order thinking skills is positively related to the

development of this skills in students. For example, a longitudinal experimental study showed a positive relationship between such HO teaching strategies as dealing with real-life problems and encouraging open-ended class discussions and the level of students' critical thinking skills, which are classified as higher-order thinking skills [Miri, David, Uri 2007]. Another study with a similar design revealed that using HO practices in the classroom promoted conceptual understanding of content, drawing connections between facts and ideas, and encourage students to use higher-order thinking skills in problem solving [Baumert et al. 2010]. As a result, HO practices turned out to be positively related to students' mathematics achievements at the end of the tenth grade even if nine-grade performance was controlled for.

At the same time, HO teaching practices are also positively related to the development of lower-order thinking skills. Jacquelyn F. Gamino with co-authors assessed the impact of the Science Mathematics and Research for Transformation (SMART) program on two types of reasoning skills, fact-learning (i. e. LO thinking skills) and gist-reasoning (i. e. HO thinking skills) [Gamino et al. 2010]. Within the SMART program, teachers used tasks targeting HO thinking skills, where students had to learn to abstract meaning from texts by omitting unimportant details and summarizing. In another group, teaching practices were designed to develop rote memorization. Use of the SMART program was found to be positively related to both fact-learning and gist-reasoning. Meanwhile, LO practices only contributed to fact-learning performance.

The positive effects of HO practices on lower-order thinking skills was also demonstrated on a sample of seventh- and eighth-grade students in the United States [Cohen et al. 1997]. Students in the classrooms where social sciences were taught using HO practices (open-ended group work activities encouraging student interactions) performed much better on the tasks requiring higher-order thinking than their peers in the control classrooms. Meanwhile, no difference in performance between the experimental and control classrooms was found in the tasks requiring fact memorization, i. e. lower-order thinking.

Finally, the use of HO practices correlates positively with progress in students' self-regulation skills. An experimental study showed that higher-order strategy training improved inhibitory control<sup>34</sup>ability to control one's impulsive and automatic responses<sup>34</sup>among 12- to 15-year-olds [Motes et al. 2014]. In its turn, inhibitory control as part of executive functioning is positively related to students' math achievement (see, for instance, [Bull, Lee 2014; Liew 2012]).

Given the confirmed positive effects of HO practices on various thinking skills, one may assume that they can also be positively related to academic achievements. Otherwise speaking, if a math teacher begins to use, say, real-world problems more often, students' outcomes are expected to improve. However, an overwhelming majority of stud-

ies only reveal a positive correlation between traditional (LO) teaching practices and achievement in secondary school, whereas the effects of HO practices are either insignificant or negative in both mathematics and science. For instance, Spanish researchers used PISA and TALIS<sup>4</sup> data to find out that traditional teaching methods had a positive influence on PISA scores in mathematics, whereas more innovative active learning strategies had a negative impact on student achievement [Cordero, Gil-Izquierdo 2018]. Similar findings were obtained from TIMSS data in the United States [Bietenbeck 2014] (mathematics and science) as well as in longitudinal studies conducted in the U.S. [Schwerdt, Wuppermann 2011] (mathematics and science) and Israel [Lavy 2016] (mathematics, science, Hebrew, and English). Finally, the Russian longitudinal study Trajectories in Education and Careers (TrEC) based on TIMSS and PISA data demonstrated that PISA scores in mathematics were positively related to exposure to formal mathematics concepts in the classroom and negatively related to exposure to applied mathematics concepts [Carnoy et al. 2016].

Despite confirmed impact of teaching practices on student achievement, most studies exploring the factors of academic performance at school zero in on teachers' professional characteristics [Hanushek, Rivkin 2006; Ladd 2008; Wayne, Youngs 2003]. In particular, a significant positive correlation was found between student achievement and teacher credentials and qualifications [Carnoy et al. 2016; Clotfelter, Ladd, Vigdor 2007], years of experience [Clotfelter, Ladd, Vigdor 2007; Rivkin, Hanushek, Kain 2005; Tyumeneva, Khavenson 2012], and the Russia-specific characteristic of teacher category [Carnoy et al. 2016; Zakharov, Carnoy, Loyalka 2014]. For instance, student performance was found to be positively related to teachers' mathematics preservice training in university mathematics departments rather than faculties of education [Carnoy et al. 2016]. Effects of such teacher characteristics manifest themselves most notably in the academic performance of students from families of middle and high socioeconomic status.

As we can see, the studies carried out so far rather indicate a negative or insignificant relation between HO practices and mathematics achievement. However, a number of limitations should be considered that are typical of data collection methods used in those studies. First, PISA mostly obtains information on classroom teaching practices from the student questionnaire, with the exception of few countries [OECD2013]. Meanwhile, dispersed opinions among students may result in assessment bias. Second, surveys collect information on teaching practices simultaneously with testing, whereas experimental studies allow to evaluate the delayed effects of teach-

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<sup>4</sup> Teaching and Learning International Survey: <http://www.oecd.org/edu/school/talis.htm>

ing practices, measuring the performance of both teachers and students at least twice. Attempts to assess the delayed effects using longitudinal data have been made in a number of studies, but they only analyze teachers' characteristics, not the practices that they use [Clotfelter, Ladd, Vigdor 2007; Rivkin, Hanushek, Kain 2005; Wayne, Youngs 2003]. Finally, the relationship between teaching practices and student achievement may differ depending on the characteristics and specific features of education systems [Caro, Lenkeit, Kyriakides 2016].

This study attempts to overcome the limitations of international surveys as sources of information on the relationship between teaching practices and school students' mathematics achievement. On the one hand, we use the TIMSS teacher questionnaire to find out what types of tasks teachers use in the classroom and how often, thus solving the problem of assessment reliability. On the other hand, our data is longitudinal, allowing to evaluate the delayed effects of different teaching practices. Longitudinal data will help us answer, using a value-added production function, the question, how exposure to tasks targeting higher- and lower-order thinking skills is related to students' mathematics achievements.

## **2. Research Methodology**

### **2.1. Data**

The study uses data from the first two waves of TrEC — the international assessments TIMSS-2011 (eighth grade) and PISA-2012 (ninth grade) conducted in Russia on the same representative sample of students. A total of 4,893 students from 231 classes participated in the study in 2011 and 4,472 students from 229 classes participated in 2012. For the purposes of this study, only teachers who had taught the participating students since at least the eighth grade were included in the sample. The resulting sample thus comprised 3,472 students and 185 teachers of mathematics.

### **2.2. Variables**

Student achievement was measured using the TIMSS and PISA instruments and converted to a 1,000-point scale. We used standardized TIMSS and PISA scores in mathematics. In both assessments, students' performance is represented as five probabilistic scores; Rubin's combination rules were applied to include probabilistic scores in our analysis [Rubin 1987].

In addition to student performance data, we also used data obtained from the 2011 and 2012 contextual questionnaires for students, teachers, and principals. Teacher questionnaires provided data on teachers' educational background and category, type of school and math program, and teaching practices. The question about teaching practices used in mathematics classes was asked as part of the TIMSS-2011 (eighth grade): "In teaching mathematics to this class, how often do you usually ask students to do the following?" (Question 19). Teachers were asked to choose one of four response options

(“Every or almost every lesson”, “About half the lessons”, “Some lessons”, or “Never”) for each of eleven teaching practices:

- a) Listen to me explain how to solve problems
- b) Memorize rules, procedures, and facts
- c) Work problems (individually or with peers) with my guidance
- d) Work problems together in the whole class with direct guidance from me
- e) Work problems (individually or with peers) while I am occupied by other tasks
- f) Apply facts, concepts, and procedures to solve routine problems
- g) Explain their answers
- h) Relate what they are learning in mathematics to their daily lives
- i) Decide on their own procedures for solving complex problems
- j) Work on problems for which there is no immediately obvious method of solution
- k) Take a written test or quiz

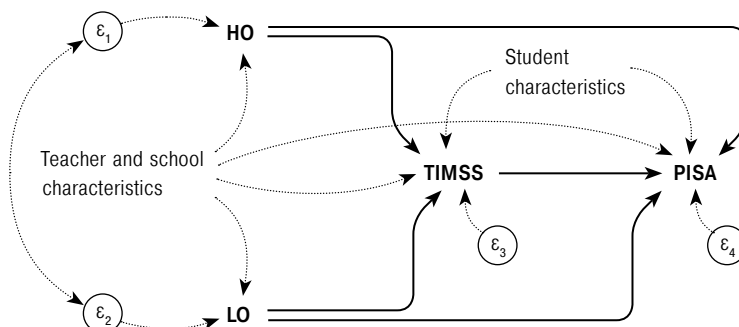
Analysis also included control variables. Firstly, there was a students' socioeconomic status, because it has been proven by a number of studies to be a strong predictor of academic achievement, in mathematics in particular [Kuzmina 2016; Chirkina 2018; Khavenson, Chirkina 2019]. Socioeconomic status of students was measured using two indicators from the student questionnaire, mother's education (1 for mothers who have a Bachelor's degree or above, and 0 if otherwise) and the number of books at home (1 for more than 100 and 0 for less) [Khavenson 2016; Bodovski, Chykina, Khavenson 2019]. Secondly, we used a population size obtained from the questionnaire for school principals as well as aggregated class characteristics, such as class size, percentage of female students, and average socioeconomic status of students. Descriptive statistics for all the variables used for analysis is given in Appendix 1, and for teachers' responses to questions on teaching practices, in Appendix 2.

### **2.3. Analysis Strategy**

Structural equation modeling (SEM) was used to answer the research questions. A few models of mathematics teaching practices were constructed and assessed using confirmatory factor analysis in order to construct scales for LO and HO teaching practices. Then, the relation of the two types of practices to teacher and class characteristics was assessed using SEM.

SEM was also used to find out whether there was any difference in the impact of relationship between HO and LO teaching practices and mathematics achievement at the end of secondary school (Figure 1). At this stage, relationship between the teaching practices and mathematics achievement in the eighth (TIMSS) and ninth (PISA) grades was assessed, while controlling for student, class, teacher,

Figure 1. Full analysis model



and school characteristics. Since data was clustered, regression residuals were corrected using the Huber–White robust standard errors.

Three groups of models were created to analyze the relationship between teaching practices and student performance in the two assessments. Dependent variables were represented by TIMSS scores in mathematics in the first group, PISA scores in mathematics in the second one, and PISA scores while controlling for TIMSS performance in the third one (full model) (Figure 1). Three models were constructed in each group, LO practices being the independent variable in the first one, HO practices in the second one, and both types of practices in the third one. All the models controlled for student, teacher, and school characteristics.

### 3. Results

#### 3.1. Constructing the types of mathematics teaching practices

According to a revised version of Bloom’s taxonomy of thinking skills [Anderson, Krathwohl 2000], teaching practices were classified under one of the two types depending on whether they targeted lower- or higher-order thinking skills (Table 1).

Next, confirmatory factor analysis was used to test a two-factor model of teaching mathematics to a class (four practices within each factor). The total of three models were tested. Model 1 included all practices as a single factor, Model 2 discriminated between the LO and HO factors in compliance with the theoretical model, and Model 3 controlled for covariance between the two factors. As judged by the fit indices, Model 3 describes the data best of all (Table 2).

Figure 2 presents the confirmed factor structure and factor loadings for each teaching practice. Within the HO factor, the highest factor loadings are observed for j) “work on problems for which there is no immediately obvious method of solution” and i) “decide on their own procedures for solving complex problems.” Within the LO factor, the highest factors loadings are observed for b) “memorize rules,

**Table 1. Distribution of classroom activities listed in Question 19 of the teacher questionnaire between the two types of teaching practices\***

| LO factor   | HO factor  |
|---|--|
| a) Listen to me explain how to solve problems                             | e) Work problems (individually or with peers) while I am occupied by other tasks |
| b) Memorize rules, procedures, and facts                                  | h) Relate what they are learning in mathematics to their daily lives             |
| d) Work problems together in the whole class with direct guidance from me | i) Decide on their own procedures for solving complex problems                   |
| f) Apply facts, concepts, and procedures to solve routine problems        | j) Work on problems for which there is no immediately obvious method of solution |

\*Lines c), g), and k) were excluded from analysis, as no response distribution was obtained for them.

**Table 2. Fit indices for the constructed models of teaching practices**

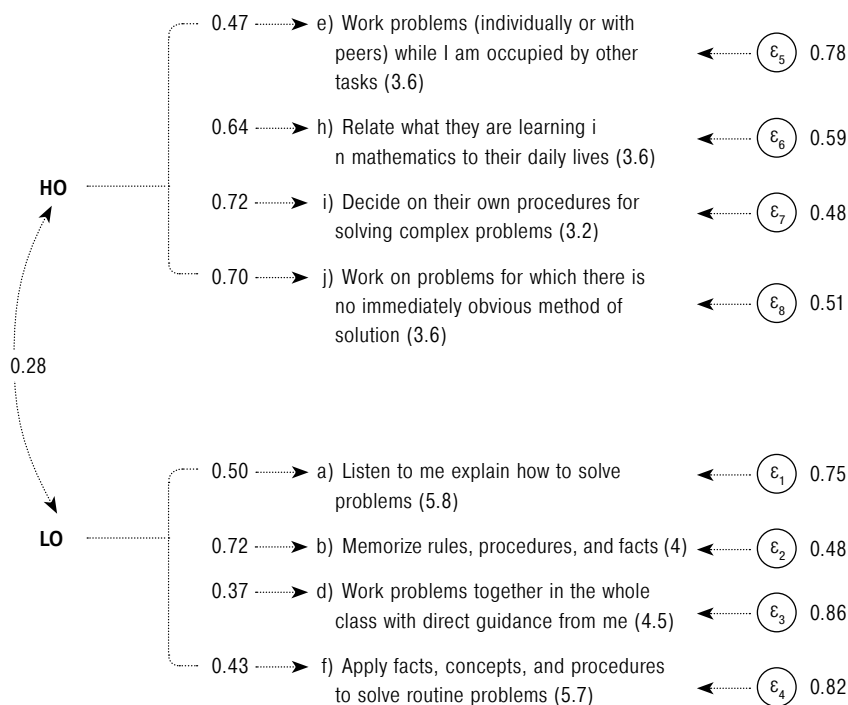
|   | One factor | Two factors | Two factors with covariance |
|---|------------|-------------|-----------------------------|
| RMSEA (Root Mean Square Error of Approximation) | 0.145      | 0.097       | 0.090                       |
| CFI (Comparative Fit Index)                     | 0.684      | 0.856       | 0.884                       |
| TLI (Tucker Lewis index)                        | 0.557      | 0.799       | 0.829                       |
| SRMR (Standardized Root Mean Square Residual)   | 0.105      | 0.091       | 0.064                       |

procedures, and facts”, and the lowest ones for d) “work problems together in the whole class with direct guidance from me.” The two factors are significantly related to each other, yet the correlation coefficient is low (0.28).

### 3.2. Relationship between mathematics teaching practices and teacher, class, and school characteristics

The use of the specified teaching practices is not related to such teacher characteristics as category or preservice degree, yet it is related to some of the class and school characteristics (Table 3). LO practices are less likely to be used in advanced math classes as well as in medium-sized cities and large towns (with populations of 100,000–500,000) as compared to densely populated urban areas (cities with populations of over 500,000). However, these coefficients have low levels of significance. As for HO practices, the relationship with population size is nonlinear: HO practices are more likely to be used in schools located in remote rural areas (less than 3,000 people) and small towns or villages (50,000–100,000) than in large cities. While controlling population size, teachers are using HO practices in large classes more often.

Figure 2. **Factor structure of the types of mathematics teaching practices**



### 3.3. Relationship between teaching practices and students' mathematics achievement

Let us first examine the results for the first and second groups of models in which the relationship between teaching practices and students' scores is analyzed separately for TIMSS and PISA (Table 4). LO practices show no significant correlation with TIMSS scores, while a one-SD increase in exposure to HO practices improves mathematics achievements by 0.7 SD (Table 4, Models 1 and 2). Initially, LO practices are significantly positively related to PISA scores. The relationship between HO practices and PISA performance is significantly positive, no matter whether LO practices are controlled for or not. In both cases, a one-SD increase in exposure to HO practices in the classroom improves mathematics achievements by 0.71 and 0.75 SD, respectively. Importantly, when both types of practices are included in the model, the LO correlation coefficient changes radically for both TIMSS and PISA and becomes significantly negative.

Analysis of the third group of models, with PISA scores as the dependent variable and TIMSS scores being controlled for, shows the same positive relationship between LO practices and PISA scores (Table 5) as without controlling for TIMSS scores (Table 4, Model 4).

**Table 3. Characteristics of teachers and classrooms in which LO and HO practices are used**

|   | Type of teaching practices |                   |
|---|----------------------------|-------------------|
|   | LO                         | HO                |
| Teacher preservice (Reference category: math education degree): math degree | -0.00<br>(0.09)            | -0.09<br>(0.07)   |
| Teacher preservice: no math education                                       | -0.10<br>(0.08)            | -0.06<br>(0.07)   |
| Type of school (1 = lyceum/gymnasium)                                       | -0.03<br>(0.10)            | 0.05<br>(0.08)    |
| Advanced math class (1 = Yes)   | -0.20*<br>(0.12)           | 0.01<br>(0.07)    |
| Teacher category (Reference category: highest): first                       | 0.09<br>(0.07)             | -0.00<br>(0.06)   |
| Teacher category: second or none  | -0.05<br>(0.11)            | 0.07<br>(0.10)    |
| Classroom size  | -0.01<br>(0.01)            | 0.02***<br>(0.01) |
| Percentage female (%)   | -0.21<br>(0.26)            | -0.02<br>(0.23)   |
| Books at home: 100+ (%)   | 0.09<br>(0.25)             | 0.17<br>(0.20)    |
| Mother's education: Bachelor's degree or above (%)                          | 0.13<br>(0.22)             | 0.10<br>(0.16)    |
| Population (Reference category: over 500,000): 100,000–500,000              | -0.23*<br>(0.13)           | 0.10<br>(0.09)    |
| Population: 50,000–100,000  | -0.15<br>(0.19)            | 0.24**<br>(0.12)  |
| Population: 15,000–50,000   | -0.03<br>(0.11)            | 0.15*<br>(0.08)   |
| Population: 3,000–15,000  | -0.10<br>(0.11)            | 0.14<br>(0.10)    |
| Population: less than 3,000   | -0.07<br>(0.13)            | 0.45***<br>(0.17) |
| N of observations   | 3,414                      | 3,414             |

Standard errors in parentheses

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

However, the trend of the previous models persists: as soon as the use of HO practices is controlled for, the relationship between LO practices and PISA scores becomes negative, even though insignificant. Meanwhile, the relationship between HO practices and PISA perfor-

Table 4. **The impact of teaching practices on TIMSS and PISA scores**

|                         | TIMSS             |                   |                    | PISA              |                   |                    |
|-------------------------|-------------------|-------------------|--------------------|-------------------|-------------------|--------------------|
|                         | (1)               | (2)               | (3)                | (4)               | (5)               | (6)                |
| LO practices            | 0.01<br>(0.01)    |                   | -0.27***<br>(0.01) | 0.11***<br>(0.02) |                   | -0.16***<br>(0.03) |
| HO practices            |                   | 0.70***<br>(0.02) | 0.78***<br>(0.02)  |                   | 0.71***<br>(0.02) | 0.75***<br>(0.03)  |
| Number of books at home | 0.15***<br>(0.01) | 0.15***<br>(0.01) | 0.15***<br>(0.01)  | 0.17***<br>(0.02) | 0.17***<br>(0.02) | 0.17***<br>(0.02)  |
| Mother's education      | 0.11***<br>(0.01) | 0.11***<br>(0.01) | 0.11***<br>(0.01)  | 0.10***<br>(0.02) | 0.10***<br>(0.02) | 0.10***<br>(0.02)  |
| Control variables       | Yes               | Yes               | Yes                | Yes               | Yes               | Yes                |
| Constant                | -0.29***          | -0.20***          | -0.24***           | -1.00***          | -0.97***          | -1.01***           |
| N of observations       | 3,394             | 3,413             | 3,357              | 3,394             | 3,413             | 3,357              |

Standard errors in parentheses

\* p&lt;0.1; \*\* p&lt;0.05; \*\*\* p&lt;0.01.

Table 5. **Relationship between teaching practices and PISA scores, with TIMSS scores being controlled for**

|                             | PISA scores, when controlling for TIMSS scores |                   |                   |
|-----------------------------|--|-------------------|-------------------|
|                             | (7)  | (8)               | (9)               |
| LO practices                | 0.10***<br>(0.02)                              |                   | -0.01<br>(0.03)   |
| HO practices                |  | 0.32***<br>(0.02) | 0.31***<br>(0.03) |
| TIMSS scores in mathematics | 0.59***<br>(0.01)                              | 0.56***<br>(0.01) | 0.56***<br>(0.01) |
| Number of books at home     | 0.08***<br>(0.01)                              | 0.09***<br>(0.01) | 0.09***<br>(0.01) |
| Mother's education          | 0.03*<br>(0.02)                                | 0.04*<br>(0.02)   | 0.04*<br>(0.02)   |
| Control variables           | Yes  | Yes               | Yes               |
| Constant                    | -0.83***                                       | -0.85***          | -0.88***          |
| N of observations           | 3,394  | 3,413             | 3,357             |

Standard errors in parentheses

\* p&lt;0.1; \*\* p&lt;0.05; \*\*\* p&lt;0.01

mance remains positive, although the correlation coefficient is nearly twice as low as in the model that does not control for TIMSS scores, a one-SD increase in exposure to HO practices improving PISA scores by 0.31 SD.

While the coefficients of correlation between the number of books at home and PISA scores decrease little when controlling for TIMSS scores and retain the significance level of  $p < 0.01$ , the relationship between mother's education and PISA scores loses an essential part of its significance (Table 4, Models 4–6; Table 5, Models 7–9).

#### 4. Discussion

The findings of this study indicate that the use of teaching practices promoting both higher- and lower-order thinking skills is positively related to students' mathematics achievements in the eighth and ninth grades. However, the effects differ in size, HO practices (such as “decide on their own procedures for solving complex problems”) proving to be much more effective. Such results are valid only if LO or HO practices are analyzed individually. When both types of practices are controlled for, the relationship between LO practices and mathematics achievement becomes either insignificant (eighth grade) or negative (ninth grade), while the impact of HO practices becomes even stronger.

A value-added production function was used to analyze the delayed effects of both types of practices on mathematics achievement. At the end of the academic year, correlations between HO and LO practices and achievement gains remain the same as they were at the beginning of the year. The impact of HO practices remains positive, though less significant, and that of LO practices loses its significance when controlling for previous achievement. In other words, the positive effects of teaching practices promoting higher-order thinking skills maintain their significance over a year.

This study thus demonstrates that using tasks that target higher-order thinking skills in the classroom is more preferable for improving mathematics achievement. The larger positive impact of HO practices was also confirmed when they were used together with LO practices, and even one academic year later. Otherwise speaking, such practices as solving complex problems or relating knowledge to daily lives have positive effects on mathematics performance in any situation, which is not the case with practices promoting lower-order thinking.

No significant correlations were found between the preferred type of teaching practices and teacher or classroom characteristics (such as percentage of female students, percentage of students from families of low socioeconomic status, etc.). LO practices are less likely to be used in advanced math classes, but this difference does not relate to the observed effectiveness of HO practices. Consequently, the more effective HO practices can be applied by all teachers and will be useful for teaching mathematics to classes of any type.

Theoretical value of this study consists in shedding light on the relationship between teaching practices promoting higher-order thinking skills and students' mathematics achievement. Our findings are inconsistent with those obtained in other studies that are also based on international student assessments. To some extent, it may be due to using a value-added production function and drawing information about teaching practices from teacher questionnaires in this study. However, taking into account the possible effects of national contexts, the revealed effects should be tested in other education systems as well.

The inferences made in this study have a high practical value for the contemporary school education policies concerned about developing skills for the 21st century. However, correct interpretation of results obtained from such large-scale surveys would apply to trends at the level of the whole student population. Further research is needed to develop more detailed recommendations for teachers. For example, it would make sense to analyze the impact of LO and HO practices on subsamples differing in students' socioeconomic status and academic performance. Martin Carnoy and his colleagues, for instance, showed that the relationship between teaching practices and academic achievement of Russian students from low socioeconomic backgrounds differed as a function of their previous achievement [Carnoy et al. 2016]. For this group of students with middle and high initial (TIMSS) math scores, exposure to formal mathematics in the classroom improved their achievements more effectively than exposure to applied math and word problems. Meanwhile, no significant correlation was found between achievements of initially low-achieving students and the types of practices used by teachers in the classroom. In addition, a number of studies have shown that teachers tend to choose teaching practices promoting higher- or lower-order thinking skills depending on students' previous achievement [Zohar, Alboher Agmon 2018; Zohar, Dori 2003]. Therefore, subsampling will make it possible to develop more specific guidelines on applying individual teaching practices to different groups of students.

Restriction of analysis to a single branch of knowledge limits the range of opportunities for interpretation. In our case, it is necessary to keep in mind that mathematics has always been regarded in Russia as a unique tool for promoting "intellectual development in mainstream school" [Kozlov, Kondakov 2011:36]. Mathematical education has been a significant factor of social segregation on the global scale [Jorgensen, Gates, Roper 2014]. Therefore, further research should measure the impact of different teaching practices on students' achievement in other subjects. Besides, it is important to point out that teacher self-report data was used in this study. Although such an approach may result in bias in assessing the exposure to particular practices [Kapuza, Tyumeneva 2016], direct observation would not have allowed answering the research questions asked in this study.

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## Appendix Appendix A. Descriptive statistics for variables included in analysis

|   | Mean  | SE   |
|---|-------|------|
| Standardized TIMSS scores in mathematics          | 0.02  | 0.12 |
| Standardized PISA scores in mathematics           | 0.04  | 0.11 |
| Population size: > 500,000                        | 0.31  | 0.46 |
| Population size: 100,000–500,000                  | 0.22  | 0.41 |
| Population size: 50,000–100,000                   | 0.08  | 0.27 |
| Population size: 15,000–50,000                    | 0.17  | 0.38 |
| Population size: 3,000–15,000                     | 0.14  | 0.35 |
| Population size: < 3,000                          | 0.08  | 0.27 |
| Teacher preservice: math degree                   | 0.14  | 0.35 |
| Teacher preservice: math education degree         | 0.67  | 0.47 |
| Teacher preservice: no math education             | 0.19  | 0.39 |
| School type: lyceum/gymnasium                     | 0.20  | 0.40 |
| Class size  | 21.07 | 4.77 |
| Percentage female                                 | 0.50  | 0.14 |
| Books at home: 100+, %                            | 0.33  | 0.19 |
| Mother's education: Bachelor's degree or above, % | 0.46  | 0.23 |
| Advanced math class                               | 0.13  | 0.33 |
| Teacher category: highest                         | 0.41  | 0.49 |
| Teacher category: first                           | 0.43  | 0.50 |
| Teacher category: second or none                  | 0.16  | 0.37 |
| Books at home: 100+                               | 0.33  | 0.47 |
| Gender=female                                     | 0.50  | 0.50 |
| Mother's education: Bachelor's degree or above    | 0.46  | 0.50 |

**Appendix B. Descriptive statistics for teachers' responses to Question 19 of the teacher questionnaire**

|   | Mean | SE   |
|---|------|------|
| In teaching mathematics to this class, how often do you usually ask students to do the following? |      |      |
| Listen to me explain how to solve problems  |      |      |
| Some lessons  | 0.08 | 0.27 |
| About half the lessons  | 0.21 | 0.41 |
| Every or almost every lesson  | 0.71 | 0.45 |

|   | Mean | SE   |
|---|------|------|
| Memorize rules, procedures, and facts   |      |      |
| Never   | 0.02 | 0.13 |
| Some lessons  | 0.19 | 0.40 |
| About half the lessons  | 0.43 | 0.50 |
| Every or almost every lesson  | 0.36 | 0.48 |
| Work problems together in the whole class with direct guidance from me        |      |      |
| Some lessons  | 0.16 | 0.37 |
| About half the lessons  | 0.33 | 0.48 |
| Every or almost every lesson  | 0.50 | 0.51 |
| Apply facts, concepts, and procedures to solve routine problems               |      |      |
| Some lessons  | 0.09 | 0.29 |
| About half the lessons  | 0.16 | 0.37 |
| Every or almost every lesson  | 0.75 | 0.44 |
| Work problems (individually or with peers) while I am occupied by other tasks |      |      |
| Never   | 0.02 | 0.13 |
| Some lessons  | 0.49 | 0.50 |
| About half the lessons  | 0.37 | 0.48 |
| Every or almost every lesson  | 0.13 | 0.34 |
| Relate what they are learning in mathematics to their daily lives             |      |      |
| Never   | 0.01 | 0.11 |
| Some lessons  | 0.49 | 0.50 |
| About half the lessons  | 0.36 | 0.48 |
| Every or almost every lesson  | 0.13 | 0.34 |
| Decide on their own procedures for solving complex problems                   |      |      |
| Never   | 0.17 | 0.37 |
| Some lessons  | 0.68 | 0.47 |
| About half the lessons  | 0.13 | 0.34 |
| Every or almost every lesson  | 0.02 | 0.16 |
| Work on problems for which there is no immediately obvious method of solution |      |      |
| Never   | 0.19 | 0.39 |
| Some lessons  | 0.72 | 0.45 |
| About half the lessons  | 0.09 | 0.29 |

# Fictitious Efficiency:

## What the Russian Survey of Performance of Higher Education Institutions Actually Assessed

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**Abstract.** Annual Survey of Performance of Higher Education Institutions, conducted in Russia since 2012, was used to identify “inefficient” universities, subject to measures including closure or merging with other schools. As a result of these policies, the number of Russian universities has decreased more than 1.5 times since 2013. In this article, we analyze the consequences of implementing the appraisal system invented by the Russian Ministry. We argue that the use of the Survey reflects a conceptual confusion between effectiveness

(the organization’s ability to achieve socially significant goals) and efficiency (the ability to achieve goals with minimal cost). The Ministry has made managerial decisions based on the Survey results (like merging a public university with an allegedly better performing HEI), which indicates understanding of the Survey as an assessment of efficiency. At the same time, statistical analysis of the performance indicators demonstrates that structural characteristics of universities (region and belonging to an institutionalized category, e. g. a pedagogical or an agrarian university) explain the significant part of the variance in the university’s performance. This led to discrimination against certain “unlucky” categories of universities. The methods used include logistic regression to estimate the odds of being labeled as an efficient organization in 2014 and the Cox proportional hazards model to estimate the university’s chances of survival between 2013 and 2017.

**Keywords:** performance assessment, organizational efficiency, higher education in Russia, Survey of Performance of Higher Education Institutions.

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The number of Russian universities decreased more than 1.5 times between 2012 and 2017 (from 2,130 to 1,314), and that of branch cam-

puses reduced by half, from 1,229 to 583<sup>1</sup>. Most often, the universities that disappear either have their licenses revoked as a result of an unscheduled inspection by the Federal Service for Supervision in Education and Science (Rosobrnadzor) (in case they are private) or merged with other institutions (in case they are public). What can be described, in terms of the population ecology of organizations [Hannan, Freeman 1977] as “organizational extinction” [Marion, Bacon 1999] has been an outcome of deliberate policy aimed at reducing the number of universities offering ersatz education. The Survey of Performance of Higher Education Institutions was supposed to become the main tool to identify such universities. The Survey was designed as a guidance for “optimizing the university network” as it was explicitly stated in a governmental resolution elaborating the Presidential decrees of May 2012<sup>2</sup>. This article is an attempt to find out how well the survey actually solved the task it had been supposed to solve.

Our main thesis is that a conceptual error was committed by the survey designers, who confused effectiveness with efficiency<sup>3</sup>. As a result, while being a relatively meaningful, though questionable, measure of effectiveness, the Survey was used as a measure of efficiency—inadequately so, as it measured “ascriptive” competitive advantages of universities instead. Below, we are going to show that rejection of “inefficient” universities on the basis of Survey results was in fact the policy of punishing the unlucky institutions which had no required “ascriptive” properties.

### **Effectiveness vs. Efficiency**

In organizational analysis, effectiveness is doing the right things, measured by the quality of output. Efficiency is doing things right. An organization producing more with the same costs is considered more efficient [Cameron, 1983; Witte, López-Torres, 2017]. Many successful organizations are efficient and effective at the same time, but this is far from always being the case [Ostroff, Schmitt 1993]. Universities’ efficiency has been studied by education economists focusing on the methods and statistical analysis as a measurement instrument<sup>4</sup>. Ef-

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<sup>1</sup> According to the website of the Main Data Processing Center of the Ministry of Education and Science: <http://indicators.miccedu.ru/indicators/>

<sup>2</sup> Decree No. 599 On Measures for Implementation of the State Policy in Education and Science: <http://kremlin.ru/acts/bank/35263>

<sup>3</sup> TN: Both “efficiency” and “effectiveness” are translated into Russian as *эффективность*, which is the word used in the name of the Survey.

<sup>4</sup> Data envelopment analysis (DEA) is the most popular method of studying universities’ efficiency. For a review of input- and output-oriented models used in different countries and a description of two possible models for Russia, see [Abankina et al. 2013]. Other studies in this field explore the impact of the excellence initiative “5–100 Project” on universities’ efficiency [Agasisti et al. 2018b] and the impact of universities on regional economic growth [Agasisti et al. 2018a].

fectiveness has been explored within the framework of organizational theory [Cameron 1986]. Few studies investigate both efficiency and effectiveness [Powell, Gilleland, Pearson 2012; Ostroff, Schmitt 1993].

Depending on whether an instrument should measure efficiency or effectiveness, it is designed to include inputs or outputs. Inputs are resources that are put into the university, such as average score of admitted applicants, tuition fees, or publications of newly-recruited researchers. Outputs are outcomes of the university's performance, such as graduate employment rate or publications per faculty member. It is not always possible to distinguish between the input and output indicators. Even the most straightforward metrics appear to be misleading: the quality of students is sometimes treated as an input, but the ability to attract better students may be regarded as an outcome of effective recruiting, which makes it an output [Edvardsen, Førsund, Kittelsen 2017].

Meanwhile, distinguishing between inputs and outputs and using both types of indicators in analysis is critical for measuring efficiency, as outputs alone are not enough to evaluate the university performance. Let us say, we have measured average salaries of university graduates. Can this data be used to assess university's efficiency? No. The university might have recruited gifted students who took care of their education themselves, being left to their own devices<sup>5</sup>. Where inputs are hard to measure directly, they can be measured through comparison with other universities in the same category.

Measurement of effectiveness relies more on outputs, as they allow to see whether an organization fulfills its mission. Inputs may be used as well, but only as an indirect indicator of outputs. Say, being unable to assess the quality of university research, an assessor will turn to R&D spending, reasoning that good research costs a lot, so cost-intensive research is more likely to be of high quality.

Application of measurement results is also determined by whether efficiency or effectiveness is assessed. Low efficiency requires punitive measures against administrators misusing the funds. Low effectiveness, however, does not imply finding a scapegoat, but it rather provides an opportunity to identify the centers of excellence to which heavier investments should be directed. Academic Ranking of World Universities, also known as Shanghai Ranking, is an example of a purely effectiveness-oriented instrument that uses the number of articles published and cited as an indicator but does not control for faculty size, thus ignoring average productivity [Kincharova 2014]. A ranking designed this way detects the most important centers of ex-

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<sup>5</sup> A review of studies showing that the fact of graduation from a top U.S. university adds nearly nothing to starting salaries, as Harvard recruits the best of the best who will succeed in life anyway, is presented in [Gerber, Cheung 2008].

cellence but does not show whether their success results from efficient use of the resources at hand.

The process of developing the Survey of Performance of Higher Education Institutions is shrouded in mystery. As far as we know, the names of its authors have never been publicized. Consequently, it remains unclear whether it was intended to measure efficiency or effectiveness. The internal logic of the survey can be analyzed by examining its structure and methods of implementation—but these two avenues lead to contradictory inferences. The way the Survey results were actually used indicates that it had been designed as a measure of efficiency. Indeed, merging with an allegedly better managed institution was the most widespread response to low university performance—which is only reasonable if low performance is interpreted as a result of poor management<sup>6</sup>. However, the next section demonstrates that structurally, the Survey consists predominantly of input-based characteristics, and thus could measure only effectiveness.

### **How the Survey Is Designed**

The numbers of organizations that participated in the Survey of Performance of Higher Education Institutions are given in Table 1. The number of participating universities differs from year to year, mainly due to organizational mortality. For instance, mergers affected 18 universities in 2014<sup>7</sup>, 40 in 2015, 28 in 2016, and only 10 in 2017. Meanwhile, not all the inefficient universities were closed or reorganized. Some of them were left out from the Survey for a year and then materialized again.

The Survey collects information on a few dozens of indicators, grouped into eight categories, (1) education, (2) research and development, (3) international activities, (4) financial and economic activities, (5) infrastructure, (6) employment, (7) faculty, and (8) additional characteristics. Each group is represented by one key indicator (changes in the number of variables within each group from year to year are reflected in Table 2). The key indicators are not integrated indexes; they are based on a single variable from the relevant group. Mean USE (Unified State Exam) score of enrolled applicants, for example, is the key indicator of education<sup>8</sup>. Somewhat unexpectedly, the indicator of research and development does not make allowance for publication productivity and only considers R&D spending per faculty member (R&D and creative project spending in art schools). Financial and economic activities are described as revenue from all sources per faculty member, international activities as the percentage of inter-

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<sup>6</sup> In [Guba, Zavadskaya 2017], it is shown that dissolution has not always followed “inefficiency” automatically; below, however, we are going to see that organizations labelled as inefficient had fewer chances of survival.

<sup>7</sup> The number of surviving entities.

<sup>8</sup> Art schools also take into account creative competition results, and military and sports universities consider the results of aptitude/fitness tests.

*Note:* An essential question in this study was that of the survey coverage. A comparison of data from the *Regions of Russia* statistical bulletin with the Survey findings from different years revealed the most noticeable discrepancy in the year 2013, but coverage improved subsequently (1 to 20% disagreement). Branch campuses were covered less than main ones by the Survey.

**Table 1. Number of higher education institutions participating in the survey**

|                              | 2013  | 2014  | 2015  | 2016 | 2017 |
|------------------------------|-------|-------|-------|------|------|
| Universities (main campuses) | 901   | 959   | 901   | 830  | 769  |
| Branch campuses              | 1,229 | 1,234 | 1,232 | 932  | 692  |

**Table 2. The number of university performance indicators in the eight major categories**

| Group of indicators               | 2013 | 2014 | 2015–2017 |
|-----------------------------------|------|------|-----------|
| Education                         | 8    | 11   | 15        |
| Research and development          | 8    | 16   | 16        |
| International activities          | 6    | 12   | 13        |
| Financial and economic activities | 4    | 3    | 4         |
| Infrastructure                    | 4    | 8    | 8         |
| Employment                        | 3    | 3    | 1         |
| Faculty                           | -    | 5    | 5         |
| Additional characteristics        | 16   | 16   | 59        |

national students, infrastructure as total floor area of laboratories per student, and employment as the percentage of students who did not apply for employment assistance. Additional indicators are estimated depending on university specialization. For non-specialized universities (all except art, sports, and military schools), the additional indicator is defined as the population of doctoral faculty per 100 students.

Most key indicators do not describe what could be unequivocally regarded as independent achievements, i.e. output- or outcome-based variables assessing the university's contribution to science, regional and national wellbeing. Exceptions include the number of international students, the attraction of which can be valued as a form of education export, and graduate employment (however, there is considerable doubt about assessment validity here). The Survey relies rather on inputs, which is always fraught with the risk of (i) overestimating the organizations that accumulate a lot of resources but cannot use them efficiently, (ii) overestimating the resources that have, in effect, low significance for organization success (is lab floor area really key to achieving the university's mission?), and (iii) (in case it was designed to measure efficiency) failing to distinguish between the university's own achievements and what came as a result of enjoying a favorable set of external parameters. Indeed, by the time the ineffi-

cient university shutdown initiative was launched, Russian universities had had a long evolutionary history and occupied certain niches that had not been chosen by the then effective administrators. Moreover, those niches were largely predetermined by universities' "ascriptive" characteristics—similar to those ascribed to individuals—that affected their status in university stratification [Sokolov 2017].

**The Impact of  
Ascriptive Charac-  
teristics on the  
Trajectory of  
University Develop-  
ment**

The past decade has seen ample literature on the factors affecting the trajectories of university development [Ramsden 1999; Warning 2004; Shin 2009; Zhang, Patton, Kenney 2013; Cattaneo, Meoli, Signori 2016; Boliver 2015; Gómez et al. 2009]. Most of the studies examine the influence of various characteristics on university research performance, while paying little attention to the education aspect. Accordingly, researchers mostly use bibliometric indicators as dependent variables. Table 3 presents a few studies, specifying the country of origin and the factors that they regard as determinants of university performance. As seen from Table 3, researchers used different approaches to university classification. However, the majority of the studies use, in some form or other, geographic and economic determinants as well as the effects of various national initiatives<sup>9</sup>.

Let us dwell on the studies of Italian universities as an example. How do structural determinants affect (if at all) performance indicators? Significance of the historic economic divide between northern and southern Italy was tested in [Mateos-González, Boliver 2019]. The authors suggest analyzing the structural predictors of organizational performance in the way that sociologists analyze the effects of economic, social, and cultural capital on individual achievement. The Italian system of higher education turned out to be an important case for structural determinant analysis, as the authors managed to demonstrate the impact of the regional factor, reflecting the difference in the socioeconomic status between northern and southern universities, on their research and education performance. For instance, it was found that students in northern Italy tend to sign up for more courses and spend less time on completing their programs, northern universities have a higher doctoral student enrollment, and publications of professors affiliated with northern universities are more likely to be found in international journals and cited.

Mattia Cattaneo and his colleagues [Cattaneo, Meoli, Signori 2016] investigate the impact of university characteristics on the number of publications produced by the faculty. As performance-based funding was introduced, an increase in the number of publications

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<sup>9</sup> In those countries, just as in Russia, universities are subject to a number of national excellence initiatives (see the far-right column of Table 3). When analyzing university performance, researchers use data obtained as a result of those initiatives, which is also true for this article.

Table 3. **Determinants of university performance**

| Publication                   | Country of origin | Determinants   | National initiatives      |
|-------------------------------|-------------------|--|---------------------------|
| Cattaneo, Meoli, Signori 2016 | Italy             | <ul style="list-style-type: none"> <li>• North–Center–South</li> <li>• Private/public</li> <li>• Size (enrollment)</li> <li>• Availability of a faculty of medicine or engineering</li> <li>• Legitimacy (based on analysis of media sources)</li> </ul>   | VQR, VTR                  |
| Gómez et al. 2009             | Spain             | <ul style="list-style-type: none"> <li>• Level of regional development (region's GDP as compared to the EU-25 average)</li> <li>• Private/public</li> <li>• Size (enrollment, faculty size)</li> <li>• Specialization (based on the distribution of doctoral faculty among nine domains of knowledge)</li> </ul>   | CEI Programme             |
| Warning 2004                  | Germany           | <ul style="list-style-type: none"> <li>• City population</li> <li>• Former Eastern/Western Germany</li> <li>• Size (enrollment)</li> <li>• Age</li> <li>• University with a medical school</li> </ul>  | DFG Excellence Initiative |
| Boliver 2015                  | Great Britain     | <ul style="list-style-type: none"> <li>• Universities/polytechnics</li> <li>• Age</li> </ul>   | RAE, REF                  |
| Ramsden 1999                  | Australia         | Combination of specialization and age: <ul style="list-style-type: none"> <li>• Sandstone universities (traditional academic education, founded before 1987)</li> <li>• Universities of technology (applied research, employment-oriented)</li> <li>• Wannabee sandstones (another category of universities founded before 1987)</li> <li>• New universities (founded after 1987)</li> </ul> | ERA                       |
| Shin 2009                     | South Korea       | Adaptation of the Carnegie's classification with due regard for university size and specialization   | Brain 21 Project          |
| Zhang, Patton, Kenney 2013    | China             | <ul style="list-style-type: none"> <li>• Size (faculty size)</li> <li>• Province's revenues</li> </ul>   | 985 Project, 211 Project  |

was more perceptible in the more popular universities — probably because it did not require much effort from them. Popularity was measured as a number of mass media articles mentioning the university. As in the previous study, universities in northern Italy were found to be more productive. In addition, big universities produced more publications, whereas private schools were less research-oriented.

A research team from the National Research University Higher School of Economics puts forward a few assumptions on how belonging to a certain “family” (institutionalized category) of Soviet universities (pedagogical, (poly)technic, etc. — see below) determined the choice of a specific trajectory of development [Kuzminov, Semenov,

Froumin 2013]. Another study links the ability of universities in a certain region to attract high school graduates to the region's migration attractiveness but never brings analysis to the level of individual universities [Abankina, Abankina, Filatova 2016]. One of the authors of the present study [Sokolov 2017] attempted to use logistic regression to evaluate significance of the "family" factor for the emergence of one of the types of university economies.

If we ignore such contextual factors, we will be unable to explain why this or that university occupied a certain niche in the ecology of higher education and, in particular, to what extent it used all of its growth opportunities. Consequently, we will be unable to say how efficiently it was managed. For instance, to assess the progress of an institution on its way to becoming a leading research university, it is not only managerial decisions that should be taken into account but also a number of objective "innate" characteristics that define the university's competitive status. Such characteristics include being located in a large city with a stimulating academic environment, region's wealth, university's age, specialization ensuring an inflow of financially reliable students and/or connections with growing industries, and being a historical monopolist in the local market. If the role of those factors in university performance is not considered, performance-based distribution of funding will promote further polarization in higher education [Abankina, Abankina, Filatova 2016; Talovskaya, Lisyutkin 2018] as well as degradation of institutions that lack the "innate" characteristics required to be high performers.

It was not that the Ministry did not see the pitfalls of using the Survey as a metric of efficiency. Allowance being made for the influence of university size on simple quantitative performance indicators, which had been proven for U.S. universities [Dundar, Lewis 1998], most indicators were standardized by being divided by the number of faculty members<sup>10</sup>. A specific indicator of "weighted enrollment" was used instead of employment for branch campuses. Besides, the baselines used by the Ministry to measure efficiency along the key indicators change as a function of geographic location (e. g. education baseline values differ between St. Petersburg and Moscow, and employment baselines were estimated for federal districts). However, the method of identifying those baselines is not transparent, so the justification behind them remains unclear. Meanwhile, their effects are rather dubious, as we are going to see below.

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<sup>10</sup> In this regard, the Survey designers were not too inventive in developing the key indicators and followed the established procedure. However, different approaches are possible. For example, [Calabrese et al. 2018] suggest using a "power law"-based method instead of linear dependence on size. Using the case of Italian universities, they demonstrate that this approach to performance indicator design reduces the effect of size-related bias.

Now, we are going to assess the extent to which performance indicators of individual universities in the Survey could be explained by efficient management or the effects of structural factors that made some key resources more or less accessible. We can analyze to what extent the assessment of university management efficiency was biased by the Survey's inability to control for the ascriptive factors—hence, it will become clear how good the Survey-based purging campaign was at detecting actually worse-performing institutions.

**Variables** The study is based on an analysis of key performance indicators of the universities participating in the Survey<sup>11</sup> in 2014. The number of participants was the highest that year, and certain subpopulations had not been reduced yet as a result of mergers and acquisitions. That is why the 2014 data is the most suitable for describing the institutional ecology of post-Soviet universities in all its diversity<sup>12</sup>. Originally, the sample consisted of 1,801 universities<sup>13</sup>, 822 main campuses and 979 branch campuses. However, primary data analysis revealed statistically significant differences between main and branch campuses. For each indicator, less than half of the branch campuses were found to be efficient, so only one quarter of branch campuses were ranked as efficient overall (Table 4). At the same time, the impact of some independent variables could not be assessed for branch campuses (in particular, some “families” had no branch campuses at all). Obviously, it would be reasonable to analyze main and branch campuses separately. In this article, we are zeroing in on main campuses.

The variables used in the Survey to rank universities as efficient or inefficient (described above) were used in this study as dependent variables. We also used overall efficiency as an aggregate of all the indicators (a university had to score above the baseline in any four indicators to be acknowledged as efficient). Independent variables were mostly ascriptive characteristics of an organization, i.e. the properties that it could not get rid of and that determined the amount of resources available. Two groups of those properties, geographic location and

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<sup>11</sup> Data was obtained from the website of the Main Data Processing Center of the Ministry of Education and Science, which contains detailed information on every university including branch campuses. The information requested was submitted by universities via a special form called “Monitoring in the Core Activities of Higher Education Institutions (Form No. 1-Monitoring).”

<sup>12</sup> There is a 1.1% disagreement between the number of main campuses listed as participants in the 2014 Survey and the data from the *Regions of Russia* statistical bulletin.

<sup>13</sup> We excluded universities under reorganization (no performance indicators were available for them) and those which recently absorbed other schools, as mergers could have affected their performance; therefore, the final sample is smaller than the number of universities covered by the 2014 Survey.

**Table 4. Percentages of universities efficient in the key indicators among branch and main campuses** (% of total number of universities in the group)

| Efficient in                      | Main campuses | Branch campuses |
|-----------------------------------|---------------|-----------------|
| Education                         | 57.18         | 27.07           |
| Research and development          | 72.26         | 33.09           |
| International activities          | 66.18         | 28.40           |
| Financial and economic activities | 56.20         | 47.19           |
| Infrastructure                    | 51.34         | 49.44           |
| Employment                        | 52.31         | –               |
| Reduced enrollment                | –             | 45.86           |
| Additional indicator              | 65.94         | 38.61           |
| Overall                           | 71.53         | 25.23           |

belonging to a “family”, have been widely discussed in literature on higher education.

Geographic location is naturally an ascriptive variable — Adyghe State University would find it difficult to move from the Republic of Adyghe. The concept of “geographic location as an ascriptive variable” also involves region-specific characteristics. We used the socio-economic development taxonomy of subjects of the Russian Federation [Federation Council of the Federal Assembly of Russia 2007] to classify regions depending on their relative wealth, economic structure, and migration attractiveness. This taxonomy divides all the regions into seven categories:

- A. Locomotives of growth
  - 1) Global cities
  - 2) Centers of federal importance (federal centers)
- B. “Backbone” regions
  - 3) Commodity-producing regions
  - 4) Old industrial regions
- C. Depressed regions
  - 5) Stagnating regions
  - 6) Regions in crisis
  - 7) Special regions (the special territories of Chechnya and Ingushetia)

Belonging to one of the “families”—pedagogical universities, schools of arts and culture, etc. [Sokolov 2017—requires some explanation. In the Soviet world picture, universities were producing staff for specific

economic sectors. As a rule, they were directly subordinate to the relevant government department, their names containing a relevant reference. In 1991, belonging to a “family” determined the university’s future in at least two senses. First, the relation to an economic sector determined prestige and attractiveness for prospective students. Second, it procured the numbers of state-funded places.

In a strict sense, the word “family” is only applicable to about 500 state universities that existed in the Soviet era. New universities, private and municipal in the first place, were not obliged to take names by the same template and usually ignored it. In addition, some old “families” consisted of only one university that had to supply workers for a small department. For instance, the Russian State University for the Humanities — during its time as Moscow State Institute for History and Archives — prepared archivists, and Moscow State Institute of International Relations trained diplomats. Such universities could not be used as a categorical variable in statistical analysis.

Eventually, we came up with a taxonomy based on the characteristics that have a critical impact on how the university is perceived by the Ministry and prospective students. The very basic characteristic is the founder, i. e. whether the university was state, private, or municipal. Next, we grouped state universities into categories by the major founders that had governed universities of a certain type since the Soviet times — the Ministries of Culture, Agriculture, and Health. Within the group of universities subordinate to the Ministry of Education, we identified two major categories — pedagogical and classical — that had standardized and common names (<City> State University). All the other state universities were divided into the broad categories of social sciences and humanities (if their names had a relevant reference), technical, and sports/military. The resulting taxonomy looks as follows:

- 1) Agrarian universities
- 2) Schools of arts and culture
- 3) Medical schools
- 4) Pedagogical universities
- 5) Classical universities
- 6) Sports and military universities
- 7) Technical universities
- 8) Universities for social sciences and humanities
- 9) Municipal universities
- 10) Private universities

**Results** First thing, we are going to show how being located in a regional capital affects university’s key performance indicators (Table 5).

Universities located in regional capitals differ from those in regular cities in all the indicators except financial and economic activities, but

**Table 5. Percentages of universities efficient in the key indicators in regular cities vs. regional capitals** (% of total number of universities in the group)

| Efficient in                      | Regular city | Regional capital |
|-----------------------------------|--------------|------------------|
| Education                         | 40.71        | 59.80            |
| Research and development          | 79.65        | 71.09            |
| International activities          | 69.03        | 65.73            |
| Financial and economic activities | 55.75        | 56.28            |
| Infrastructure                    | 68.14        | 48.66            |
| Employment                        | 47.79        | 53.03            |
| Additional indicator              | 76.99        | 64.17            |
| Overall                           | 76.99        | 70.66            |

only differences in education and infrastructure are statistically significant. Universities in regular cities show lower performance in education (probably because education on the periphery is less prestigious than in a central city), yet they are more likely to be efficient infrastructurally (probably due to a greater shortage of physical space in regional capitals).

Data provided in Table 6 allows tracing the correlations between the type of region and the percentage of universities efficient in some or other key indicators. At first glimpse, the “global cities” of Moscow and St. Petersburg demonstrate the lowest performance, unexpectedly. We assume, however, that the baselines for those cities were set unreasonably high. Other regions classified as “locomotives of growth” showed high performance. The lowest education-related characteristics (average USE scores) were observed in the rich commodity-producing regions, perhaps due to migration to global cities. Commodity-producing regions failed the internationalization indicators but took the first place in financial and economic activities, which largely depend on regional economic health, being naturally low in the regions in crisis<sup>14</sup>. A similar situation is observed with employment, and only infrastructure is the best in the regions in crisis, probably as a result of lower demand for real estate.

<sup>14</sup> A comprehensive analysis of universities’ research and economic performance indicators should also make allowance for differences in the level of prices and purchasing power across the regions, which sometimes amount to two-fold [Litvintseva, Voronkova, Stukalenko 2007]. We are grateful to the reviewer from *Voprosy Obrazovaniya / Educational Studies Moscow* for drawing our attention to this circumstance. At this moment, however, consideration of such differences is a direction for further research.

**Table 6. Percentages of universities (main campuses) efficient in the key indicators across regions of different categories** (% of total number of universities in the group)

| Indicator of performance          | Global cities | Federal centers | Commodity-producing regions | Old industrial regions | Stagnating regions | Regions in crisis | Special regions |
|-----------------------------------|---------------|-----------------|-----------------------------|------------------------|--------------------|-------------------|-----------------|
| Education                         | 51.19         | 70              | 50                          | 55                     | 59.26              | 59.02             | 60              |
| Research and development          | 52.78         | 86.15           | 78.13                       | 78.89                  | 80.86              | 78.69             | 60              |
| International activities          | 53.97         | 69.23           | 43.75                       | 79.44                  | 72.84              | 68.85             | 20              |
| Financial and economic activities | 52.78         | 60              | 84.38                       | 60                     | 52.47              | 47.54             | 40              |
| Infrastructure                    | 52.78         | 46.15           | 59.38                       | 46.11                  | 55.56              | 59.02             | 20              |
| Employment                        | 56.47         | 61.60           | 50                          | 57.31                  | 52.26              | 43.10             | 80              |
| Additional indicator              | 50.79         | 73.85           | 78.13                       | 71.11                  | 69.75              | 78.69             | 80              |
| Overall                           | 54.37         | 84.62           | 75                          | 77.78                  | 79.63              | 75.41             | 40              |

**Table 7. Percentages of universities efficient in the key indicators across different “families”** (% of total number of universities in the group)

|                                | Edu-<br>cation | Research<br>and devel-<br>opment | Interna-<br>tional<br>activities | Financial and<br>economic ac-<br>tivities | Infra-<br>structure | Employ-<br>ment | Addi-<br>tional<br>indicator | Overall |
|--------------------------------|----------------|----------------------------------|----------------------------------|---|---------------------|-----------------|------------------------------|---------|
| Agrarian                       | 17.65          | 90.2                             | 49.02                            | 60.78                                     | 72.55               | 35.29           | 82.35                        | 80.39   |
| Arts and culture               | 98.11          | 69.81                            | 81.13                            | 39.62                                     | 69.81               | 71.7            | 54.72                        | 88.68   |
| Medical                        | 60             | 90                               | 77.14                            | 70.71                                     | 53.57               | 52.86           | 84.29                        | 85      |
| Pedagogical                    | 88.64          | 59.09                            | 68.18                            | 63.64                                     | 29.55               | 50              | 77.27                        | 77.27   |
| Classical                      | 100            | 50.00                            | 82.61                            | 54.35                                     | 60.87               | 100             | 50                           | 93.48   |
| Sports and military            | 87.50          | 87.5                             | 75.00                            | 37.5                                      | 15.63               | 53.13           | 96.88                        | 87.5    |
| Technical                      | 82.56          | 88.37                            | 74.42                            | 76.74                                     | 41.86               | 44.19           | 97.67                        | 93.02   |
| Social sciences and humanities | 70             | 55                               | 40                               | 85  | 90                  | 80              | 60                           | 95      |
| Municipal                      | 65.31          | 63.27                            | 30.61                            | 65.31                                     | 65.31               | 57.14           | 67.35                        | 71.43   |
| Private                        | 31.56          | 63.12                            | 62.79                            | 43.52                                     | 46.84               | 52.57           | 45.18                        | 47.18   |

The number of universities efficient in education differs from “family” to “family” (Table 7), the highest performance being demonstrated by medical schools, schools of arts and culture, universities for social sciences and humanities, and pedagogical universities. The quality of students is lower in agrarian and private universities (but some of private universities scored zero on this indicator for not admitting can-

didates to state-funded places based on their USE scores). Different patterns are observed for performance in research and development, which is assessed as R&D spending. While agrarian universities rarely demonstrate high USE scores and, as a consequence, are rarely acknowledged as efficient in education, they are much more likely to score high in R&D spending. Meanwhile, medical schools and schools of arts and culture are highly efficient in education but less so in research and development.

No “family” of universities is perfectly efficient in international activities. Low performers can be found in every “family”, but their percentage varies from 17% among schools of arts and culture to 70% in the category of municipal institutions. Sports and military universities attract international students and faculty as rarely as agrarian ones, half of the institutions in both groups scoring under the baseline in international relations. Similar results are shown by classical, pedagogical, and technical universities, of which about one quarter are recognized as inefficient in this aspect.

Sports and military universities were found to be the most financially successful, no more than 15% of them being ranked as inefficient in financial and economic activities. In the rest of the categories, universities are much more likely to underscore, schools of arts and culture, private, and pedagogical universities being the least successful. In terms of infrastructural efficiency, the smallest lab floor area per student is observed for schools of social sciences and humanities and pedagogical universities, which are not actually in need of laboratories, given their specialization. The highest performance is demonstrated by sports and military universities (probably thanks to gym and stadium floor area), which are often found to be inefficient in other indicators. Only medical schools prove to be 100% efficient in employment. As for the other “families”, the inefficiency rate is rather high, ranging from 20% among sports and military universities to 50% among schools for social sciences and humanities, technical, and private universities. Agrarian institutions are most likely to perform below the baseline level, 65% of them being acknowledged as inefficient. In overall efficiency, private universities are the worst performers, only 47% of them being efficient, while the highest efficiency of 95% is observed among sports and military universities.

The next step in this study consisted in assessing the impact of various structural factors on the university performance indicators, while controlling for the rest of the factors. Binary logistic regression was used, with being ranked as efficient as the dependent variable and structural determinants as independent variables (Table 8).

On the whole, the binary logistic regression results are consistent with the descriptive statistics presented above. The probability of university being ranked as efficient along the key indicators varies across the types of region as well as across the “families”. For some “families”, low performance in one indicator is partially compensated

Table 8. **Marginal effects**

|                                   | Educa-<br>tion      | Research<br>and devel-<br>opment | Interna-<br>tional ac-<br>tivities | Financial and<br>economic<br>activities | Infrastruc-<br>ture  | Employ-<br>ment     | Additional<br>indicator | Overall              |
|-----------------------------------|---------------------|----------------------------------|------------------------------------|---|----------------------|---------------------|-------------------------|----------------------|
| Constant                          | 0.251<br>(4.738)    | 0.170**<br>(0.068)               | 0.055<br>(0.068)                   | 0.349***<br>(0.076)                     | -0.069<br>(0.070)    | -0.020<br>(0.360)   | 0.636***<br>(0.128)     | 0.349***<br>(0.079)  |
| "Family"                          |                     |                                  |                                    |   |                      |                     |                         |                      |
| Agrarian                          | -0.665*<br>(0.383)  | 0.030<br>(0.097)                 | -0.288***<br>(0.093)               | -0.209**<br>(0.093)                     | 0.291***<br>(0.067)  | -0.075<br>(1.179)   | -0.500***<br>(0.152)    | -0.295**<br>(0.138)  |
| Arts and culture                  | 0.204<br>(4.856)    | -0.168<br>(0.112)                | 0.141*<br>(0.072)                  | -0.416***<br>(0.064)                    | 0.277***<br>(0.069)  | 0.147<br>(3.260)    | -0.671***<br>(0.079)    | -0.076<br>(0.132)    |
| Technical                         | -0.236<br>(3.135)   | 0.090<br>(0.066)                 | 0.079<br>(0.067)                   | -0.123<br>(0.082)                       | 0.131*<br>(0.068)    | 0.046<br>(0.880)    | -0.438***<br>(0.161)    | -0.150<br>(0.111)    |
| Social sciences and<br>humanities | 0.068<br>(1.418)    | -0.244**<br>(0.120)              | 0.016<br>(0.094)                   | -0.214**<br>(0.100)                     | -0.121<br>(0.100)    | 0.018<br>(0.337)    | -0.507***<br>(0.150)    | -0.245*<br>(0.144)   |
| Medical                           | 0.389***<br>(0.025) | -0.470***<br>(0.099)             | 0.101<br>(0.084)                   | -0.284***<br>(0.086)                    | 0.194**<br>(0.081)   | 0.475***<br>(0.019) | -0.693***<br>(0.066)    | -0.005<br>(0.134)    |
| Pedagogical                       | 0.044<br>(0.898)    | -0.010<br>(0.119)                | 0.000<br>(0.109)                   | -0.402***<br>(0.072)                    | -0.288***<br>(0.099) | 0.041<br>(0.801)    | -0.058<br>(0.273)       | -0.149<br>(0.164)    |
| Sports and military               | -0.176<br>(2.370)   | -0.433***<br>(0.132)             | -0.350***<br>(0.121)               | 0.077<br>(0.157)                        | 0.434***<br>(0.052)  | 0.180<br>(4.266)    | -0.652***<br>(0.080)    | 0.040<br>(0.173)     |
| Municipal                         | -0.206<br>(2.652)   | -0.329***<br>(0.114)             | -0.425***<br>(0.084)               | -0.211**<br>(0.096)                     | 0.239***<br>(0.075)  | 0.074<br>(1.498)    | -0.629***<br>(0.098)    | -0.404***<br>(0.128) |
| Private                           | -0.455<br>(5.164)   | -0.215***<br>(0.076)             | -0.061<br>(0.067)                  | -0.395***<br>(0.064)                    | 0.064<br>(0.065)     | 0.040<br>(0.736)    | -0.720***<br>(0.089)    | -0.517***<br>(0.083) |
| Type of region                    |                     |                                  |                                    |   |                      |                     |                         |                      |
| Federal centers                   | 0.119<br>(2.522)    | 0.230***<br>(0.025)              | 0.169***<br>(0.040)                | 0.048 (0.055)                           | -0.102*<br>(0.057)   | 0.029<br>(0.543)    | 0.163***<br>(0.036)     | 0.199***<br>(0.028)  |
| Commodity-producing<br>regions    | -0.099<br>(1.574)   | 0.148***<br>(0.043)              | -0.040<br>(0.095)                  | 0.252***<br>(0.081)                     | 0.004<br>(0.101)     | -0.064<br>(1.022)   | 0.142**<br>(0.060)      | 0.072<br>(0.065)     |
| Old industrial regions            | -0.017<br>(0.310)   | 0.172***<br>(0.029)              | 0.243***<br>(0.035)                | 0.020 (0.051)                           | -0.076<br>(0.052)    | 0.005<br>(0.105)    | 0.111***<br>(0.038)     | 0.135***<br>(0.032)  |
| Stagnating regions                | 0.009<br>(0.182)    | 0.184***<br>(0.030)              | 0.196***<br>(0.039)                | -0.087<br>(0.056)                       | 0.020<br>(0.056)     | -0.035<br>(0.603)   | 0.068<br>(0.044)        | 0.128***<br>(0.035)  |
| Regions in crisis                 | 0.019<br>(0.370)    | 0.129***<br>(0.041)              | 0.148***<br>(0.052)                | -0.177**<br>(0.077)                     | 0.055<br>(0.077)     | -0.092<br>(1.408)   | 0.125**<br>(0.053)      | 0.074<br>(0.051)     |
| Special regions                   | -0.076<br>(1.270)   | -0.079<br>(0.209)                | -0.395*<br>(0.234)                 | -0.266<br>(0.213)                       | -0.258<br>(0.221)    | 0.165<br>(3.890)    | -0.004<br>(0.279)       | -0.389<br>(0.242)    |
| N                                 | 822                 | 822                              | 822                                | 822                                     | 822                  | 774                 | 882                     | 882                  |
| Percent correctly<br>predicted    | 0.746               | 0.758                            | 0.697                              | 0.641                                   | 0.623                | 0.624               | 0.719                   | 0.766                |
| McFadden's pseudo $R^2$           | 0.263               | 0.151                            | 0.109                              | 0.079                                   | 0.068                | 0.082               | 0.180                   | 0.201                |

\*\*\*  $p < 0,01$ ; \*\*  $p < 0,05$ ; \*  $p < 0,1$ .

Note: Reference categories: "family"—classical; type of region — global cities.

for by advantage in others. However, private, municipal, agrarian universities, and most probably universities for social sciences and humanities are definitely in less favorable positions than classical universities—the most advantaged category. Within regions, surprisingly, universities in regional capitals turn out to be the most disadvantaged, their efficiency being lower than in federal centers, old industrial regions, and stagnating regions.

### **Where the Reforms Have Led**

Therefore, being acknowledged as efficient or inefficient in conformity with the Survey of Performance of Higher Education Institutions was largely a function of university's ascriptive characteristics—and it was also the question of survival (avoiding closure or acquisition in 2013–2017) or organizational death. Cox proportional hazards model was used to assess that risk. Unlike logistic regression, the proportional hazards model includes a temporal component, i. e. how the influence of the factors changes over time. The event of university closing, merger, or acquisition was used as a dependent variable. Independent variables were represented by structural factors, and the model also included a time-varying covariate of efficiency (Table 9). Besides, we added an ecological variable that described competitiveness in the local education market, proceeding from an intuitively plausible assumption that universities facing fierce competition and a massive inflow of students from other cities would evolve differently from monopolists in a stagnating education market of a depressed region.

Being ranked as efficient is the decisive predictor of university survival. The risk of being closed<sup>15</sup> is seven times lower for efficient universities than for inefficient ones. The other factors remain significant even when the effects of efficiency are controlled for.

The impact of “family” decreases as efficiency is added to the model but remains significant at this stage—for instance, the risk of being closed is higher for private universities than for public ones even if private universities are ranked as efficient. On the contrary, medical schools, agrarian universities, and schools of arts and culture have a nearly zero risk of being closed even if they are recognized as inefficient (probably because closure for a public university normally implies a merger, and merging universities subordinate to different min-

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<sup>15</sup> One should discriminate between risk, hazard, and odds. Risk, or hazard, is the ratio of chances of being closed to the probability of all possible scenarios; odds are ratios of chances of being closed to chances of not being closed. The difference between risk and hazard is that risk is cumulative over a time span, and hazard is instantaneous. The Cox model estimates the hazard ratio between the groups at a particular time. Even though the hazard of being closed may change for each group over time, the ratio remains constant. That is, any time that we observe the groups, the hazard of being closed is seven times higher for private universities than for public ones, although the hazard for a specific group may change over time.

**Table 9. University closure risk assessment using the Cox proportional hazards model**

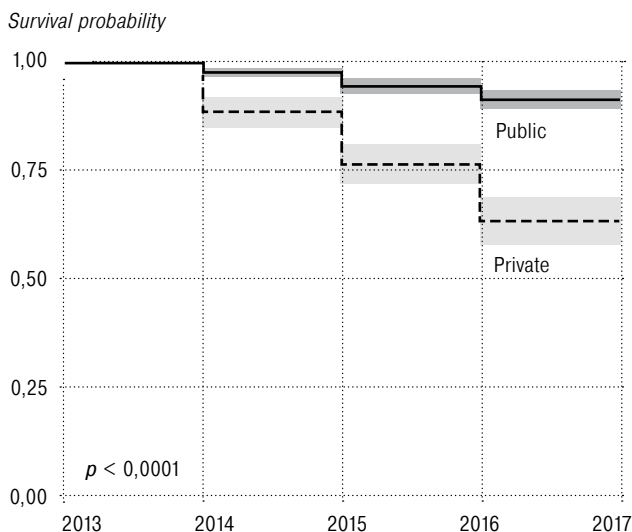
| Variable  | Model 1. Hazard ratio   | Model 2. Hazard ratio       |
|---|-------------------------|-----------------------------|
| Efficiency  |                         | 0.1434 (0.09459; 0.2174)*** |
| Competitiveness                                     | 1.006 (0.9994; 1.012)   | 1.005 (0.9994; 1.011)       |
| “Family” (Reference categories—classical)           |                         |                             |
| Agrarian  | 0.0 (0.0; 0.0)***       | 0.0 (0.0; 0.0)***           |
| Arts and culture                                    | 0.0 (0.0; 0.0)***       | 0.0 (0.0; 0.0)***           |
| Technical   | 5.269 (1.17; 23.73)*    | 5.159 (1.166; 22.83)*       |
| Social sciences and humanities                      | 6.902 (1.348; 35.33)*   | 6.433 (1.304; 31.73)*       |
| Medical   | 0.0 (0.0; 0.0)***       | 0.0 (0.0; 0.0)***           |
| Pedagogical   | 2.216 (0.2991; 16.42)   | 2.135 (0.3076; 14.82)       |
| Sports and military                                 | 6.53 (1.21; 35.23)*     | 6.361 (1.206; 33.56)*       |
| Municipal   | 4.593 (0.8982; 23.48)   | 4.057 (0.8229; 20)          |
| Private   | 15.13 (3.534; 64.78)*** | 11.98 (2.834; 50.63)***     |
| Type of region (Reference categories—global cities) |                         |                             |
| Federal centers                                     | 1.632 (0.7471; 3.566)   | 1.894 (0.883; 4.063)        |
| Commodity-producing regions                         | 1.684 (0.3587; 7.911)   | 1.796 (0.4081; 7.908)       |
| Old industrial regions                              | 2.35 (0.8795; 6.277)    | 2.554 (0.9744; 6.692)       |
| Stagnating regions                                  | 1.829 (0.6247; 5.355)   | 2.004 (0.7039; 5.707)       |
| Regions in crisis                                   | 2.855 (0.9101; 8.959)   | 2.85 (0.936; 8.677)         |
| Special regions                                     | 0.0 (0.0; 0.0)***       | 0.0 (0.0; 0.0)***           |
| R <sup>2</sup>                                      | 0.102                   | 0.134                       |

\*\*\*  $p < 0,01$ ; \*\*  $p < 0,05$ ; \*  $p < 0,1$ .

istries is bureaucratically challenging). Socioeconomic development of the region did not affect university closure rates, except the special regions, in which no universities had been closed at all. The level of competition in the education market was also found to have no significant effects on university survivability.

As we can see, the immediate outcome of the university performance assessment reforms was the reduction in the number of universities belonging to “unlucky” categories. Figure 1 shows statistically significant differences between the survival curves of private and public universities. Between 2013 and 2017, the risk of being closed was constantly growing for private universities.

Figure 1. **Comparing the Kaplan–Meier survival curves of private and public universities**



## Discussion and Conclusion

As can be seen from the above, the concerns associated with using inputs to measure performance of Russian universities are quite legitimate. A university's chances of scoring above the baseline of efficiency in certain aspects are largely contingent on its ascriptive characteristics. While "innate" strengths and weaknesses of public universities and main campuses balanced one another to some extent, private universities and branch campuses were doomed to lose. Such determinism could have been justified if performance measured by the Survey had been interpreted as effectiveness and the Ministry's goal had been simply to close weak institutions, leaving the strong ones. In that case, implementation of the Survey results would have boiled down to weeding out the universities that conformed the least to the standard of a model research university attracting students from Russia and abroad, getting its research heavily funded, boasting generous lab floor areas, and paying high salaries to its faculty—regardless of why exactly they did not conform. Leaving aside discussion of whether such an approach to assessment would have been justified,<sup>16</sup> we

<sup>16</sup> In our mind, it would not be justified at all, as such an initiative would deny the plurality of modern universities' missions, in the light of which a particular indicator may be more or less relevant. Take graduate salaries, for example. A pedagogical university whose graduates all get employed as school teachers may be recognized as extremely successful in fulfilling its mission. It cultivates in students a strong belief in the importance of their vocation,

can conclude that the Survey results were definitely not used that way. Low-performing public universities were not closed, but merged—together with all of their problems—with strong institutions. Again, this measure would have been justified if the Survey had measured efficiency and it could have been hoped that more efficient managers of surviving universities would untangle all the mess in the weak institutions. However, our findings show that efficient management could have played a much lesser role in the leadership of some universities than their administrators probably wanted to think. Some institutions had more favorable conditions from the very beginning, and their high performance reflected the advantages of their “family” and geographic location rather than successful leadership.

What could be changed in the Survey if the experiment was started over again and the goal was to measure efficiency, i. e. how well a university has been using its resources to survive and develop? Naturally, the main challenge with efficiency assessment is that both resources (inputs) and outcomes (outputs) should be measured. Two solutions are possible here. The first one implies comparing the indicators longitudinally. A university may be compared to itself (provided that it has not been merged or otherwise reorganized), where a 20% increase in a specific indicator over a certain period of time will mean a significant improvement. Or, comparison can be made to the progress of other universities over the same period (precautions being taken against time lag bias, indicator volatility for small universities<sup>17</sup>, etc.). Such metrics can serve as a tool for evaluating university management.

The second solution is about introducing a more effective system of baselines to make allowance for competitive advantages of some university categories. Instead of applying baselines for capital cities, which are in place today, expected outcomes could be estimated for universities possessing a particular set of characteristics (main or branch campus, type of region, “family”, etc.) to assess institutions by the extent to which their performance is better or worse than expected. By way of experiment, we applied the obtained logistic regression coefficients to the 2014 data, estimated the universities’ chances of

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which makes them agree to work as teachers despite low pay. However, if 100% of the graduates of an institute of finance end up as teachers of social sciences, that institute may be suspected of preparing graduates unable to find a job matching their qualifications. At the moment, the Survey requires that universities perform well in at least four indicators. It would be more rational, however, to determine a list of missions corresponding to university specialization and resources—and specify the target performance indicators for each mission.

<sup>17</sup> Volatility of Survey indicators for small universities is a major challenge for interpretation. Many indicators, particularly those related to the means of the Pareto distributed variables (e. g. citations per 100 faculty members), often turn out to be extremely unreliable for small universities.

being ranked as efficient, and singled out those that succeeded despite low chances and those that failed despite having all the chances. Among the universities that crossed the baseline, the lowest chances (33.4%) of doing so had been observed for 45 private universities in Moscow and St. Petersburg. Most of them (29) were still active in 2017, so from this point of view, they should be regarded as the most efficiently managed universities in Russia<sup>18</sup>.

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<sup>18</sup> Within this approach, Kazan State University of Culture and Arts and Far Eastern State Academy of Physical Culture could be regarded as the least efficiently managed universities of Russia in 2014. They were recognized as inefficient, although their chances of scoring above the baseline had been 95.83 and 95.73%, respectively. Both of them still exist.

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# Non-Formal and Informal Learning: International Recognition Practices

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Abstract

This article explores how non-formal and informal learning evolved in the light of the global processes of digitization and technology modernization. A cross-country analysis of participation in non-formal and informal learning activities is carried out, dwelling on the key models of recognition of such learning (based on the findings from Europe, Asia, the United States, and Australia). It is shown that social and legal aspects relative to the recognition of non-formal and informal learning differ dramatically across countries, affecting their economies, socioeconomic development, and pace of technological innovation. Recognition of non-formal and informal learning occurs at three levels. Internationally, competence standards and recognition mechanisms are designed. On a national scale, every country elaborates public documents regulating its specific mechanisms of validating and recognizing non-formal and informal learning. National differences in competence recognition practices manifest themselves where a number of countries offer accreditation of competences, and some recognize the skills acquired in volunteering, leisure and sociocultural activities. Finally, the local level reflects the interests of labor market stakeholders, such as corporations, employees and employers. The article also emphasizes the role of corporate universities in advocating the policy of competence recognition in non-formal and informal learning.

Keywords

non-formal learning, informal learning, competence, recognition of non-formal and informal learning, validation of non-formal and informal learning, competence recognition, competence certification, nostrification, corporate universities.

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# Literary Education: What Key Stakeholders Think

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**Abstract.** In order to determine the structure of literary education, i. e. the school literature demands of the key

stakeholders in education as well as the institutions and resources used to satisfy those demands, we analyze the term “literary education”, describing the long-established approach to interpreting the underlying concept, and use findings of qualitative sociological studies, such as focus groups and in-depth interviews with teachers, librarians, parents, college and high-school students. For all the interpretation differences, what the stakeholders have in common is the extremely low perceived role of school literature courses and libraries, along with searching for ways to satisfy the existing demands in other forms of acquiring literary knowledge and gaining reader experience.

**Keywords:** stakeholders in education, literary education, qualitative research in sociology, school, library, family, teachers, parents, teenagers, self-reflection, demands.

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Literary education today is a complex, multicomponent process involving a broad variety of social institutions. Approaches to literary education, its organization and efficiency have been increasingly problematized by stakeholders and researchers. What is it actually for? Should it be compulsory? Why is the school failing to raise a skilled reader, and often any reader at all? Which institutions, apart from the school, are and should be involved in this process?

This study, conducted by the Laboratory of Sociocultural Educational Practices of Moscow City University, aims at assessing the performance of Moscow institutions of literary education based on the opinions of key stakeholders capable of self-reflection. Findings of qualitative sociological research — focus groups and expert interviews — done as part of the project provided the foundation for analysis.

**Defining  
“Literary  
Education”**

As a starting point, we analyze the definitions of “literary education”. Investigating the term’s origin and history, we outline how its interpretation affected literature education and how modern teaching practices have been changing.

Viktor Chertov, a historian of literature teaching methodology, documents the emergence of the term in his monograph *Russian Literature in Pre-Revolutionary School*, quoting the poet Mikhail Dmitriev’s memoirs: “Back in the days of Zhukovsky and in my day<sup>1</sup>, literary education was given the highest priority at the university’s noble boarding school. Sciences were in place, but Anton Antonovich Prokopovich-Antonsky, the never-to-be-forgotten head of the school, seemed to find general education more useful than specialized classes, the former being many-sided and satisfying a greater number of needs both in personal and professional life.” [Chertov 2013:38] Remarkably, “literary education” is interpreted as designed to satisfy the students’ needs; we assume that “literary education” in that boarding school was not limited to mandatory courses in rhetoric and poetics but also involved participation of students in literary meetings, where their writings and translations were critically reviewed and works of contemporary literature were read and discussed.

The phrase “literary education” came into wide use through the works of Viktor Ostrogorsky, who understood it as ethico-aesthetic education by literary means which involved literary analysis as well as emotional and moral assessment of literary oeuvres. In fact, he equated literary education with the gymnasium course in language arts, though pointing out that “language arts, as a discipline, is not to be understood solely in the narrow sense of prose and poetry (rhetoric and poetics) and history of literature. Language arts is the totality of the so-called literary education acquired by a boy during his years at the gymnasium, from the earliest grades until grade seven or eight.” [Ostrogorsky 1941:157] Later works by Ostrogorsky and his contemporary Vladimir Stoyunin defined approaches to the content and structure of the gymnasium course in literature of the 19th–early 20th century, which survived into the school literature curricula of the Soviet Union and present-day Russia. Methodology, and soon daily teaching practices as well, thus became focused on the school course of literature.

To illustrate this thought, let us refer to a glossary entry proposed by Elena Tselikova, a modern St. Petersburg-based educational specialist. The entry begins with a definition: “Literary education in school is a process and outcome of absorbing systematized literary knowledge and competencies acquired during the school years and necessary for a full-fledged perception of language arts and for the development of speech culture and creative skills. Accordingly, the main

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<sup>1</sup> Zhukovsky was a boarding school student in 1797–1801.

spheres of literary education include reading, analysis and interpretation of literary texts, theory and history of literature, and individual creative writing.” [Tselikova 2015:184] Further on, in line with the established tradition, the article discusses the purposes and stages of literary education, making reference, in particular, to the federal state learning standard for literary education. Basically, the *Glossary* documents the state of things that took its origin with Ostrogorsky, limiting literary education to the literature course both temporally (school years) and spatially (classroom lessons, with rare extracurricular activities).

Today’s occasional discussions on the content of literary education are mostly focused on the required reading list but provide no analysis of the structure of literary education as a combination of formal and informal practices. Meanwhile, informal practices do exist; being oriented toward the reader’s interests and needs, they allow defining literary education in a different way today, as “a process of mastering a system of literary knowledge and skills that allow the reader to perceive belles-lettres as the art of writing, develop their personal reading interests, worldview, philosophy of life, consciousness, behavioral patterns, and a deep need to fully satisfy their reading interests through independent and purposeful action. The process of literary education is a component of socialization that secondary school is supposed to provide. The distinctive nature of literary education is determined by that of literature as a discipline and as the art of writing, as well as by the complex effects that reading and individual cognition have on the development of students’ spiritual world, moral values, taste for art, and aesthetic needs. As an outcome of literary education, students must be able to evaluate literary works against their own operational and terminal values and in their own very special way. The structure and content of literary education as well as grade-specific differences are regulated by a number of normative documents, the national school curriculum in the first place [Sitchenko, Gladyshev 2014:83] Importantly, this definition does not limit “literary education” to studying literature at school, much less to literature classes. And, while the final paragraph defines literary education as a formal type of education within the school curriculum framework, this definition outlines a new approach to literary education oriented toward shaping and satisfying students’ needs and teaching them reading behavior models. Based on the same premise, we explored the infrastructure of reading (a 2017/18 academic year project), examining “the key components of a reading person’s behavior, represented as a description of generalized purposes or situations, and only then the institutions involved in shaping or satisfying the reader’s needs.” [Asonova et al. 2018:29]

This year, our research was targeted at stakeholders in literary education and what they thought about the relevant institutions. We assume that modern stakeholders do not perceive literary educa-

tion exclusively as teaching literature in school, as it goes far beyond that. Here, literary education is broadly interpreted as involving not only formal institutions (schools, public and school libraries) but informal ones, too (book reading clubs, etc.). Other institutions—such as theaters, museums (not only literary ones), cinema, and others—can also act as providers of literary education. While their primary goals are not related directly to the purposes of literary education, in reality they do contribute to such education, especially when teachers integrate them into the learning process. Finally, family is another obvious institution of literary education, as that is where reading experience usually begins. This article thus seeks to explore the problems of such institutions of literary education as school, family, and libraries.

### **Study Background**

The sociological survey reported in this article was largely qualitative. Five focus groups were conducted with stakeholders in literary education capable of self-reflection on the issues raised: Moscow literature teachers and school librarians, parents and grandmothers willing to get their school-aged children and grandchildren into reading, and 17- to 18-year-old freshmen of Moscow colleges. The latter had just finished their school literature course, so the problems they had faced were still relevant. They also still had fresh memories of their school experience, yet an outside perspective already—more generalized and reflective. Besides, they had no fear that their judgment would somehow affect their academic performance.

At this stage, we did not include school students into the focus groups, assuming that it would be hard for them to analyze the institutions of literary education. However, we are going to include them in our further studies.

Focus groups were designed to find out which institutions of literary education and reading promotion were valued the most by key stakeholders in education, what problems they identified, and what possible solutions they could see.

In addition, a series of expert interviews were conducted with teachers, librarians, and other persons concerned, in which they expressed their opinion about the problems of literary education in Moscow, shared their practices of raising a competent reader, and proposed ways of solving the existing problems.

Before we zero in on the major problems experienced by the institutions of literary education, let us analyze what key stakeholders consider to be the purposes of literary education and why they believe the system should promote reading in children. That reading promotion is highly desirable is beyond argument in the Russian society (particularly among women). This is one of the greatest paradoxes in the modern sociocultural system that we have observed. Literature centrism has been gradually fading away as long as the intelligentsia has been losing its prestige—it was already in 1993 that sociologists spotted

this trend [Dubin, Gudkov 2009]. That is why school students inevitably find themselves faced with the problem of “why read” [Litovskaya 2014:156]. Nonetheless, literature and reading have remained highly valued, especially by women who are more committed to the intelligentsia values and more likely to conform [Borusiak 2016b], while the fundamental institutions—school first of all—keep promoting that value with varying degrees of success.

**What Is Literary  
Education  
Actually For?**

As focus group and interview data indicates, the overwhelming majority of stakeholders in literary education consider it very important because children should develop as readers and show an understanding of literature.

Paradoxically, teachers and librarians—that is, professionals who are actually providing literary education to students—found it more difficult than any other group to identify the purposes of such education. First, unlike other stakeholders, they tend to problematize this issue deeply and heavily as they constantly deal with it in their professional life. It turns out that purposes may be different, and teaching strategies should be determined by those differences. Fumbling for a universal answer, teachers mostly described the purposes of literary education in very general terms—“*raise readers*<sup>2</sup>”, “*promote a reading culture*”, “*this is the art of living*”—avoiding any specifics. Second, some teachers realize that their professional goals are often remote from children’s interests, so their teaching practices often turn out to be ineffective. Third, many teachers are convinced that the school curriculum is largely inadequate to students’ needs, and thus their teaching goals cannot actually be achieved to the full extent. All of this results in strong feelings of unhappiness and career dissatisfaction. “*I think about it all the time, and I always want to flee, to run away from all those curricula and the USE<sup>3</sup> in literature*,” said one of the teachers. Fourth, they understand that it is impossible to inspire love for reading in every child, given the intense competition among the abundant forms of leisure in today’s world.

During the study, some teachers doubted the feasibility of making literature a required course—exactly because the purposes of literary education are so blurred: “*I believe it depends on the purpose. If literature is perceived as an introduction into culture, it should be a required course, and we are thus pushing children into culture. It’s a different matter that one day, they may decide they don’t wanna be there anymore—but the cultural codes have already been crammed. If we are talking, say, about reading for pleasure, it’s quite a different story then, where the literature course may be unnecessary.*”

<sup>2</sup> Here and elsewhere, respondents’ answers are italicized.

<sup>3</sup> Unified State Examination (*Translator’s Note*)

However, an absolute majority of the teachers and librarians interviewed consider literary education to be an indispensable part of the school curriculum: *"It is necessary, because reading is a universal tool for communicating with other people and the outside world. We are reading someone else's views, someone else's texts, and texts in a broader sense. We are reading the text of the world, and we are projecting ourselves into it, ideally becoming part of it."* Most interviewees do not see knowledge of texts by students as the main goal of literary education, valuing more the opportunity to understand oneself and the world around through those texts. However, it is not literature alone that creates that opportunity, which is one of the reasons for doubts about making literature a required school course.

The approach adopted by mothers and grandmothers can be referred to as pragmatic. Being convinced that books may help children solve some real-life problems, they see their mission in choosing the right books and offering them at the right time. Some of them identify internal deficiencies in their children that they believe could be compensated by books. Others are concerned about helping the child through the challenges of puberty and expect books to be helpful in that respect—for suicide prevention, in particular. Still others hope that books will prevent their kids from excessive computer use, which they consider to be harmful to physical and intellectual development. Drawing on their personal experience, the respondents claim that reading is useful for learning from others' mistakes: *"This is some kind of solid life experience. We don't go personally through all the situations in real life. In some situations, I actually recall reading about it in a book, and I use it."* Basically, mothers maintain that literary education should inculcate a proper system of values in children, compensate for their internal deficiencies, and help them solve real-life problems; passing on the cultural codes through literature was also mentioned in some cases. Meanwhile, there was no talk about understanding a literary text, its language or characteristics. Apparently, literature in itself, as an artistic value, is not as important in the public mind as the ability of books to teach helpful life lessons.

As for fathers, our focus group included those who were deeply involved in their children's education. Most of them find it important for children to read, so they do their best to encourage reading. Meanwhile, a good part of the respondents rely on a different assumption. Reading is great, they agree; however, since it is not always possible to get children reading due to a wide range of leisure activities to choose from, it will be no catastrophe if they do not read: *"No one should be forced to read, as the world is changing and the amount of information is snowballing."* Some fathers were not concerned at all about their child having no interest in reading: *"Children who got through the Soviet school, who read all those books—most of them did not make good adults, you know."* Obviously, men tend to aban-

don the idea — traditional for the Russian culture — that books make people better by teaching them high moral values.

Yet, most fathers are eager about getting their kids into reading and try to read to them as often as possible. However, unlike mothers and grandmothers, they rather do it for the purpose of communication (“*I only engage in all of that to feel them and let them feel me*”), parent-child reading being “*sort of a nice and cozy form of communication first of all.*” Women normally spend more time with children than men, so for some fathers, having a chance to read to their kids before bed is one of the few accessible and pleasant ways of fostering an intimate relationship with them. Meanwhile, some respondents mentioned that books and reading played a great role in the personal and cultural development and reported taking great responsibility in selecting the books for their children.

Opinion among students was divided, some seeing the purposes of literary education as pragmatic and others as value-oriented. Boys who believed that reading and studying literature was useful for exams showed the highest degree of pragmatism. Some respondents said that books had helped them in real life or could do so in theory. Having read a book, one can learn a lot from the characters and their mistakes in particular — this idea has been vigorously promoted by the school. Meanwhile, our findings show that teenagers sometimes reinterpret it in a very pragmatic way, and some treat it literally, as an instruction manual. Numerous statements of the following kind were made during the focus groups: “*I read ‘The Horse Dancer’ by Jojo Moyes when I was cramming for the USE, and I got super motivated by the idea that you should always achieve your goals or die trying. I read it and I figured, ‘I should do my best too.’ And so I started writing a diary and doing a lot of studying, and it just helped me so much.*”

**Major Institutions  
of Literary  
Education:  
Stakeholders’  
Perspective**

The question about the institutions involved in literary education was analyzed during the focus groups. At the beginning, the participants were asked to name the major institutions of literary education, and their answers were written on cards. Next, the respondents were asked to arrange the cards in any specific way. Most often, the cards were ranged by significance, forming a linear or a more complex hierarchical structure.

Finally, the participants were handed out 7 or 8 prefabricated cards each. Every set of cards represented antonym pairs of adjectives (*hot—cold*, etc.), one adjective per card. The respondents were asked to match their cards with the pre-identified institutions of literary education. After that, the number of cards assigned to each institution was calculated (as an indicator of importance) and the adjectives written on them were read aloud. If positive connotations prevailed, the attitude toward an institution was deemed positive, and the other way round. What mattered as well was the order in which the

institutions were mentioned, i. e. whether they were recalled spontaneously or were reminded of by the moderator.

School was named first thing in all the focus groups. Today still, it is perceived as the most important (or one of the most important, for teenagers) institution by all the stakeholders in literary education. The “school” card was also assigned the largest number of adjective cards. The proportion of cards attributed to school was the highest among mothers and grandmothers (41%), followed by teachers (29%) and teenagers (19%). In the latter focus group, the number of mentions of “school” was slightly inferior to that of “mass media” and “the web” in the aggregate. The gap between the school and all the other institutions was significant in the adult focus groups, being remarkably wider among parents than teachers. Apparently, teachers are unsure if the modern school is able to make every child a competent reader, whereas mothers and grandmothers believe that it should be, ideally.

Family and libraries were also named as important institutions in all the focus groups, although the former was assigned few cards overall and the latter were only mentioned after being reminded of by the moderator. Theaters and museums were named by the adults, and most groups also identified informal institutions, such as reading groups, book clubs, literature Olympiads, etc. Teachers were the only ones to name children as stakeholders in literary education. Of course, children are not an institution, but it was teachers who found it important to emphasize that the whole process would be meaningless without children. In addition, respondents in some focus groups mentioned mass media, the web (teachers and teenagers), bookstores (teachers and teenagers), book publishing companies (teachers), pedagogical universities and teacher training institutions (teachers), and friends of school students.

**School as an  
Institution of  
Literary Education:  
Stakeholders’  
Perceptions and  
Major Problems**

School was the first to be named among the institutions of literary education in all the focus groups, as nothing can beat its importance in the public perception or among professional educators.

Criticism of the school was the strongest among teachers, 20 out of their 22 cards being strictly negative: “*black*”, “*dull*”, “*unnecessary*”, “*sick*”, etc. Their choice manifests extreme dissatisfaction with the conditions, rules, and outcomes of their work. “*I now realize that the Ministry of Enlightenment was missing in those cards – it would have attracted all the negatives,*” said one of the participants – and this despite the fact that the sample consisted of engaged and highly skilled teachers. The findings also reveal that teachers lack understanding of their professional purpose.

So, what problems do teachers see in school literary education? What do they think should change? In the course of this study, literary education was largely treated as an institution, so the respondents were more likely to focus on the problems that inhibited teachers from

achieving their primary goal of raising a competent reader. In particular, the existing system of graduation assessments was referred to as a major hindrance. The teachers suggested cancelling or modifying the Basic State Examination and Unified State Examination in literature as well as the graduation essay requirements. One of the participants proposed *“shifting the regulatory focus from knowledge to skills and introducing analysis and interpretation of unfamiliar texts.”*

Lack of qualified literature teachers is an even more significant challenge in modern school literary education, judging by the number of mentions. The respondents insist therefore that the system of professional development for literature teachers needs essential improvements. The respondents themselves report not lacking sources of information, participating in online and offline literature teacher communities, giving and attending master classes; however, they complain, a number of school teachers have been using obsolete teaching methods over many years.

New approaches in the teaching of literature, new formats, and changes to the curriculum were mentioned most often by teachers. Statements concerning the new approaches can be generalized as follows: literature classes should be made lively and free of scholastic dogmas; modern methods of teaching, including interactive ones, must be designed and implemented. In particular, a number of teachers suggested integrating other types of art into literature classes (*“include music, painting, theater,” “use museums, theaters, and music in teaching”*), which many of them had already been doing. The modern context makes it *“advisable to use information technology and media environment as sources of formal and informal literary education”* and, most importantly, to *“avoid clichés in discussing literary works”*, *“make literature classes actually about literature — reading, analysis, thinking, and writing”*—so as to inspire interest in children, the absence of which renders reader development impossible.

Debates over the school literature curriculum have been raging for decades. Are school students able to understand the extremely complicated classics of Russian literature? Can an average school student read and perceive immense literary works? To what extent is the school curriculum harmonized with students' interests? Not infrequently, sociological research gives negative answers to those questions [Pavlovets 2016; Pavlovets 2018; Borusiak 2016a, Borusiak 2017; Asonova 2017]. Nearly all the teachers involved in the survey insist that curriculum variation should be real, not declared; that teachers should be allowed to select literature depending on their students' abilities and needs; that *“teachers — and students — should be given more freedom in choosing curricula and literature”*; that *“teachers should be free in shaping the curriculum, choosing the texts and methods”* (responses of this type were very common); that *“the required classics reading list should be reviewed”*; that schools need modern and foreign literature; and that *“preachy and didactic texts*

*should be removed from the required reading list, especially in elementary school*". Teachers believe that literary education in school will be unable to achieve its primary mission without such reforms.

Parents of today's school students tend to hold traditional views on school literary education. Considering it to be a function of the school first of all, they believe that children will have no problems if they go to a good school: *"We've been so utterly lucky to have this school. I would even rank it at the very top and move everything else down, even the family."* A bad school becomes the source of the majority of problems with reading development and literary education.

In the focus groups with mothers and fathers, school was labelled as *"feminine"*, and only two connotations were positive, *"new"* and *"necessary"*. The rest of the characteristics, as in the teacher group, were negative, and most were even the same as given by the teachers. Despite being asked to assess the problems of literary education faced by their children today, parents were unable to close their mind to their personal experience of studying literature at school, sometimes positive — and sometimes negative because they had been unlucky to have a bad teacher. The respondents emphasize, meanwhile, that little has changed since then and it is all the same now.

An absolute majority of responses on the problems of literary education in school were related to inadequate curriculum. The books on the required reading list are outside the age of students (*"I just think the school curriculum should not include literary works written by adults and for adults"*), too long (*"My six-grader is struggling to read long books"*) and complicated (*"He reads but doesn't understand anything"*), so school literature does not cultivate a love for reading in children. Many complained about their children not reading the required books because of a poorly designed literature curriculum and said they could understand it: *"My kid didn't read any of the school literature — it's utterly unreadable."* This opinion was shared by mothers, fathers, and grandmothers.

Being convinced that the curriculum does not meet children's needs, parents believe that it should be altered. They suggest adding adventure fiction, fantasy, foreign classics, Soviet and contemporary young adult books, maintaining that if the school literature curriculum is tailored to children's age and interests, it will immediately improve the situation. However, mothers and grandmothers predominantly spoke about adding things and seemed to be unwilling to remove anything from the existing curriculum. Not daring to encroach upon the Russian classics, parents (in contrast with teachers, who insisted on curriculum variation in literary education) virtually did not bring this issue up.

Some fathers, though, proposed a rather drastic solution to the problem of literary education, which was to abolish literature as a required course (*"How come is literature a required school course? Why not make an optional reading club?"*). Some teachers are unanimous

with fathers on this point. No such proposals were made by mothers or grandmothers, who regard Russian classical literature as a top core value and do not see any institutions other than school that could introduce children and teenagers to the classics. On the whole, parents see two major problems in literary education: children are required to read books beyond their age and, as a result, do not read much. However, they were not concerned about literature in itself as well as the school's mission of raising a competent, engaged reader.

Teachers in the focus group named institutions of teacher education and professional development as important factors of improving the quality of literary education. Meanwhile, the cards that they placed next to those institutions bore negative characteristics only: *"false"*, *"foe"*, *"dirty"*, *"cold"*, *"far"*, *"worse"*, etc. Group discussion participants and interviewees contend that no positive change is possible in school literary education without an essential reformation of teacher education and professional development. Focus group participants consider the present-day institutions of teacher education and professional development to be archaic, their methods obsolete, and many teachers lacking the skills required to be effective in today's world.

Just like students, their parents and grandmothers did not mention teacher education and professional development among the institutions of literary education, as this aspect is rather a feature of the professional discourse. Nonetheless, they touched upon the issue superficially as they were discussing the figure of the teacher, whom they assigned a paramount role in literary education. The most important, they say, is to have a good teacher, which does not happen very often: *"You must be very lucky to get a good teacher of literature."* This opinion can probably be interpreted as an indirect complaint against teachers' qualifications.

To increase the number of good teachers, parents hold, it is necessary first of all to improve the quality of higher education, make the admission process more selective, raise teacher pay, and promote the prestige of the teaching profession. Situation will change when pedagogical colleges begin to select the best high school graduates and teach them appropriately: *"Selection should be tough"*, *"I guess the profession should have a prestige and a certain status."* In addition, pedagogical colleges should recruit motivated candidates who love children and literature: *"Well, it might be a dull answer, but I believe they must be fond of literature themselves, and of children too."* A great many respondents believe that a literature teacher must be a special kind of person since what they teach is not a regular discipline but a course in which high human values are constantly discussed: *"There are no born teachers, but there should be," "The person should be free. It's like, I teach because I want to, and I like it so much that I would do it without even being paid, I actually feel good doing it."*

On the one hand, parents would like to see well-prepared teachers in schools, i.e. they want the responsible institutions to be effective.

On the other hand, this is not enough for many others, who want the profession to be popular and every teacher to possess extraordinary virtues at the same time. Teachers demonstrate a sounder approach to this problem, being convinced that functioning of the teacher education and professional development institutions is what matters the most, since waiting for an inflow of “born” teachers to the school is quite utopian.

Unlike adults, teenagers treat school as a very important institution of literary education — not unique though. More cards were given to mass media and the web in the aggregate than to the school, yet slightly less severally. More positive connotations were assigned to “school” by teenagers — nearly as many as negative ones — than by teachers or parents. By the moment of participation in the focus group, it had been about six months since the graduation from high school, so their memories of literature classes were still very fresh. Depending on what they had memorized from that experience, they chose contradictory characteristics, e. g. “*kind*” and “*evil*”, “*old*” and “*new*”, “*obsolete*” and “*modern*”. Most probably, if they had participated in the survey in their being school students, they would have assigned the most important role to this institution and assessed its performance more strictly. As they graduated, however, this formal institution of literary education gave way to informal ones.

### **School Libraries as an Institution of Literary Education**

Libraries were spontaneously named among other institutions of literary education by teachers, librarians, and mothers, while fathers and students had to be reminded of the option, which means they do not perceive libraries as a relevant institution.

In the focus group with teachers and librarians, this institution was mainly awarded positive connotations, yet of a specific kind: “*rural*”, “*daytime*”, “*kind*”, “*friend*”, “*quiet*”, “*feminine*”, etc. “*Nunnery!*” said one of the group discussion participants as the attributes had been read aloud, setting everyone laughing. The image of a library came out archaic, weak, and old-fashioned. When the discussion focused on school libraries, teachers and librarians, just as all the other stakeholders, claimed that the school library had been undergoing a major crisis, its functionality being restricted to checking out textbooks in most schools, so it appears vital to diversify its functions.

Some schools have integrated their libraries into the process of literary education, but none of the discussion participants or interviewees reported this practice to be effective. Many respondents claim that school libraries should complement literature classes, in which the choice of books to read is extremely limited. Less formal, subject-subject relationships could occur — which happens occasionally — between the librarian and the student to foster free choice reading that is so lacked in schools.

Teachers and librarians mentioned various forms of school library activities in their focus group, such as book fairs, author visits, Olympiads and competitions, etc. All of them imply integration between the teacher and the librarian. In reality, according to both teachers and librarians, such integration of effort occurs very rarely, provided that the library is actually interested in doing anything other than checking out textbooks to students—which is most often the case.

Although the school library received quite positive, “soft” connotations, all the focus group participants and interviewees believe the social image of a school librarian to be negative. *“When I say that I work as a school librarian, it puts an end to the conversation. Ninety percent of people had a negative experience with librarians, so if you wanna end a conversation, just say you’re a librarian.”* The focus group with young adults shows that there is a tangible grain of truth in this statement: *“I hated going to the library, I didn’t like it there. The atmosphere was somewhat like disgusting,” “Librarians are always angry because they like just sitting and doing nothing, and there you come and disturb them.”* Isolated examples of positive experience were provided, but the overall attitude among teenagers was profoundly negative. While the participants had little idea of children’s public libraries (except the Russian State Children’s Library), everyone had dealt with school libraries. All the respondents agreed about school libraries being necessary—this is where you get your textbooks—but communication with librarians had often involved conflicts, and no one could name any other functions of this institution.

Focus groups revealed that mothers and fathers also had a vague notion of this institution and little concern for the way school libraries functioned.

**Family as an  
Institution of  
Literary Education.  
Family-School  
Communication**

Family was named as an important institution of literary education by all the study participants and was given mostly positive connotations in all the focus groups—which was partly a reaction to the very notion of “family” irrespective of the educational context and partly because family did not have the pitfalls of literary education that the respondents could see in school. Family as an institution of literary education was assigned the cards “kind” and “friend” in all the focus groups—in contrast with school, described as “evil” and “foe”.

The role of the family in literary education, unlike that of the school, was mentioned very briefly by teachers. Apparently, classroom reading practices matter much more for parents than home reading practices do for the school. In interviews with teachers, the family aspect was not normally raised until a reminder question was asked. One of the teachers mentioned lectures for parents organized by a private school as a positive experience. In this situation, teachers were perceived as subjects and parents as objects of education. Teachers did not feel wrong about it as they rightfully considered themselves pro-

professionals and thus entitled to teach not only children but their parents, too.

As for subject-subject parent-teacher relationships, parents' attempts to influence and control the process of literary education mostly resulted in conflicts. Some teachers claimed that their own attempts—or those of their colleagues—to integrate non-canon literature had given rise to discontent and even complaints among certain conservative parents: *"There have been increasingly more parents who do nothing but demand and complain all the time, most often being unaware of the way things should be."* Orientation of the best teachers toward curriculum variation and greater freedom of teaching obviously does not resonate with parents, who would prefer a rigid curriculum with minor improvements. One thus gets the impression, which is yet to be verified, that teachers and parents have developed different approaches to literary education. While teachers want more autonomy, from parents among other factors, parents often believe that the books proposed by literature teachers for reading are in conflict with the values they teach their children at home, so they would like reading lists to be agreed upon with them.

At the same time, teachers often expressed a contrary opinion that school and family should invest joint effort in literary education of children, but, sadly, parents stop engaging as soon as they send their kids to school, trying to shift the responsibility entirely to school teachers, which is wrong: *"Most parents still pass the buck to us. Their business is to earn money, as it's always been."*

Teachers consider family to be a fundamental institution of reader development but mainly at preschool age—in school, parent-teacher communication within the framework of literary education turns out to be very weak.

On the contrary, mothers, fathers, and grandmothers talked at length and in detail about their effort towards cultivating a love for reading in children—sometimes fruitful, but often futile. They described how much they had invested in it and which techniques they had used. Mothers had sometimes even practiced coercion: *"I forced my children to read when they were small."* Some tried to create a reading-friendly environment at home, with parents reading a lot themselves and building extensive home libraries. Others used a variety of methods to engage children in reading: *"At first, we would read together, me reading aloud a paragraph and her reading a word, then a line."* More often, however, parents and grandmothers referred to the tradition of reading bedtime stories, usually to preschoolers unable to read yet. As a child begins to attend school, most parents delegate further literary education of their children to school teachers, although co-reading practices and help with book selection sometimes persist. Parents spoke little about school-family communication, just as teachers said nothing about interacting with parents in the process of literary education. Parents are supposed to provide chil-

dren with literature for school lessons and get them to read to the extent possible — those are the limits of family-school relationship in literary education.

Teenagers in the focus group spoke gladly and warmly about their parents reading them before bed in early childhood. Those who had not been read bedtime stories talked about it in a noticeably injured voice, as about something important that they had been denied as children. However, such reading practices stopped for nearly everyone as they started attending school. There was only one respondent who proudly said that her family still practiced co-reading, referring to this tradition as “weird” because she knew that it was different from other families. Many focus group participants pointed out that grandmothers had been more engaged in their reader development than mothers or fathers as they had more free time for communicating with their grandchildren than the ever-busy parents. Most teenagers consider this warm and cozy home reading practice to be important, claiming that it was then that they developed a love for books and that they wish they had been read to for longer than it usually happens. When school started, informal home reading was replaced with formal practices, which many students label as coercive, lamenting that they often had to read books that they did not like and were not willing to read. As soon as a school student started reading fluently on their own, parents would insist that children should read on a regular basis and often choose books without considering their tastes. From then on, literary education at home became quasi-formal, resembling the school version. Meanwhile, teenagers wish that formal and informal reading practices had proceeded in parallel and that the institution of family had maintained its role in literary education during the school years.

**Conclusion** As the study revealed, the purposes of literary education are neither obvious nor common for all the stakeholders. An absolute majority of the respondents believe that literary education is indispensable because it is critical that children develop as readers and show an understanding of literature. Meanwhile, not everyone is sure that literature should be a required school course, since there are other institutions of reading engagement. In particular, some teachers and fathers suggest that literature courses could be made elective.

Few respondents believe that even highly effective institutions of literary education can make every child an avid and engaged reader in a situation where other forms of leisure compete aggressively with reading. This goal appears to be desirable, yet not always achievable.

The purposes of literary education are seen differently by teachers (understanding oneself and the world around being the most typical answers), mothers and grandmothers (reading compensates for children’s internal deficiencies; books can help students avoid making mistakes in real life; reading is the most useful form of leisure that

allows saving children from excessive video gaming and social media use), fathers (focus on the communicative function of parent-child reading), and teenagers (who believe that literary characters can teach motivation and other essential life skills).

Assessing the importance of various institutions of literary education, teachers, librarians, and parents traditionally assigned the highest priority to the school. Teenagers ranked school nearly as important as mass media and the web in the aggregate. Projective tests revealed that teachers and parents were likely to attribute negative connotations to school, as compared to a more positive attitude among teenagers. The more important an institution is perceived to be, the more hopes are pinned on it and the more rigorously it is assessed.

As for school libraries, this institution is blatantly stalling, according to all the participants, most of whom believe that school libraries engage too little in literary education. Teenagers reported having had conflicts with school librarians; librarians themselves spoke about the negative social image of their profession; parents appear to be virtually unconcerned about school library activities; and teachers are convinced that ideally, school libraries should be an organic part of the educational process, but teachers and librarians rarely join their efforts in real life.

None of the subjects of literary education doubts the importance of family as a fundamental institution of reader development. When comparing home and school reading, teenagers tend to favor the former as an informal practice connecting children and parents. Regretfully, they say, many parents give up home reading as soon as their children start school, delegating the function of literary education to literature teachers. Unwillingness of many parents to keep engaging in literary education of their children during the school years was also reported by teachers, but they rather meant coercion of students into reading the required books than maintenance of home reading practices. Teachers also point out that if parents monitor closely the choice of literature by the teacher, it often results in conflicts. It happens because parents demand strict compliance with the school canon, whereas the teachers involved in the study insist on curriculum variation in literary education.

All the stakeholders share the opinion that curriculum inadequacy is a major problem of literary education. Teachers and parents also agree that literature teachers should be more qualified, which implies improvements in the quality of teacher education. Besides, teachers find it critically important to improve the system of professional development for literature teachers; they talked at length about possible ways of modernizing this system as a critical tool of enhancing the institutions of literary development. Parents agree about the teacher being the key figure in literary education, yet they care less about the specific aspects of teacher education, placing their hopes on new teachers that will be obsessed with teaching as their vocation or even

devotion. This is a manifestation of the traditional literature centrism of the Russian society, i. e. the perception of literature classes and reading as highly value-loaded activities supposed to inculcate the fundamental moral and ethical norms and values that consolidate the nation. Those demands have been decreasing with the gradual diminishing of literature centrism, yet they still remain heavy enough, especially among women.

According to the respondents, present-day literary education consists of two stages, preschool childhood — when home reading practices develop an understanding of belles-lettres as a communication resource and as a means of building emotional connection with the loved ones — and the schooling period, which represents a transition to independent reading so as to satisfy one's intellectual, moral, and professional needs. Ideally, literary education in school should be a joint effort of various institutions: school, library, mass media, and others.

The teacher remains the key figure in literary education, but their professional competencies should undergo a fundamental transformation to enable them to apply the cultural-historical approach in teaching while at the same time satisfying students' reading interests, use a variety of resources — libraries, mass media, etc. — efficiently to encourage reader autonomy in children and adolescents, and be able to communicate with all the educational relationship participants, parents in the first place. Therefore, the purposes of literary education appear to consist in raising the reader as a subject capable of showing autonomy in using all the components of the reading infrastructure, on the one hand, and ensuring ongoing development and maintenance of that infrastructure — which includes a variety of institutions to satisfy various readers' needs — on the other.

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# Sustainable Development in Secondary Schools Curricula: The Polish Context

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and the DESD (Decade of Education for Sustainable Development) principles, all teachers, at each education stage, should include in their curricula content-supporting efforts towards sustainable development. Knowledge is the basis for acquiring and developing competencies. Students' knowledge can be helpful for shaping their competencies in creating sustainable development in social, economic, and environmental spheres. This article presents the results of research on integrating the key issues of sustainable development in education programs. Research was conducted between March and November 2016, involving 337 teachers employed in lower and upper secondary schools. As the findings indicate, Polish teachers are not properly prepared to incorporate the key issues of sustainable development in their teaching practices.

**Key words:** education for sustainable development, curriculum, teacher, key issues of sustainable development.

**Abstract.** According to recommendations of the European Commission

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## **Introduction**

Education is one of the most important components of the social system. It ensures effective activity of individuals and societies. Effectively organized education facilitates meeting many social objectives, such as sustainable development. School is where socialization happens, so it should be open to innovations, prepare students to face social changes, encourage them to take up challenges and participate actively in their local communities and society, and teach them

how to transform the existing social relations. Around the world, many people in community groups, government agencies, schools, colleges, and universities use teaching practices to promote sustainability in their lives and those of their neighbors (Hopkins, McKeown, 2002). The sustainable development goals can only be achieved by a learning society that adapts to new conditions promptly and actively thanks to properly planned and effectively implemented education. The concept of Education for Sustainable Development (ESD) was included in *Agenda 21*, the official document of the 1992 Earth Summit, namely Chapter 36 of Section IV (*Means of implementation*), which stipulates promoting education, public awareness and training related to sustainable development and environment protection. The document describes education as critical for promoting sustainable development. Since *Agenda 21*, there have been many other documents and publications regarding the principles of sustainable development education, its objectives, means of implementation, and recommended methods and format of teaching. *Agenda 21* states that education, both formal and non-formal, public awareness and training all over the world should be recognized as indispensable to sustainable development. Adequate educational initiatives and introduction of a new teaching model in schools will make sustainable and harmonious development of humans and, consequently, the world more likely. The document also declares that education worldwide must be reoriented towards sustainable development and environmental improvement. Education, including institutionalized education, should be recognized as a “process by which human beings and societies can reach their fullest potential.”<sup>1</sup> It should be integrated in all disciplines by employing various didactic methods and effective means of communication.

Education for sustainable future is a huge challenge for education systems. It requires the following questions to be addressed: How can we better understand the complexity of our world? How are problems of today’s world interrelated and what does it mean for people who try to solve them? What kind of world do we want in the future? Does this vision fit within the systems of sustaining life on Earth? How can we reconcile the requirements of economy, societies, and environment? The idea of education for sustainable development is the commitment to achieve balance between social and economic wellbeing, on the one hand, and cultures, traditions, and protection of natural resources, on the other. ESD emphasizes the need to respect human dignity, honor diversity, and protect the environment and natural resources on Earth (Kuzior 2014).

Education for sustainable development should be holistic as it needs to address all the aspects of human functioning in society and

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<sup>1</sup> <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>

nature and provide students with the knowledge, skills, tools, and instruments necessary for multi-dimensional coexistence with other animate and inanimate beings.

Education for sustainable development has at least four key postulates:

- 1) Integration postulate, addressing the holistic perspective that enables integration of many aspects of sustainable development (e. g. ecologic, environmental, economic, socio-cultural, local, regional, global, past, present, and future);
- 2) Critical postulate, which questions the prevailing patterns taken for granted that may be unsustainable (such as the idea of constant economic growth based on consumerism and relevant social lifestyle);
- 3) Transformative postulate, which consists in shifting from awareness to actual changes and transformations through strengthening the status and building the potential. The goal is to achieve a more sustainable lifestyle, adopt the relevant values, build sustainable communities, and create sustainable enterprises;
- 4) Contextual postulate, recognizing that there is no single, universal sustainable way of living or acting. Nations, societies, communities, and people should all learn from one another while bearing in mind that contexts are different and subject to change. Therefore, the sustainable way of living will change too, depending on the context and current needs of specific groups.

Jolanta Szempruch (2012) notes that the special role of education in sustainable development involves the following:

- Enabling learners to acquire skills, knowledge, and attitudes ensuring their harmonious (sustainable) development;
- Providing equal access to education at all levels and in all social contexts (family, school, professional or local community);
- Building awareness of the importance of lifelong learning;
- Developing social responsibility and promoting democracy by informing individuals about their rights and responsibilities;
- Supporting harmonious development of personality (Szempruch, 2012).

Over the past five decades, recognition of education as the key social strategy to elaborate a socio-economic model towards sustainable development has led to the creation of curricula in environmental education, civic education (for democracy), intercultural education, and global education. In some countries, for example in the UK, those curricula have been integrated into formal (schools and universities) and non-formal education (private institutions). As for the implementation of formal education programs, it is recommended to:

- Develop curricula that prioritize sustainable development;
- Provide sufficient information about environmental issues and human-nature relationships;
- Ensure that students can learn to care about nature and feel empowered to protect it;
- Enable students to develop their analytical and research skills as well as skills that will allow them to exercise active citizenship.

Supported by the non-formal activities, formal education prepares students for the future. From the perspective of sustainable development, it means that the focus on shaping critical thinking, communication, and debating skills (while emphasizing that learning, social participation, and decision-making in adult life are ongoing processes) should be at least as strong as the focus on acquiring the necessary knowledge for education to yield the best possible outcomes. Paul Vare and William Scott (2008) consider it important to discriminate between education for sustainable development (ESD1) and education as sustainable development (ESD2). The first approach, rooted in daily practice, mostly involves content and information sharing and provides guidelines regarding changes in environmental behavior and the way we think about our life at present. ESD2 is oriented towards dialogue and debate, focusing on controversial issues and developing critical thinking and decision-making skills that students will need in the complicated and uncertain world of the future.

The main objective of the whole school community (directors, teachers, students and their parents) within the National Environmental Education Strategy “Through Education to Sustainable Development” should be to use the opportunities included in the core curriculum to realize and consolidate the need to live according to the principles of sustainable development. The strategy offers the following guidelines to achieve this goal:

- Raise individuals who will be aware of their unity with nature and the socio-cultural environment;
- Shape the ability to observe the environment and gather information about it;
- Teach about the laws of nature, relationships in nature, and human-nature relationships;
- Develop the ability to solve problems according to the knowledge possessed and the value systems adopted;
- Stimulate sensitivity to the beauty of nature and spatial order;
- Inculcate respect towards life and health, both one’s own and those of other beings;
- Introduce active forms of outdoor education;
- Promote cooperation among teachers in creating an atmosphere conducive to the achievement of the key ESD goals.

Daniella Tilbury (2011) singles out four main processes which are the base of education for sustainable development: (i) processes that stimulate innovations within the curricula and learning experiences; (ii) processes of active and participatory learning; (iii) processes that engage the “whole system”; and (iv) processes of collaboration and dialogue (including multiple-stakeholder and intercultural dialogue). The Global Monitoring and Evaluation Survey identified nine types, or formats, of teaching and learning associated with sustainable development. Some of them may be considered conventional (like transmissive pedagogy or disciplinary learning), and some more modern (like multi-stakeholder processes and social learning or the systems thinking approach).

Education for sustainability is “a method of reforming the education system as a whole to provide students with the skills they need for the challenges of the 21st century” (UNESCO 2011). It involves stimulation of critical thinking about the principles and values underlying the whole education context at all levels, and helping countries make progress towards the Sustainable Development Goals (Capelo, Santos, Pedrosa, 2011). The goal of education for sustainable development is to support attitudes of respect to human needs, which are in line with sustainable use of natural resources and caring about the planet. Another important role of education is to promote global solidarity. It means that people should act according to the principles of justice, empathy, and equality in their daily choices (*Education for sustainable development and holistic curriculum change. A review and guide*, 2012).

An important initiative promoting the principles and premises of education for sustainable development consisted in announcing the years 2005–2014 the Decade of Education for Sustainable Development (DESD), or the Decade of Change (UNESCO 2005; Barth, Godemann, Rieckmann, Stoltenberg, 2007; Wals A. E. J., *Shaping the Education of Tomorrow. 2012 Report on the UN Decade of Education for Sustainable Development*, Paris 2012; Buckler, Creech 2014). Activities during that Decade were designed to show teachers, students, and other stakeholders in education that formal and informal education were the only way to achieve sustainable development. One of the goals was to make teachers realize their incredibly important role in building a sustainable society. Effective education for sustainable development requires integration of the key issues of sustainable development into the general subject curricula. This is a huge challenge for teachers who should be literate in systems thinking (Sleurs 2008; Bointner, Braun-Wanke, Duchkowitsch, Kranzl, Piening 2011; Barth, Rieckmann 2012)—a competency that allows them to effectively integrate the most important issues of social, economic, and environmental aspects of sustainable development into their curricula. Regardless of the type of school and the subject taught, all teachers should implement the principles of the Decade of Education for Sustainable

**Table 1. Guidelines for the key issues of sustainable development to include in the lower and upper secondary school curricula in Poland.**

| Subject/Group of Subjects  | Recommended Curriculum Content   |
|--|--|
| Polish language  | Multiculturalism, the concept of “small homeland”, national heritage, national diversity, uniqueness of Polish art on the international map, globalization, aspects of mass culture, women in culture and as creators of art, etc.   |
| Humanities and social sciences (social studies, history, cultural studies, entrepreneurship) | Challenges of modern society, rights and obligations of the citizen, principles of functioning of the European Union, democracy, women's and children's rights, political systems of other countries, conflicts and ways of solving them, sustainable consumption and ways of producing goods, building a value system based on respect for the well-being of all people, etc. |
| Foreign languages  | Culture of other countries; in addition, issues related to sustainable development are implemented, for example, when reading source texts, listening to recordings, etc.—while developing language competencies   |
| Mathematics  | Exercises related to the subject of sustainable development, such as overpopulation, protection of nature, natural resources, sustainable consumption, etc.  |
| Natural sciences (biology, chemistry, physics, geography, family life education)             | Sustainable management of natural resources, preservation/conservation of nature, protection of biodiversity, sustainable production methods, balanced diets, health as an integral part of sustainable development, striving for well-being in a sustainable way, ways of reducing pollution, etc.  |
| IT   | Protection of intellectual property, integrity on the web, internet security, proper use of new communication tools, culture of new media, etc.  |
| Arts (music, visual arts)  | Heritage of past generations as a common good and value, communicating through art, culture as a way of expressing oneself in a globalized world, etc.   |

Source: Mróz, Ocetkiewicz, Walotek-Ściańska, 2018; on the basis on curriculum review

Development, which means that they should also cover the key issues of sustainable development in the present and future in their curricula.

Ken Robinson and Lou Aronica (2015) point out that curricula set out frameworks of what students should know, understand, and be competent to do. In most schools, some parts of the curriculum are obligatory, while others are optional, like extra-curricular activities. Curricula can be formal or informal. A formal program is obligatory, with grades and exams, while the informal part includes voluntary activities. Teachers are quite free in selecting non-obligatory, optional content. It is worth to point out that, according to the DESD postulates, teachers are obliged to include in their curricula issues that may

contribute to the level of students' knowledge and awareness about the modern world's needs and to the acquisition and development of the key sustainable development competencies in them (de Haan 207a; de Haan 2007b; de Haan 2010; Mróz et al., 2018b). Guidelines for the key issues for sustainable development to include in the lower and upper secondary school curricula in Poland are shown in Table 1. It is up to teachers to determine the extent to which they will address these issues in their didactic process.

### **Problem of Research**

Based on the analysis of the subject matter literature, we assume that integration of the key issues of sustainable development into the curricula of all subjects, at every stage of education is one of the prerequisites for effective education for sustainable development. Behavior change for sustainable development is based on the knowledge about sustainable development premises, principles, and goals. In our study, we investigate which of those issues Polish teachers introduce into their curricula on a regular basis. With this in mind, the following research questions are formulated:

- (1) Which of the key sustainable development issues do teachers include in their curricula at 3rd and 4th education levels?
- (2) How do teachers integrate those issues into their curricula?

Analysis of research results will help determine the level of integration of the ESD principles in schools, where the study was conducted, and their education programs.

### **Methodology of Research**

The research was conducted with a nomothetic approach within a quantitative paradigm, using the survey method (Babbie, 2013). Survey questionnaire is the most popular survey research technique that provides large amount of data in a short period of time. Using anonymous survey, researchers may also expect honest and objective answers (Babbie, 2013). To find answers to the research questions, an original survey questionnaire addressed to teachers was developed. It consisted of three parts, and one of them was dedicated to the key issues of education for sustainable development and their integration in school curricula.

The research tool was designed based on the theoretical framework presented in the *Introduction* section. Considering the research assumptions related to the problems presented, that is, emphasis on the descriptive aspect of sustainable development curricula, we used nominal variables which were analyzed by means of descriptive statistics and internal comparisons as well as comparisons with independent variables. For this purpose, contingency table analysis was performed and the strength of the association between the nominal

variables was shown using the chi square test with derivatives. The analysis was performed using STATISTICA software (Nachmias, Nachmias, 2007).

### **General Background of Research**

The goal of research was to explore and describe how key ESD issues are integrated into curricula at the 3rd (lower secondary) and 4th (upper secondary) levels of education. This is important, as according to recommendations of the European Commission and the DESD principles, all teachers, at each education stage, should include in their curricula content-supporting efforts towards sustainable development. Students' knowledge may be helpful for shaping their competencies in creating sustainable development in social, economic, and environmental spheres.

The subject of our research was the sustainable development-critical issues that teachers regularly integrate into their curricula and the ways they implement them during classes. For this purpose, we used the survey method which allowed collecting a great amount of data from a large number of respondents within a short period of time.

### **Sampling**

In order to collect data for research, convenience sampling (Christensen, Johnson, 2011) was applied in accordance, the only criterion being whether the participants agreed to take part in the survey. The advantage of convenience sampling is that it allows identifying the relations between phenomena. However, it is fraught with bias, meaning that the sample may be not representative. The respondents invited to take part in the survey were teachers of general subjects in lower and upper secondary schools. In order to collect the data, we distributed printed questionnaires in the lower and upper secondary schools in the Małopolska region. Following the principles of convenience sampling, we had chosen this region as appropriate for our study (based on the availability of respondents and their consent to participate in the survey). Małopolska region is also a specific area to investigate teachers. Educators working in schools have a wide access to different formats of learning and professional development, as there are many pedagogical universities and institutions offering various forms of vocational training.

During the survey, the teachers were asked to choose issues that they addressed during their classes (integrated into their curricula) on a daily basis. The issues listed in the questionnaire were selected based on a review of literature devoted to education for sustainable development. The teachers were also asked to declare which methods of implementation they used most often — we wanted to find out whether they covered the key sustainable development issues during the classes (direct interaction with students), introduced them as they gave home assignments (indirect interaction with stu-

Table 2. **Teachers' demographic statistics** ( $N = 337$ )

|                     |                     |     |                |   |     |
|---------------------|---------------------|-----|----------------|---|-----|
| Gender              | Female              | 78% | Subject taught | Polish language   | 18% |
|                     | Male                | 22% |                | Human and social sciences (social studies, history, cultural studies, entrepreneurship) | 20% |
| School location     | Village             | 38% |                | Foreign languages   | 22% |
|                     | Town                | 40% |                | Mathematics   | 11% |
|                     | City                | 22% |                | Natural sciences (biology, chemistry, physics, geography, family life education)        | 26% |
| School level        | Lower secondary     | 53% |                | IT  | 2%  |
|                     | Upper secondary     | 47% |                | Arts (music, visual arts)   | 1%  |
| Years of employment | 0–5                 | 11% |                |   |     |
|                     | 6–10                | 19% |                |   |     |
|                     | 11–15               | 25% |                |   |     |
|                     | 16–20               | 30% |                |   |     |
|                     | 21 and more         | 15% |                |   |     |
| Teacher category    | Trainee             | 5%  |                |   |     |
|                     | Contractual teacher | 13% |                |   |     |
|                     | Appointed teacher   | 24% |                |   |     |
|                     | Chartered teacher   | 58% |                |   |     |

dents), or addressed them during additional classes or out-of-school activities.

There were 927 questionnaires distributed, of which 337 were completed. Demographic statistics of the respondents is presented in Table 2.

### Results of Research

Analysis of the research results revealed that respondents included such key issues of sustainable development as the values of good, justice, responsibility, solidarity, and tolerance in their curricula, nearly 85% opting for this response. Teachers often discuss the problems of responsible use of media and environmental protection with their students, which were selected by 76% and 73.6% of the respondents, respectively. Issues related to children's rights are covered relatively often during classes with children and youth (indicated by 60.2% of the respondents). More than half of the teachers address issues of gender equality (54%), building a civil society (53.7%), and responsible consumption (51%). Problems of sustainable management of natural resources (46.6%) and climate disaster prevention (45.7%) are included in curricula slightly less frequently. Sustainable economy and fair trade were discussed the least of all (28.2% and

**Table 3. Key issues of education for sustainable development integrated by teachers into their curricula**

| Issues integrated into curricula                             | Subject taught (%) |                                |                   |             |                  |         |
|--|--------------------|--------------------------------|-------------------|-------------|------------------|---------|
|  | Polish language    | Humanities and social sciences | Foreign languages | Mathematics | Natural sciences | Average |
| Responsible consumption                                      | 50.00              | 44.78                          | 47.30             | 52.78       | 60.47            | 51.39   |
| Fair trade   | 21.67              | 31.34                          | 29.73             | 30.56       | 31.40            | 29.10   |
| Civil society  | 68.33              | 67.16                          | 54.05             | 33.33       | 41.86            | 53.87   |
| Sustainable economy  | 21.67              | 34.33                          | 21.62             | 30.56       | 40.70            | 30.34   |
| Environmental protection                                     | 60.00              | 59.70                          | 87.84             | 63.89       | 86.05            | 73.68   |
| Climate disaster prevention                                  | 30.00              | 31.34                          | 63.51             | 36.11       | 60.47            | 46.75   |
| Responsible management of natural resources                  | 26.67              | 43.28                          | 51.35             | 41.67       | 63.95            | 47.37   |
| Values: good, justice, responsibility, solidarity, tolerance | 96.67              | 88.06                          | 90.54             | 77.78       | 73.26            | 85.14   |
| Gender equality  | 66.67              | 53.73                          | 62.16             | 33.33       | 52.33            | 55.42   |
| Children's rights  | 71.67              | 65.67                          | 64.86             | 44.44       | 53.49            | 60.99   |
| Responsible use of media                                     | 85.00              | 74.63                          | 85.14             | 66.67       | 63.95            | 75.23   |
| None of the above  | 0.00               | 0.00                           | 0.00              | 5.56        | 0.00             | 0.62    |
| Other  | 3.33               | 7.46                           | 1.35              | 0.00        | 1.16             | 2.79    |
| Total  | 100                | 100                            | 100               | 100         | 100              | 100     |

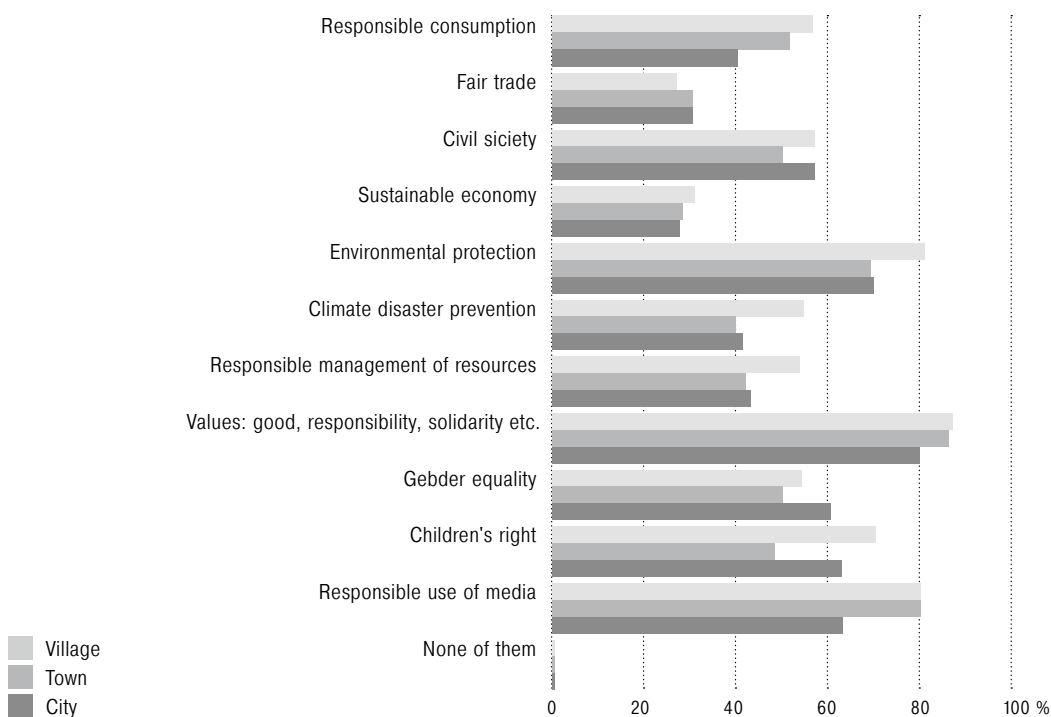
29.1%, respectively). Only two respondents selected none of the listed options. In total, 13.1% of all the respondents were found to cover all the issues listed in the questionnaire in their teaching practices.

The choice of specific topics is not affected by such variables as school level (lower secondary, upper secondary), teacher's years of employment, category, or gender. School location proved to explain more of the diversity of issues addressed by the teachers than any other variable.

The findings imply that teachers in rural schools are slightly more likely to emphasize the need for protection of environment. They discuss the issues of natural disasters and prevention thereof more often than teachers in schools located in urban areas.

Students in rural schools also learn more often about the responsible use of natural resources, which are now being degraded at an unprecedented scale. In cities, meanwhile, teachers are more likely (as compared to teachers in villages and towns) to discuss the issue of equal rights for both genders with their students. However, children's rights are more often discussed by teachers in village schools. The

Figure 1. **Diversity of key ESD topics and location of school**



problem of responsible use of media is covered most often by teachers who work in towns.

Ten respondents added their own examples of key ESD-related topics they include in their curricula. Those were: *sustainable transport* (two chartered teachers of geography, cities), *protected areas* (two biology teachers, one chartered and one appointed, city and town), *colonization and its effects* (one appointed teacher of history and civic education, town), *nuclear energy industry* (one appointed chemistry teacher, city), *aquatic environment protection* (one trainee teacher of biology, village), *human health* (one chartered biology teacher, town), *social justice* (contractual teacher of history, town), and *sustainable economy* (chartered teacher of civil education, city).

What we also intended to find out was how teachers integrate the abovementioned issues into their curricula. Analysis revealed that the key sustainable development issues were most often covered by including them as topics taught during subject lessons. This practice is used “very often” by 63.2% of the respondents and “sometimes” by 29.1%. Another frequently used method consists in encouraging students to after-school activities and participation in various social initi-

Table 4. **Methods of integrating the key issues of sustainable development into curricula (%)**

|  | Never | Occa-<br>sionally | Some-<br>times | Very<br>often | Total |
|--|-------|-------------------|----------------|---------------|-------|
| Included as topics taught during subject lessons                                     | 3.56  | 4.15              | 29.08          | 63.20         | 100   |
| During additional classes, for example interest clubs                                | 54.0  | 24.03             | 12.16          | 9.79          | 100   |
| Including the key ESD issues in homework assignments                                 | 18.99 | 31.75             | 40.95          | 8.31          | 100   |
| Encouraging students to engage in out-of-school activities, social initiatives, etc. | 9.50  | 13.35             | 37.39          | 39.76         | 100   |

Figure 2. **Methods of integrating the key ESD issues used by teachers of different subjects**

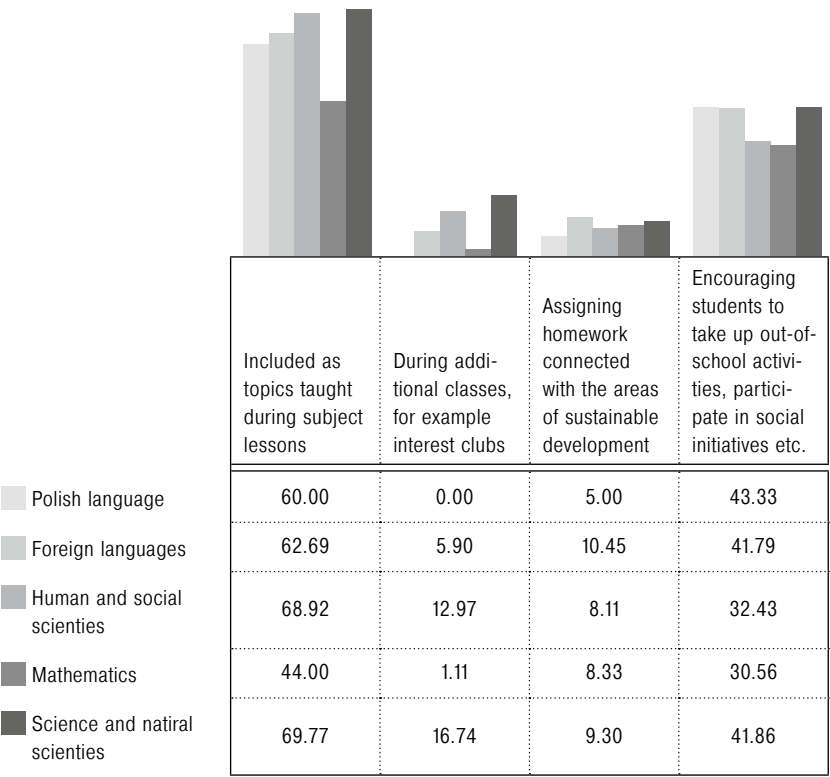


Figure 3. **Covering ESD-related topics during subject lessons depending on school location**

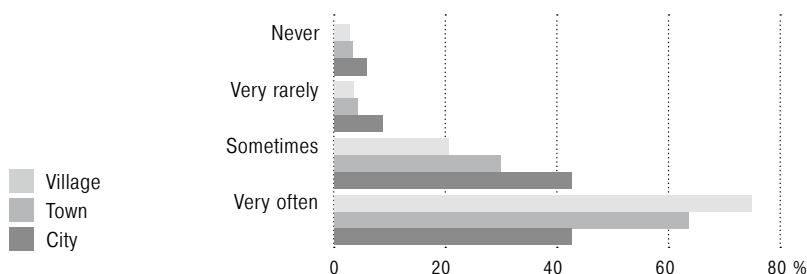


Table 5. **Covering ESD-related topics during subject lessons depending on school location: Pearson's chi-square test**

|                    | Value               | df | Asymptotic significance (2-sided) |
|--------------------|---------------------|----|-----------------------------------|
| Pearson's $\chi^2$ | 21.428 <sup>a</sup> | 6  | 0.002                             |
| Likelihood Ratio   | 20.838              | 6  | 0.002                             |
| Linear-by-Linear   | 16.344              | 1  | 0.000                             |
| N of Valid Cases   | 332                 |    |                                   |

<sup>a</sup> 33.3% of cells (4) have expected count less than 5. The minimum expected count is 2.25.

atives. This method is practiced "very often" by almost 40% of the respondents and "sometimes" by 37.4%. ESD topics are also discussed during extra-curricular activities, for such as interest clubs. This method is used by 46% of the respondents in total. However, fewer teachers use it "often". The least frequently used method is integrating sustainable development issues into home assignments, which 41% use "sometimes", 31.8% "occasionally", and only 8.3% "very often".

During analysis of the research results, correlations between the chosen methods of integrating the key issues of sustainable development into curricula and the specific variables were examined. Pearson's chi-square test revealed a correlation at the significance level below 0.05.

Figure 2 shows the most frequently used methods that teachers of different subjects use to integrate ESD-related topics into their curricula.

The method of covering ESD-related issues as topics during subject classes also depends on school location (the size of population in the area where the school is located). The correlations are shown in Figure 3.

Figure 4. Including ESD-related topics during subject lessons depending on teacher category

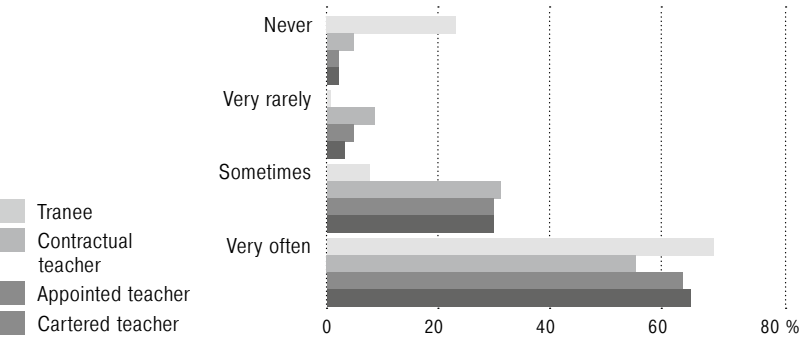


Table 6. Including ESD-related topics during subject lessons depending on teacher category: Pearson's chi-square test

|                    | Value               | df | Asymptotic significance (2-sided) |
|--------------------|---------------------|----|-----------------------------------|
| Pearson's $\chi^2$ | 21.140 <sup>a</sup> | 9  | 0.012                             |
| Likelihood Ratio   | 14.363              | 9  | 0.110                             |
| Linear-by-Linear   | 3.875               | 1  | 0.049                             |
| N of Valid Cases   | 336                 |    |                                   |

<sup>a</sup> 43.8% of cells (7) have expected count less than 5. The minimum expected count is .46

This correlation may be explained, among other things, by the fact that teachers in village schools have less opportunities to encourage students to engage in out-of-school activities for sustainable development such as social initiatives, meetings with experts, etc. The correlation between integrating ESD issues into subject lessons and teacher category is also statistically significant. The correlations are presented in Figure 4.

Discussing the key sustainable development issues during additional classes also correlates with teacher category. The correlations are shown in Figure 5.

Additional classes during which the key sustainable development topics are discussed are most often delivered by contractual teachers and — somewhat less frequently — by trainees. Trainee teachers are the youngest and the least experienced ones. In order to obtain a higher category, they have to prove their expertise, skills, and engagement in the life of their school and local community.

Figure 5. **Discussing key sustainable development issues during additional classes depending on teacher category**

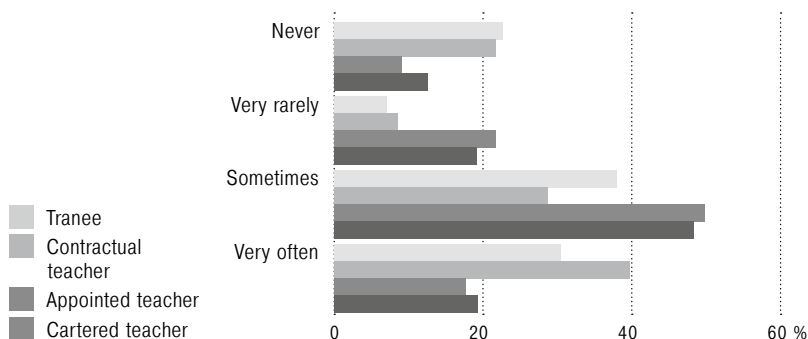


Table 8. **Discussing the key sustainable development issues during additional classes depending on teacher category: Pearson's chi-square test**

|                    | Value               | df | Asymptotic significance (2-sided) |
|--------------------|---------------------|----|-----------------------------------|
| Pearson's $\chi^2$ | 19,658 <sup>a</sup> | 9  | 0,020                             |
| Likelihood Ratio   | 19,154              | 9  | 0,024                             |
| Linear-by-Linear   | 0,363               | 1  | 0,547                             |
| N of Valid Cases   | 336                 |    |                                   |

<sup>a</sup>18.8% of cells (3) have expected count less than 5. The minimum expected count is 1.78.

Table 9. **Assigning homework connected with issues of sustainable development and taught subject**

| Including the key ESD issues in homework assignments | Subject taught (%) |                                |                   |             |                  |         |
|--|--------------------|--------------------------------|-------------------|-------------|------------------|---------|
|  | Polish language    | Humanities and social sciences | Foreign languages | Mathematics | Natural sciences | Average |
| Never  | 21.67              | 16.42                          | 16.22             | 38.89       | 15.12            | 19.50   |
| Occasionally   | 23.33              | 31.34                          | 32.43             | 41.67       | 34.88            | 32.20   |
| Sometimes  | 50.00              | 41.79                          | 43.24             | 11.11       | 40.70            | 39.94   |
| Very often   | 5.00               | 10.45                          | 8.11              | 8.33        | 9.30             | 8.36    |
| Total  | 100                | 100                            | 100               | 100         | 100              | 100     |

Figure 6. **Discussing the key sustainable development issues during additional classes depending on school location**

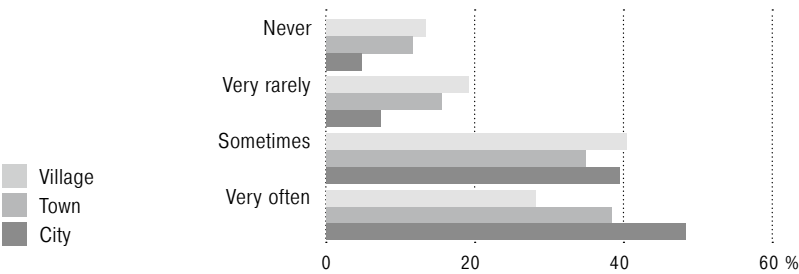


Table 10. **Discussing the key sustainable development issues during additional classes depending on school location: Pearson’s chi-square test**

|                    | Value  | df | Asymptotic significance (2-sided) |
|--------------------|--------|----|-----------------------------------|
| Pearson’s $\chi^2$ | 22.653 | 6  | 0.001                             |
| Likelihood Ratio   | 23.532 | 6  | 0.001                             |
| Linear-by-Linear   | 18.109 | 1  | 0.000                             |
| N of Valid Cases   | 332    |    |                                   |

Analysis of the results revealed a correlation between including the key ESD issues in homework assignments and the subject taught. The results are presented in Table 9.

Methods of encouraging students to engage in various out-of-school initiatives are determined by school location. The correlations are shown in Figure 6.

Data analysis indicates that students are most often encouraged to be active in their local community by teachers in urban schools, followed by teachers in schools located in towns. It is worth to point out that teachers in cities obviously have more opportunities to participate in various initiatives than those working in rural areas.

**Conclusion** To summarize the research results, we need to emphasize that, although most respondents declaring that they integrate the key ESD issues into their curricula, they were unable to name their own examples of relevant topics covered in their work with students. Teachers

tend to discuss the most universal issues, paying less attention to the problems of biodiversity protection, use of renewable energy sources, and natural disaster prevention. Importantly, teachers consider education for sustainable development to be holistic and try to address not only the issues relative to their subject but also the problems critical for sustainable development as a whole (Tsankov, 2017).

Teachers declare that they often integrate the key sustainable development issues into out-of-school activities, such as home assignments, additional classes, and social initiatives. It is worth to point out that the paradigm of sustainable development, suggests that teachers, as active members of their local communities, should engage in improving sustainability of such communities to promote harmonious development of all its members. Thus, integration of the key sustainable development issues into education by encouraging students to be socially active appears to have a great value. However, local efforts will not yield the intended results if they are not accompanied by fostering students' competencies as part of the schooling process.

For the sustainable development postulate to be implemented, all teachers must raise students' awareness about sustainable development. Therefore, teacher education students should be provided with basic knowledge on the sustainable development, raise their awareness about it, and develop relevant attitudes.

In order to effectively implement the principles of ESD, teachers must collaborate with one another; they should point their students to systemic solutions instead of limiting the content of their teaching to their subject alone. Cooperation with the local community is also necessary, but it requires that teachers engage with their local environment out of school and involve many people in mutual activities.

The vast majority of teachers try to integrate the key sustainable development issues into their curricula, but they do not always know how to do it. Even though they can identify the most important areas, they cannot include them effectively in their programs or engage students during the classes.

Under the conditions of a global crisis, education represents the most efficient way of forming the social and intellectual basis for implementing the principles and ideas of sustainable development and coevolution (Nasibulina, 2015). It should be borne in mind that the content of educational programs determines to a large extent whether students will demonstrate awareness and knowledge about the needs of the modern world. A sustainable future is possible through education of the next generations. In this respect, the role of teachers is significant and indisputable. They should provide students with knowledge and skills, shape attitudes, and thus support the acquisition and development of key competences for the sustainable future of the world. They can do this by integrating, in various ways, the key issues of sustainable development into their curricula.

Teachers must be aware of how important it is for students to know about the principles and issues of sustainable development. Such awareness will enable a behavioral change promoted by ESD. It should be remembered that properly planned and effectively implemented education is fundamental to achieving the social goals. At present, one of the high-value social goals consists in building sustainable societies, which can be achieved indirectly with the help of teachers who will effectively implement the ESD principles, starting from including the key ESD issues into their curricula.

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# Accessibility of Mathematics MOOCs to Learners with Disabilities

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**Abstract.** Fifty-six mathematics Massive Open Online Courses (MOOCs) for Bachelor's degree students were sampled by browsing through the course lists of five leading MOOC platforms offering learning content in Russian. Accessibility of the sampled MOOCs to persons with disabilities was evaluated by experts using 70 predetermined criteria. No accessibility issues related to hyperlink behavior, quality of sound reproduction, visualization in graphical web browsers, mobile user experience, background and text contrast, or keyboard operation were revealed during analysis. However, it transpired that

none of the MOOCs allowed customizing user interface or displaying content in text-based web browsers. In addition, 98% of digital documents, 82% of mathematical notation, and 91% of tests are rendered unfaithfully by screen readers; captions are unavailable in 64%, transcripts in 66%, and lecture notes in 52% of the MOOCs; no MOOC offers sign interpretation for their video; and audio alone is not sufficient for adequate perception of the content in any MOOC. The findings reveal low accessibility of mathematics MOOCs in Russian to people with disabilities, particularly those with severe visual impairments, and illustrate the need to bring the existing MOOCs into compliance with the Web Content Accessibility Guidelines (WCAG 2.1), ensure that platform administrators conform strictly to WCAG 2.1 before posting new MOOCs, teach MOOC authors and developers to create accessible course content, and involve persons with disabilities in beta testing of MOOCs.

**Keywords:** MOOCs, mathematics education, e-learning, distance learning technology, web accessibility, persons with disabilities.

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Massive Open Online Courses (MOOCs) are the most promising tool for teaching people with disabilities, as they imply distance learning without actual learner presence in the classroom [Policar, Crawford, Alligood 2017; Kent 2015; De Waard et al. 2014].

MOOC developers should consider the needs of vulnerable learner groups, people with disabilities in the first place [De Waard et al. 2014]. Providers and developers are required to make MOOC content accessible to student with disabilities under a number of national and international legal instruments: the Universal Declaration of Human Rights (1948)<sup>1</sup>, the Convention on the Rights of Persons with Disabilities (2006)<sup>2</sup>, Federal Law No. 181-FZ On Social Protection of People with Disabilities in the Russian Federation of November 24, 1995<sup>3</sup>, Federal Law No. 273-FZ On Education in the Russian Federation of December 29, 2012<sup>4</sup>, etc. In particular, according to Article 19 (Education of People with Disabilities) of the Federal Law No. 181-FZ, “the State shall promote education for persons with disabilities and guarantee to provide the necessary conditions.” Article 79 (Organization of Education for Learners with Disabilities) of Federal Law No. 273-FZ obligates vocational schools and higher education institutions to create “special conditions to facilitate learning for people with disabilities”. Article 9.13 of the Code of Administrative Offenses of the Russian Federation<sup>5</sup> imposes administrative liability on officials for not providing access to services, social, engineering and transport infrastructure for people with disabilities. However, accessibility of MOOCs is not prescribed straightforwardly in any Russian law or bylaw.

Adaptation of MOOC content to vulnerable learners’ needs may be defined, according to the Convention on the Rights of Persons with Disabilities, as “reasonable accommodation”, i. e. “necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms”, whereas failure to meet web accessibility requirements may be regarded as disability discrimination.

In some countries (Australia, Great Britain, the European Union, the United States, and others), national web accessibility standards are based on Web Content Accessibility Guidelines (WCAG)—WCAG 2.0 (2008)<sup>6</sup> or WCAG 2.1 (2018)<sup>7</sup>—and have the force of law [AHRC2014; BSI 2010; Eur-Lex 2016; GSA 1998, and others]. The regulations apply to all products and services offered through web browsers, including learning resources such as MOOCs.

Students, regardless of their disability status, should have no problems viewing learning materials, doing assignments, communi-

<sup>1</sup> [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_120805/](http://www.consultant.ru/document/cons_doc_LAW_120805/)

<sup>2</sup> [https://www.un.org/ru/documents/decl\\_conv/conventions/disability.shtml](https://www.un.org/ru/documents/decl_conv/conventions/disability.shtml)

<sup>3</sup> [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_8559/](http://www.consultant.ru/document/cons_doc_LAW_8559/)

<sup>4</sup> [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_140174/](http://www.consultant.ru/document/cons_doc_LAW_140174/)

<sup>5</sup> [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_34661/](http://www.consultant.ru/document/cons_doc_LAW_34661/)

<sup>6</sup> <https://www.w3.org/TR/WCAG20/>

<sup>7</sup> <https://www.w3.org/TR/2018/REC-WCAG21-20180605/>

cating in forums, and obtaining knowledgeable support from tutors. Therefore, MOOCs should comply with WCAG, the principles of universal design [NC State University 1997], and MOOC platform recommendations on creating accessible content<sup>8</sup>.

Research on the accessibility of MOOCs in mathematics requires special attention, as people with disabilities often tend to gravitate toward science, technology, engineering and mathematics (STEM) fields, which is especially true of individuals with a high-functioning autism spectrum disorder [Wei et al. 2013]. Mathematical and programming jobs provide autonomy and independence, allowing to work remotely and avoid working conditions contra-indicated for people with disabilities. Jobs like mathematician, software engineer, software technician, mathematical researcher, computer information researcher, or university lecturer are recommended for people with impaired vision, hearing, locomotor activity and blood circulation<sup>9</sup>.

Demand for MOOCs in mathematical fields is one of the highest [Semenova, Vilkova, Shcheglova 2018]. Meanwhile, it is harder to bring mathematical content into compliance with accessibility requirements as compared to content that has no scientific notation or visual elements [Lowe, Mestel, Williams 2016; Ramírez-Vega, Iniesto, Covadonga 2017]. Significance of research on web content accessibility in mathematics has been proved by creation of a specialized working group of the World Wide Web Consortium (W3C) that mainly seeks to disseminate the best modern web design practices in the semantic markup of mathematical and scientific content<sup>10</sup>.

No comprehensive research has been done on web accessibility of mathematics MOOCs in Russia so far. This article aims at evaluating content accessibility of mathematics MOOCs in Russian to persons with disabilities.

## 1. The Concept of Web Accessibility

Web accessibility is understood as such organization of web content where a website can be accessed by as many user groups as possible. The more people have the opportunity to use web content, the

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<sup>8</sup> Development Requirements and Recommendations for Online Courses Posted on the National Open Education Platform (<http://npoed.ru/docs>); Accessibility Best Practices Guidance for Content Providers (<https://edx.readthedocs.io/projects/edx-partner-course-staff/en/latest/accessibility/index.html#>); Accommodations for learners with disabilities (<https://learner.coursera.help/hc/en-us/articles/208280056-Accommodations-for-learners-with-disabilities>).

<sup>9</sup> Order of the Ministry of Labor of the Russian Federation No. 515 On Approval of Guidelines on the List of Recommended Types of Work and Professional Activity of Persons with Disabilities Taking into Account the Impaired Functions and Limitations of Their Life Activity (<https://rosmintrud.ru/docs/mintrud/orders/268>).

<sup>10</sup> W3C Math Home (<https://www.w3.org/Math>).

more accessible content is considered to be [Carter, Markel 2001; W3C2012]. Individual differences, including medical conditions, can affect the possibility of getting access to web content. The following clusters of disabilities that can be barriers to access are identified: blindness, other visual impairments (including limited vision and colorblindness), deafness (including hearing loss), speech impairments, mobility impairments (including hand motor impairments), cognitive impairments (including specific learning disabilities), and neurological disorders (including seizure disorders) [Carter, Markel 2001; W3C2012; Burgstahler 2015]. Web accessibility implies creating a learning environment that ensures compatibility with assistive technologies, such as screen magnifiers, scanners, screen readers, voice-to-text technologies, Braille translators, and other software and hardware [Wentz, Jaeger, Lazar 2011]. Web accessibility refers to web design that will allow people to perceive, understand, navigate and interact with the Web, contributing with content [Luján-Mor, 2013; Acosta et al. 2018].

The international web content accessibility guidelines (WCAG) are developed by W3C within the framework of Web Accessibility Initiative (WAI). Generally accepted on the web as constitutive documents on web accessibility, they represent a set of guidelines on how to make web content perceivable, operable, understandable and robust to all users regardless of their ability or disability. The W3C Working Group elaborated the Website Accessibility Conformance Evaluation Methodology (WCAG-EM)<sup>11</sup> that provides guidance on evaluating how well websites conform to the WCAG.

MOOC accessibility is assessed using several methods: automatic accessibility checking tools [Iniesto, Rodrigo 2014; Ferati, Mripa, Bunjaku 2016; Martin, Amado-Salvatierra, Hilera 2016; Ramírez-Vega, Iniesto, Covadonga 2017; Akgül 2018; Kosova, Khalilova 2019], expert evaluation using manual, audio and visual accessibility tests [Al-Mouh, Al-Khalifa, Al-Khalifa 2014; Iniesto, Rodrigo 2014; Ferati, Mripa, Bunjaku 2016; Martin, Amado-Salvatierra, Hilera 2016; Ramírez-Vega, Iniesto, Covadonga 2017; Shutova 2018], disability simulators [Iniesto, Rodrigo 2014], and testing by people with disabilities [Bohnsack, Puhl 2014]. Lately, web accessibility has been used as a criterion in rankings of MOOC quality [Iniesto, Rodrigo 2016].

Initially, MOOC technologies were developed without paying adequate attention to barriers for learners with disabilities [McAndrew, Gruszczynska 2013]. Contemporary findings demonstrate low accessibility of MOOCs and MOOC platforms for such students. Heuristic evaluations and expert reviews show that Coursera MOOCs do not conform to WCAG 2.0 [Al-Mouh, Al-Khalifa, Al-Khalifa 2014]. Another

<sup>11</sup> Website Accessibility Conformance Evaluation Methodology 1.0 (<https://www.w3.org/TR/WCAG-EM/>).

er study assessed the accessibility of five MOOC platforms and found EdX to be the only one entirely accessible to blind people [Bohnsack, Puhl 2014]. In yet another study, automatic testing and expert analysis of eight MOOC platforms revealed that all the providers except EdX and FutureLearn had major accessibility problems [Martín, Amado-Salvatierra, Hilera 2016]. None of the Spanish MOOC platforms were found accessible to users with disabilities, especially people with severe visual impairments [Inierto, Rodrigo 2014]. Similar findings were obtained by researchers investigating Albania's MOOC platform Almooc [Ferati, Mripa, Bunjaku 2016] and testing the accessibility of three Turkish MOOC providers [Akgül 2018]. Visual evaluation of certain pages of four MOOCs in Russian revealed low accessibility of the courses to users with sensory impairments [Shutova 2018]. Numerous violations of WCAG 2.0 were discovered by automatic tests evaluating web accessibility of Russian mathematics MOOCs [Kosova, Khalilova 2019].

In the recent years, some studies [W3C2014; Inierto et al. 2017; Gay, Djafarova, Zefi 2017] have focused on auditing the accessibility of MOOCs to people with disabilities. It appears reasonable to profile learner preferences and needs in order to personalize accessible MOOCs for students with disabilities [Inierto, Rodrigo 2016]. A software design for MOOC platforms (using the case of EdX) has been proposed in order to conceptualize, design, build and test accessible MOOCs [Sanchez-Gordon, Lujan-Mora 2016]. Investigations based on a series of interviews with individuals involved in the MOOC development suggest some progress in producing universally accessible MOOCs and tailoring the existing MOOCs to meet the needs of learners with disabilities [Inierto et al. 2016].

Therefore, despite being open and cost-free, modern MOOCs and MOOC platforms fail to provide equal access to their content for vulnerable learner groups, particularly people with severe visual impairments.

## **2. Data and Methods**

Courses were sampled by browsing through the course lists of five leading MOOC platforms offering content in Russian: Open Education<sup>12</sup>, Lektorium<sup>13</sup>, Universarium<sup>14</sup>, Coursera<sup>15</sup>, and Stepik<sup>16</sup>. Sampling was performed based on the criterion of MOOC applicability in the Bachelor's degree majors of Mathematics, Applied Mathematics, and Applied Mathematics & Computer Science. The resulting sample

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<sup>12</sup> [https://Open Education.ru/](https://OpenEducation.ru/)

<sup>13</sup> <https://www.lektorium.tv/>

<sup>14</sup> <https://universarium.org/>

<sup>15</sup> <https://www.coursera.org/>

<sup>16</sup> <https://welcome.stepik.org/ru>

was comprised of 56 free online courses in Russian that were delivered during the period of research (January–March 2019).

The methodology of expert analysis implied manual evaluation carried out by two experts who tested MOOCs in the Google Chrome, Mozilla Firefox, Microsoft Edge, Opera and Lynx web browsers along 70 criteria developed in accordance with WCAG 2.1<sup>17</sup>, the content accessibility best practices provided by EdX<sup>18</sup>, the program practices to ensure access to students with disabilities by Sheryl Burgstahler [Burgstahler 2019], and the web accessibility design considerations developed by the Center for Persons with Disabilities at Utah State University [WebAIM 2019a; Ramírez-Vega, Iniesto, Covadonga 2017]. The criteria checklist contained six modules depending on the type of content assessed: general accessibility of MOOCs (15 criteria), accessibility of multimedia material (20 criteria), accessibility of digital documents (9 criteria), accessibility of tests (6 criteria), accessibility of mathematical notation (15 criteria), and accessibility of modelling and simulation (5 criteria). The latter module was not included in analysis as none of the courses contained simulations.

Expert evaluation consisted in assessing each characteristic in the set of data on the Yes / No / Partially / N/A scale. To validate expert evaluation, independent parallel testing of seven random MOOCs from different providers was carried out by two experts at the design stage, with subsequent comparison of the findings. The experts—the authors of this study—used the 70 pre-developed criteria and the same hardware and software. Identical results were obtained, proving the method of manual analysis reliable.

A body of 56 records (equal to the number of MOOCs) obtained as a result of web accessibility tests was managed with IBM SPSS Statistics 23.0 and presented as descriptive statistics (data aggregated into charts and graphs, frequency analysis, contingency table analysis).

The following assumptions and limitations applied:

1. Accuracy of data visualization was tested for the 800x600, 1024x768, and 1280x1024 screen resolutions.
2. Background and text/graphics contrast ratio was tested using the Color Contrast Checker tool [WebAIM 2019b], with the minimum required contrast ratio of 4:1.
3. Mobile website experience was tested using the Web Developer emulator in Google Chrome and by directly viewing web pages from Android-based smartphone and tablet.
4. Media player and screen reader compatibility was tested using the ChromeVox extension in Google Chrome.

<sup>17</sup> <https://www.w3.org/TR/2018/REC-WCAG21-20180605/>

<sup>18</sup> <https://edx.readthedocs.io/projects/edx-partner-course-staff/en/latest/accessibility/index.html#>

5. Text-to-speech accuracy was tested using the ChromeVox extension in Google Chrome, the in-built Read Aloud feature in Microsoft Edge, and the NVDA screen reader. In addition to Google Chrome as the default web browser, Mozilla Firefox was also used to access mathematical content as it includes native MathML support.
6. No auxiliary aids or accessibility software for persons with disabilities were used in analysis, except built-in screen readers.
7. If at least three hours were allocated for testing, the test was deemed to allow unlimited time for taking.
8. Tests requiring good hand-eye coordination involved object moving, object matching, and other tasks where sharp eyes and confident hands are needed.

### **3. Findings**

#### **3.1. General accessibility of MOOCs**

All the MOOCs have an adequate quality of sound reproduction and allow adjusting audio speed and volume. Sufficient background and text ratio is provided in every MOOC. All the pages are displayed properly on mobile devices and visualized with no loss in quality in the Chrome, Firefox, Opera and Edge web browsers. All content can be accessed with the keyboard alone. All the MOOCs contain video lectures, their media players being compatible with screen readers and all the controls being keyboard accessible.

Hyperlinks are valid and clear in 54 MOOCs (96.4%).

Meanwhile, none of the courses offer user tools to modify font size or color palette. Besides, none of the websites have content accessible via text-based web browsers (tested using Lynx).

Changes in screen resolution result in loss of content organization and readability in 15 MOOCs (26.8%).

#### **3.2. Accessibility of multimedia material**

A little over one third of the MOOCs provide closed captioning (Table 1), Coursera and Lektorium accounting jointly for 31.2% of the sample with all of their courses (15 and 3, respectively) coming with closed captions. On Open Education, only two MOOCs (3.6%) are closed-captioned. Four MOOCs on Universarium (7.1%) and 22 on Stepik (39.3%) have no captions at all. Unlike on Coursera or Open Education, captions on Lektorium are created automatically and cannot be downloaded, which affects their quality and limits their further use. Figure 1 shows the distribution of conformance to web accessibility requirements for closed-captioned MOOCs.

Visual fragments essential for the plot have either incomplete audio description or none at all in 51 MOOCs (91.1%). Meanwhile, the audio alone in every MOOC is not enough to ensure adequate perception of the content.

Lecture transcripts are provided by one third of the MOOCs assessed, including 15 on Coursera (26.8%), three on Open Education (5.4%), and one on Lektorium (1.8%). All the transcripts on Coursera and two on Open Education (3.6%) are downloadable. Visual descrip-

Table 1. **Accessibility evaluation of multimedia material in mathematics MOOCs (N = 56)**

| Evaluation Criterion   | Satisfied, % (n) | Not satisfied, % (n) | Partially Satisfied, % (n) | N/A, % (n) |
|--|------------------|----------------------|----------------------------|------------|
| Captions are available   | 35.7 (20)        | 64.3 (36)            | 0                          | 0          |
| Captions are generated automatically   | 5.4 (3)          | 30.4 (17)            | 0                          | 64.3 (36)  |
| Captions are appropriate and reflect the audio faithfully                              | 30.4 (17)        | 5.4 (3)              | 0                          | 64.3 (36)  |
| All captions remain on the screen for at least two seconds                             | 10.7 (6)         | 25.0 (14)            | 0                          | 64.3 (36)  |
| There are no more than two lines per caption   | 33.9 (19)        | 1.8 (1)              | 0                          | 64.3 (36)  |
| There are no more than 45 characters in each line                                      | 26.8 (15)        | 8.9 (5)              | 0                          | 64.3 (36)  |
| All captions are closely synchronized with the audio                                   | 33.9 (19)        | 1.8 (1)              | 0                          | 64.3 (36)  |
| If there are multiple speakers, captions indicate a speaker change                     | 0                | 0                    | 0                          | 100 (56)   |
| Background sound effects essential for the plot are designated in square brackets      | 1.8 (1)          | 14.3 (8)             | 10.7 (6)                   | 73.2 (41)  |
| Subtitle files are available for download  | 30.4 (17)        | 5.4 (3)              | 0                          | 64.3 (36)  |
| All visual fragments essential for the plot are described in words by the speaker      | 8.9 (5)          | 48.2 (27)            | 42.9 (24)                  | 0          |
| Audio-only is sufficient for adequate perception of the content                        | 0                | 71.4 (40)            | 28.6 (16)                  | 0          |
| Transcripts are available  | 33.9 (19)        | 66.1 (37)            | 0                          | 0          |
| Transcripts are downloadable   | 30.4 (17)        | 3.6 (2)              | 0                          | 66.1 (37)  |
| Transcripts contain visual descriptions essential for understanding video-only content | 28.6 (16)        | 5.4 (3)              | 0                          | 66.1 (37)  |
| Lecture notes equivalent to the video content are available for download               | 39.3 (22)        | 51.8 (29)            | 8.9 (5)                    | 0          |
| Sign language interpretation for audio and video media is available                    | 0                | 100 (56)             | 0                          | 0          |

tion essential for understanding video-only content is available in most of the transcripts, including 12 MOOCs on Coursera (21.4%), three on Open Education (5.4%), and one on Lektorium (1.8%). No transcripts are offered by Universarium or Stepik.

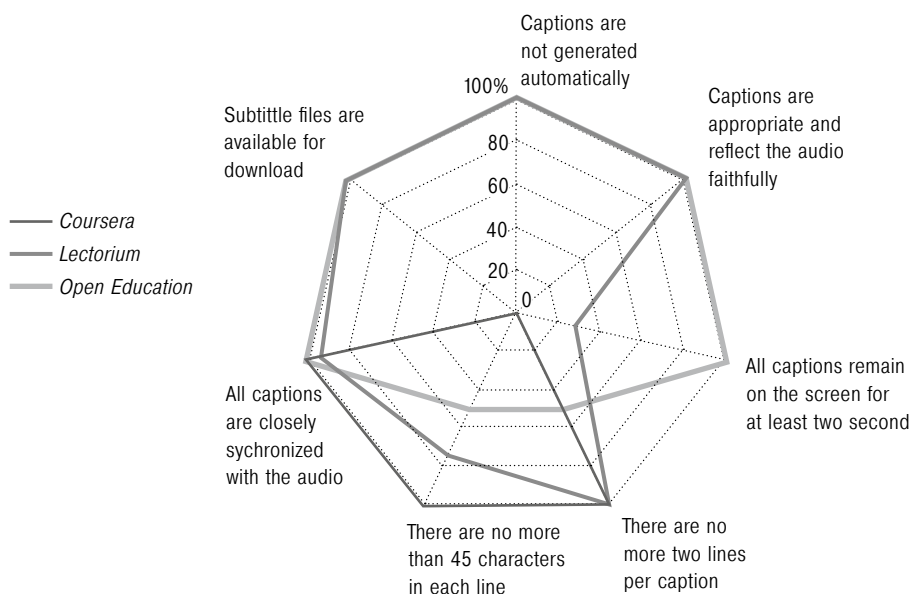
Lecture notes, provided for nearly half of the MOOCs, can be an alternative or supplement to transcripts. In most of the cases, notes reproduce the video content completely (Table 1).

None of the MOOCs offer sign language interpretation for their lectures.

### 3.3. Accessibility of digital documents

Three quarters of the MOOCs contain digital documents such as notes, presentations, glossaries, reading recommendations, etc. (Ta-

Figure 1. **Conformance of MOOCs to caption accessibility requirements**



ble 2). The most common formats are.pdf, followed by.html and, in some cases,.doc(x) and.xls(x). Analysis shows that content is adequately displayed by screen readers only in the Game Theory course (Tomsk State University x Coursera). Meanwhile, most MOOCs contain well-organized documents with clickable structural elements including multilevel headings and tables.

Availability and correct rendering of image descriptions is an important accessibility requirement that is only partially satisfied for the Mathematical Game Theory course (St. Petersburg State University x Coursera), whereas 97% of the MOOCs containing graphics do not conform to this requirement.

Lossless image scaling is supported by nearly half of the documents containing images.

In designing the content of digital documents, MOOC developers do not regard color as a key source of information, which is confirmed for 87.9% of the MOOCs containing graphics.

In most cases, hyperlinks contained in documents are clickable and go to the right place, yet one in every five links has improper formatting.

### 3.4. Accessibility of tests

Testing is used to assess students' knowledge in all the MOOCs except two on Coursera and one on Universarium. Of all the MOOCs using tests, 90.6% contain no tasks requiring good hand-eye coordination.

Table 2. **Accessibility evaluation of digital documents in mathematics MOOCs** (N = 56)

| Evaluation Criterion  | Satisfied, % (n) | Not satisfied, % (n) | Partially Satisfied, % (n) | N/A, % (n) |
|---|------------------|----------------------|----------------------------|------------|
| The MOOC contains digital documents (notes, presentations, etc.)                              | 76.8 (43)        | 23.2 (13)            | 0                          | 0          |
| Text of the document is adequately (accurately and consistently) read by screen readers       | 1.8 (1)          | 39.3 (22)            | 35.7 (20)                  | 23.2 (13)  |
| The document is well-structured, has a hyperlinked table of contents, headings, and bookmarks | 51.8 (29)        | 10.7 (6)             | 14.3 (8)                   | 23.2 (13)  |
| Tables have clickable column and row headers  | 23.2 (13)        | 3.6 (2)              | 0                          | 73.2 (41)  |
| Images that are essential for the plot have descriptions readable by screen readers           | 0                | 57.1 (32)            | 1.8 (1)                    | 41.1 (23)  |
| Users are able to enlarge images (to at least twice the standard size) without losing quality | 28.6 (16)        | 30.4 (17)            | 0                          | 41.1 (23)  |
| Color is not used as the only visual means of distinguishing a visual element                 | 51.8 (29)        | 5.4 (3)              | 1.8 (1)                    | 41.1 (23)  |
| Hyperlinks are represented by words and redirect users straight to the right place            | 48.2 (27)        | 14.3 (8)             | 5.4 (3)                    | 32.1 (18)  |
| Sufficient background and text contrast ratio is provided                                     | 76.8 (43)        | 0                    | 0                          | 23.2 (13)  |

dination (Table 3), which people with visual and motor impairments normally find difficult to complete.

Assessing the incidence of tests by their type was beyond the scope of this study. Nevertheless, it appears reasonable to emphasize that multiple choice questions and open-ended questions are the most widespread.

Some MOOCs (four courses on Stepik) offer alternatives to tasks requiring good hand-eye coordination (e. g. instead of using a mouse to match objects, users are asked to select the options from a drop-down list for every object).

In 40% of the MOOCs using tests, the content of assignments is conveyed accurately and consistently by screen readers. Screen reading errors were detected in 20% of the courses. Meanwhile, screen readers are usually not enough to ensure adequate perception of the tests. Tasks that can be understood and done entirely without looking at the screen are rare exceptions. This paradox is explained, in particular, by speakers omitting images contained in the tests due to the lack of image description.

All the tests support keyboard-only feedback, and most of them can be completed in an unlimited time.

**Table 3. Accessibility evaluation of tests in mathematics MOOCs (N = 56)**

| Evaluation Criterion  | Satisfied, % (n) | Not satisfied, % (n) | Partially Satisfied, % (n) | N/A, % (n) |
|---|------------------|----------------------|----------------------------|------------|
| The tests contain no tasks requiring good hand-eye coordination                 | 85.7 (48)        | 8.9 (5)              | 0                          | 5.4 (3)    |
| The tests offer an alternative to tasks requiring good hand-eye coordination    | 7.1 (4)          | 1.8 (1)              | 0                          | 91.1 (51)  |
| The tests are read accurately and consistently by screen readers                | 37.5 (21)        | 37.5 (21)            | 19.6 (11)                  | 5.4 (3)    |
| A screen reader is sufficient for adequate perception of the tests              | 8.9 (5)          | 76.8 (43)            | 8.9 (5)                    | 5.4 (3)    |
| Feedback can be provided using keyboard commands only (without a visual editor) | 94.6 (53)        | 0                    | 0                          | 5.4 (3)    |
| Unlimited time is allotted for taking the tests                                 | 87.5 (49)        | 7.1 (4)              | 0                          | 5.4 (3)    |

### 3.5. Accessibility of mathematical notation

Mathematical notations in the MOOCs are mostly displayed using images, video, LaTeX and MathML formats, and other means (Table 4), including linear format, visualization using the MathJax library, Microsoft Equation Editor, and, in isolated cases, scanned copies of lecture notes and HTML math symbols. Figure 2 shows the distribution of the principal ways of displaying mathematical notation among the MOOC platforms.

MathML notation system is considered to be the most accessible format [W3C2014] and is available in the majority of MOOCs.

Image description is only available in 11.8% of the MOOCs that use images to render mathematical content (drawings, graphs, formulae).

Detailed visual description for videos containing mathematical notation is available in Linear Algebra and Analytic Geometry (Peter the Great St. Petersburg Polytechnic University x Lektorium) and Advanced High School Mathematics (Moscow Pedagogical State University x Universarium).

The majority of MOOCs allow searching for and rescaling mathematical content.

All the MOOCs, to varying degrees, scale the size of their mathematical notations to fit various screen resolutions.

Proper formula transcripts are available for 25% of the video lectures containing mathematical notation. However, it is only in Probability Theory (Tomsk State University x Open Education) that the transcripts are sufficient for adequate perception of the video content.

Most MOOCs support reading of mathematical notation by screen readers, but only one in five MOOCs has its math content read cor-

Table 4. **Accessibility evaluation of mathematical notation in mathematics MOOCs** (N = 56)

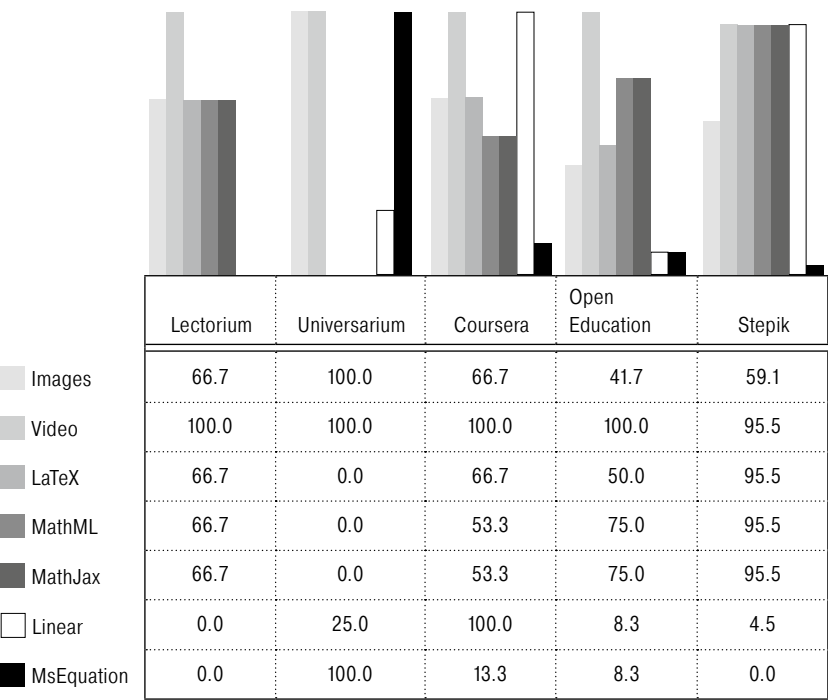
| Evaluation Criterion  | Satisfied, % (n) | Not satisfied, % (n) | Partially Satisfied, % (n) | N/A, % (n) |
|---|------------------|----------------------|----------------------------|------------|
| Mathematical notation is rendered by means of images  | 60.7 (34)        | 39.3 (22)            | 0                          | 0          |
| Mathematical notation is rendered by means of video   | 98.2 (55)        | 1.8 (1)              | 0                          | 0          |
| Mathematical notation is rendered by means of LaTeX   | 75.0 (42)        | 25.0 (14)            | 0                          | 0          |
| Mathematical notation is rendered by means of MathML  | 57.1 (32)        | 42.9 (24)            | 0                          | 0          |
| Mathematical notation is rendered by other means  | 96.4 (54)        | 3.6 (2)              | 0                          | 0          |
| Where mathematical notation is rendered by means of images, image description is available                      | 7.1 (4)          | 51.8 (29)            | 1.8 (1)                    | 39.3 (22)  |
| Where mathematical notation is rendered by means of video, visual description is available                      | 3.6 (2)          | 83.9 (47)            | 10.7 (6)                   | 1.8 (1)    |
| Search for mathematical notation is available and accessible  | 55.4 (31)        | 44.6 (25)            | 0                          | 0          |
| Mathematical notation can be rescaled   | 55.4 (31)        | 44.6 (25)            | 0                          | 0          |
| Mathematical notation is adaptable and displayed adequately at different screen resolutions                     | 60.7 (34)        | 0                    | 39.3 (22)                  | 0          |
| Video containing mathematical notation feature proper transcription of math formulae                            | 25.0 (14)        | 67.9 (38)            | 5.4 (3)                    | 1.8 (1)    |
| Mathematical notation can be read by screen readers   | 83.9 (47)        | 10.7 (6)             | 5.4 (3)                    | 0          |
| Mathematical notation is read properly by screen readers  | 17.9 (10)        | 55.4 (31)            | 16.1 (9)                   | 10.7 (6)   |
| Captions and/or transcript are sufficient for adequate perception of the video containing mathematical notation | 1.8 (1)          | 10.7 (6)             | 23.2 (13)                  | 64.3 (36)  |
| Additional material is available for interpreting the video containing mathematical notation                    | 44.6 (25)        | 53.6 (30)            | 0                          | 1.8 (1)    |

rectly. The highest quality of reading was observed for the linear math notations in Coursera transcripts.

Supplementary material to facilitate the interpretation of video lectures containing mathematical notation is provided by 45.5% of the video-based MOOCs and normally includes lecture notes, glossaries, chapters from textbooks, and bibliography.

**4. Discussion** A review of literature shows that this study is so far the third publication assessing the accessibility of mathematics MOOCs after the one produced by Alexa Ramírez-Vega et al. [Ramírez-Vega, Iniesto, Cova-donga 2017] and our previous article [Kosova, Khalilova 2019]. It is the first time that expert evaluation of mathematics MOOCs for students in mathematics and IT fields is performed in Russia.

Figure 2. **Distribution of ways of rendering mathematical notation across the MOOC platforms (%)**



None of the MOOCs examined allows customizing user interface or displaying content in text-based web browsers. Low accessibility of multimedia content is associated with poor design or lack of captions, transcripts, and lecture notes. Moreover, none of the MOOCs offers sign language interpretation for their audio content. Similar findings were obtained in a study of mathematics MOOCs in English [Ramírez-Vega, Iniesto, Cavadonga 2017].

General accessibility of media-based lessons for visually impaired learners is low, which may be related to specific video lecture design principles and the complexity of mathematical content that is rarely voiced completely. Ramírez-Vega et al. [Ibid.] also observed low accessibility of multimedia content and recommended considering the use of templates for such content to allow the minimum accessibility set out to be guaranteed.

Half of the digital documents contained in the MOOCs are not reproduced faithfully by screen readers, first of all due to the lack of description for images which often contain mathematical concepts essential for understanding (formulae, reasoning, constructions, etc.). In the vast majority of the cases, screen readers cannot guarantee

faithful and correct reading of tests because of incorrect mathematical notation and lack of image description. This is in line with the findings of a number of international studies which revealed flaws in the reproduction of various types of MOOC content by screen readers [Akgül 2018; Al-Mouh, Al-Khalifa, Al-Khalifa 2014; Bohnsack, Puhl 2014; Ramírez-Vega, Iniesto, Covadonga 2017].

Mathematical content represented in all the MOOCs in various formats (images, video, markup languages) is the main challenge in providing web accessibility, especially for people with visual impairments. Similar results were obtained by Ramírez-Vega et al. [Ramírez-Vega, Iniesto, Covadonga 2017] who revealed accessibility flaws in all types of mathematical content, despite proper visual interpretation of scientific notation.

One must distinguish between accessibility problems associated with platform limitations and those caused by design failures. For example, Coursera does not support MathML, suggesting linear format and LaTeX for mathematical notation instead, which makes content less accessible to screen readers. Open Education, Lektorium and Stepik (the former two use the Open edX open source platform) support MathML and MathJax natively, yet mathematical notation is not always read faithfully as a result of MOOC designers using alternative rendering formats (images without image description, video without visual description, inaccessible PDF files, etc.) as well as platform limitations. In particular, no page on Stepik identifies the default text-processing language, which is violation of WCAG and can lead to incorrect reproduction of the text [Bohnsack, Puhl 2014], including mathematical notation [Ramírez-Vega, Iniesto, Covadonga 2017]. To introduce formulae on platforms with MathJax support, developers use LaTeX, which is less accessible than MathML and may result in defective rendering of content by screen readers. Overall, screen readers reproduce only 20% of all mathematical content accurately and correctly, which is a huge barrier to learning for persons with severe visual impairments. Mathematical notation on Universarium proved to be the least accessible.

All the accessibility problems discovered can be grouped into three categories: i) flaws associated with violation of WCAG 2.1, which are relatively easy to fix by editing the HTML codes of the web pages; ii) flaws associated with the logical structure and content of MOOCs — fixing them will require expertise in creating accessible learning content for persons with various types of disability; and iii) platform design failures that cannot be fixed without changing the MOOC platform source code.

Summarizing the above, it is fairly safe to say that, despite the existing web accessibility guidelines and legal frameworks stipulated in international and federal regulatory documents (Universal Declaration of Human Rights, Convention on the Rights of Persons with Disabilities, Federal Law On Social Protection of People with Disabilities

in the Russian Federation, Federal Law On Education in the Russian Federation, and others) as well as national and international standards (GOST R ISO 9241–151–2014<sup>19</sup>, GOST R52872–2012<sup>20</sup>; WCAG 2.1), creating accessible courses in conformity to the applicable international rules was obviously beyond the mission of MOOC developers from the very beginning. Indeed, no automated accessibility tests were carried out, no users with disabilities participated in beta testing, the web accessibility algorithms built in the MOOC platforms were ignored or used inadequately, and in many cases the platforms were completely inaccessible to learners with disabilities.

The results obtained here are consistent with international findings [Bohnsack, Puhl 2014; Ferati, Mripa, Bunjaku 2016; Iniesto, Rodrigo 2014; Martin, Amado-Salvatierra, Hilera 2016; McAndrew, Gruszczynska 2013; Ramírez-Vega, Iniesto, Covadonga 2017] and illustrate the need to bring the existing MOOCs into compliance with WCAG 2.1, ensure that MOOC platform administrators conform strictly to WCAG 2.1 before creating new courses, involve persons with disabilities in testing new and existing MOOCs, and teach MOOC authors and developers to create accessible course content. Training in accessible mathematics MOOC development should be designed in accordance to web content accessibility rules and guidelines (W3C2014; WCAG 2.12018).

## 5. Conclusion

The findings of this study reveal low accessibility of mathematics MOOCs in Russian to people with disabilities, particularly those with severe visual impairments. Accessibility issues result from MOOC platform limitations and course design failures. A great majority of accessibility violations are associated with improper formalization of mathematical content, and complex mathematical notation structures make web accessibility of MOOCs even a greater challenge. The problem of elaborating unified guidelines on web accessibility of mathematical content remains acute and requires further investigation.

Development of a national accessibility standard for online learning resources (including MOOCs) on the basis of the international web content accessibility guidelines WCAG 2.1, web accessibility standardization best practices, and the rules of online learning content development and design will allow MOOC providers and developers to rely on a single web accessibility regulatory framework and unified accessibility evaluation methodology in creating new MOOCs and MOOC platforms as well as fixing those that already exist.

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<sup>19</sup> GOST R ISO 9241–151–2014 Ergonomics of Human-System Interaction. Part 151. Guidance on World Wide Web User Interfaces (2015) <http://docs.cntd.ru/document/1200113012>

<sup>20</sup> GOST R52872–2012 Internet Resources. Accessibility Requirements for Visually Impaired People (2014) <http://docs.cntd.ru/document/1200103663>

Once binding web accessibility requirements are included in federal laws and bylaws related to online learning, a framework will be provided for legitimating the measures to ensure conformance of MOOC platforms and web developers to the web content accessibility guidelines.

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# The “Russian Hirsch”: Predictors of Citation Usage of Scholarly Works in the RSCI

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Abstract

The article investigates the predictors of citation rate in the Russian Science Citation Index (RSCI) for Russian publications in psychology. Four groups of indicators are analyzed: formal attributes of a publication (12 indicators), parameters of publication visibility on eLibrary (3 indicators) and PsyJournals (2 indicators) that define accessibility of publication to potential readers, and author-based citation parameters (3). Special attention is paid to citation parameters as qualitative characteristics of the author's method of elaborating the scientific text and construing dialogue (in the form of citations) with other researchers. Relationship between the indicators analyzed and the RSCI citation rate is proven statistically using the multivariate statistical methods of factor analysis and cluster analysis. For each of the four groups, the strongest predictors of citation rate are identified by multiple regression analysis, which are then compared by their predictive power. It is shown that visibility (accessibility) indicators are the best predictors of citation rate, followed by formal publication attributes and, finally, citation type parameters as having the lowest predictive power. The method of logistic regression allows to identify the ultimate predictors of citation rate and measure their accuracy in predicting whether a publication is low- or highly cited, which is 77.3% and 72.9% for the indicators of visibility on PsyJournals and eLibrary (respectively), 69.9% for formal attributes, and 60.9% for citation parameters. A publication that has few in-text citations is very likely to have a low RSCI citation rate, yet a high number of in-text citations does not guarantee a high citation impact. Recommendations are provided for authors to increase their citation rates. The sample is represented by 662 publications in six Russian psychology journals, each indexed in the RSCI, Web of Science, and Scopus.

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Keywords

Russian Science Citation Index, Russian publications in psychology, citation rate, publication visibility, author-based citation, author reputation, journal credibility.

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# Employment and Labor Market Outcomes of College and Vocational School Graduates

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**Abstract** Data obtained in a 2016 survey of college and vocational school graduates produced in 2010–2015 is used to analyze the characteristics of entry-level jobs and labor market outcomes separately for graduates in higher education and vocational training (the latter featuring mid-level specialist programs and skilled-worker programs). Graduates who combined work and study tend to enjoy a competitive advantage in the labor market, the effect being the strongest for college graduates and the weakest for skilled workers. Most graduates found their first jobs rather quickly, mainly with the help of their immediate community, whereas institutions were found to play a very insignificant role in graduate employment. Supply and demand imbalance in the labor market results in about two thirds of college graduates and two fifths of vocational school graduates being mismatched to their jobs. Over one third of college graduates and over two fifths of mid-level specialists found themselves overeducated in their first jobs. Among the employed graduates of skilled-worker programs, 63% were employed as skilled workers, clerks, service and retail sale workers, i. e. their entry-level jobs were well-matched to their level of qualifications.

Employment is higher among vocational graduates of both types and significantly higher among college graduates than the national average. Graduates in higher education also demonstrate the lowest unemployment rate.

**Keywords** higher education system, vocational education system, mid-level specialist programs, skilled-worker programs, graduate employment, labor market outcomes.

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## **Students' Perceptions of Career Choices (Based on the findings of cross-regional sociological studies conducted in 2006–2016)**

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**Abstract** This article explores college students' perceptions of career choices using the data obtained in the cross-regional sociological monitoring study Contradictions and Paradoxes of Student Socialization in the Context of Transitivity of the Modern Russian Society (2016) and comparing its findings with those of similar studies conducted in 2006 and 2011. Perception of career as a means of personal development has been found to be the strongest career motivation for modern students, which improves their learning outcomes. However, students have little idea of the labor market situation and sector-specific demand, which results in job-education mismatch, oversupply in high-profile careers, shortages in other economic sectors, and graduate employment issues. Significant differences are revealed in perceived motivations for career choices between students and professors. Professional educators tend to underestimate the role of students' interest in their prospective career and overestimate the role of external factors (parental influence, desire to obtain a diploma of higher education in no matter which field, etc.). Modern students, unlike their counterparts in the 1990s, seem to realize the correlation between their learning outcomes and their career success.

**Keywords** young students, higher educational institution, career choice, motives for choosing a career.

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# **Female Lecturers at the Faculty of History and Philology of the Bestuzhev Women's Higher Education Courses as a Manifestation of Russian Emancipation of the Second Half of the 19th—Early 20th Century**

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**Abstract** The article describes the phenomenon of female “intrusion” into academia, particularly the social and legal status of the first female historians in Russia who became university lecturers. Analysis of the self-fulfillment strategies that Russian female historians pursued in the second half of the 19th—early 20th century allows to reconstruct the social mechanisms that they used in their zeal to achieve the status of highly-qualified scholars and lecturers at universities. Regulatory documents defining the status of faculty in the Russian Empire, as well as Bestuzhev Courses faculty meeting reports and unpublished memoirs are analyzed to reconstruct the sources and mechanisms of overcoming gender stereotypes, the long way that female historians had to go to be allowed to teach and study the science of teaching, the innovations that they brought to the Bestuzhev Courses teaching practices, the specific aspects of their approach to teaching, and the legal and social norms they had to change to secure themselves a faculty status equal to that of male academics. This article is the first publication analyzing the regulatory enforcement of placing the graduates from the Faculty of History and Philology of the Bestuzhev Courses into jobs. It also addresses for the first time the economic aspects of female teaching and the ways in which female lecturers interacted with course administrators and other faculty staff.

**Keywords** female historians, women's higher education courses, legal status, emancipation, gender history, women's history.

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