

## Peculiarities of Educational Environment at Mining and Metallurgical Schools of the Urals

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### ABSTRACT

The relevancy of the issue under study stems from the contradiction between the need for a modern interpretation of the activities of mining and metallurgical schools, which had played a prominent role in the institutionalization of the vocational education environment as well as from moral “obsolescence” of research work results in this field. The goal of the article is the development of environmental indices of mining and metallurgical education of the Urals. The principal concept of research of this problem is the system approach, which allows considering the main peculiarities of the educational environment at mining and metallurgical schools of the Urals comprehensively. This article includes structurally significant characteristics of the educational environment at mining and metallurgical schools of the Urals. The contents of the article may be used for the purpose of modeling, designing and construction of an educational establishment (system) meeting the demands of the new communicational reality within the system of relations between education, industry, and social environment.

### KEYWORDS

Educational environment, mining and metallurgical schools of the Urals, openness of an educational establishment, social partnership, spiritual and moral trends

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## Introduction

We shall begin with the notions outlined in the title of the article. There are two of them: “educational environment” and “mining and metallurgical schools of the Urals”. The interpretation of the first notion shall be based upon the specification given thereto by A.V. Mogilev & A.N. Shilman (2005). According to said authors, an educational environment is “a set of educational (training, fostering, developmental) influences on an individual on behalf of educational establishments, cultural institutions, mass media organizations and their services and facilities (training courses), educational and recreational groups, educational and cultural events, manuals, printed press, instructional and

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communication media etc.” In the present case, mass media, printed press and communication media shall most likely be irrelevant. At the same time, the absence of industrial objects, personal and communicatory components is quite obvious. Therefore, it is reasonable to add to the aforementioned definition the concept of the educational environment as “a specific educational facility, as expressed by the interrelated, interconditional and complementary set of material, space and figural factors, social components and interpersonal relationships, organized specifically to facilitate the teaching and learning process” (Veryaev & Shalaev, 1998; Dorozhkin et al., 2016; Ashmarina et al., 2016; Davydova et al., 2016). The lexeme “mining and metallurgical schools” is not a scientific notion in the strict sense. However, this does not grant any relief of the necessity to give next level explanations. To identify them we must rely on the understanding of them as multifunctional general education and vocational establishments, organized within the structure of “backbone” mining and metallurgical enterprises with an aim to teach literacy and professional occupations of high demand at mining and metallurgical industry (Shelepov, 2006). Time of activity of mining and metallurgical schools of the Urals: early 17<sup>th</sup> – early 20<sup>th</sup> centuries. Throughout the years of their existence, mining and metallurgical schools have greatly contributed to the development of both vocational education and metallurgy in Russia. Graduates of mining and metallurgical schools became the backbone of industry specialists, bringing world-wide fame upon the metallurgical industry of the Urals. Even foreign sources, considering their lack of affection towards admitting the superiority of others, recognized the charcoal blast-furnaces of the Urals the largest and best in Europe. Nikolai Shteinfeld, a Russian mining engineer, at the end of the 19<sup>th</sup> century had every reason to state that throughout 200 years Russia had been ploughing, reaping, forging, digging and chopping with the tools manufactured by his factory. The Urals has given Russia every copper cross carried, every axle, every ounce of gun metal, every frying pan for cooking battercakes and every penny ringing in the pockets of its people. All the need of Russian for these products was satisfied by the Urals (Vorobyov, 2001). It was largely caused by the high level of training of the Urals’ craftsmen at mining and metallurgical schools giving a start to the development of the modern Russian mining and metallurgical education system in the 20<sup>th</sup> century, which now holds one of the leading positions in the world for quality of professional training. This allowed S.V. Kolpakov (2001), in the 1990-is holding the position of President of the International Metallurgists Union, to consider as a “national peculiarity” the existence of “highly proficient workers and experts, over and over again proving their top-level skills and competence in the development and implementation of large-scale projects both within the country and abroad”. The aforementioned accomplishments have been achieved largely due to the unique educational environment of mining and metallurgical schools. In modern-day terms, we are dealing with a cluster including educational, industrial and sociocultural organizations. The unique character of mining and metallurgical education is what is to be explained herein.

### **Methodological framework**

#### ***Research methods***

The research was performed using the following methods: theoretic methods (analysis; synthesis; abstracting; concretization; generalization; analogue method; modelling; thought experiment).

### **Stages of research**

The research was performed in three stages:

- at stage one the existing methodological approaches to matter study were analyzed;
- at stage two the historical and pedagogical materials relevant to the issue were researched and the view of their evaluation was formed;
- at stage three the historical and pedagogical material research data were generalized.

### **Results**

#### **Heuristic research base defined.**

**Specification of the methodological base for research –systematic, pragmatic and synergetic – is performed.** By relying on the *systematic* approach, we were allowed to define mining and metallurgical education as a collection of educational, sociocultural, and industrial components. The *pragmatic* approach was the precondition for viewing a) the activities of mining and metallurgical schools as a specific area of sociocultural activity in a combination of its every object- and subject-based components; b) the activities of mining and metallurgical schools as a system-forming factor of integrated sociocultural activity; c) the trainee (and the trainer) as a subject for various types of educational, industrial, and sociocultural activity. The synergetic approach allows viewing mining and metallurgical schools as complex systems possessing the characteristics of openness, non-linearity, and irreducibility with a tendency towards self-organization and self-development. The synergetic approach also allows interpreting the process of reaching the integral effect of the mutually interdependent activities of affine components of mining and metallurgical schools educational environment. Use of the synergetic approach contributes to the understanding of the fact that not only education is a part of the environment, but also the environment is the part of education. We deem it necessary to point out that the matter of interrelations of the part and the whole takes a prominent place in pedagogics (Chapaev, 2005).

**Guiding principles of research defined and adapted** – those of cultural conformity and folk nature of upbringing, unique character, and, in a sense, incommensurability of pedagogic cultures and civilizations (Chapaev & Vereshchagina, 2013). The integrated expression of the aforementioned principles are the following provisions defining education as a) a social phenomenon, not a “mutual exchange between two individuals, the teacher and the student” at the level of personal relations; б) a phenomenon closely connected with the spiritual life of the society. Specification of these principles may be found in the following definitions: 1) education does not form a human being in general, but a human being in and for the given society; 2) the best educational unit is not an individual but a group; 3) the purposes of education in a society may not be perceived adequately while not segregated from specific

situations of every age-group, as well as from the social structure wherein they are formed (Zborovsky, 2000).

***Based on the analysis and the summarization of relevant research experience*** (Alekseev, 2001; Veselov, 1961; Nechaev, 1944; 1956; Kolpakov, 2001; Mezenin, 2002; 2008; Pavlov, 1990; Sergeev, 2004; Shelepov, 2006 and others), the principal peculiarities of the educational environment at the mining and metallurgical schools of the Urals were discovered. As any other system, environments may have various classifications. For example, the abiotic (inanimate), biotic (animate) and anthropogenic (made or heavily modified by man) environments are distinguished. Sometimes the geographical environment, i. e. the climate is mentioned. Most often the traditional perception of an environment in pedagogics (in this country at any rate) was as of the social environment, defined by the economic factors common for the given social formation (Babansky, 1989). Today educational environments are divided into natural and artificial, object and informational, traditional and innovative, and, of course, into open and closed etc. At the same time, modern-day pedagogues (Yasvin, 2010) actively discuss the classification of educational environments by Ya. Korchak (1922), which includes the “dogmatic” and “ideological” environments, “the environment of blissful consumption”, as well as the environment of “surface gloss and career”. The principal categories of the first type are tradition, authority, discipline, self-containment, and passivity; the second type includes creativity, good will, fervour, enthusiasm, moral asceticism; the third type – peace of mind, tranquillity, inner security, conservative habits of idle character, leniency towards modern trends; the fourth type includes skilful exploitation of borrowed values, sly self-display, insatiable vanity, rapacity, haughtiness, and servilism. All of the aforementioned proves that the taxonomization of educational environments is a complex and fairly arbitrary. However, it may make some heuristic contribution to this research. For instance, relying on the names and descriptions of the aforementioned educational environment types taking into account the available research data on this matter, we may name the ideological (spiritual and moral) trends, openness, and innovativeness as the distinctive qualities of the educational environment at mining and metallurgical schools of the Urals. Besides, we may also add the fundamental interdependence of pedagogical and industrial factors in the activities of the mining and metallurgical schools of the Urals, as well as their diversity.

### ***Spiritual and moral trend***

Spirituality is one of the most important traits of a human being. *Homo sapiens* are spiritual beings, as their level of spirituality may never be reached by other living things. Spirituality is the core of human existence, its acme. Therefore the matter of nurturing spirituality has always excited the minds of mankind. This is a permanent, “eternal” issue. Pedagogues point out (Belkin & Tkachenko, 2006) that the spiritual aspect of existence for Russians has always been dominating over the naked and vulgar pragmatism. At that, the “golden mean” must be found, the balance of relations between secular and ecclesiastic spirituality. This balance was, for the most part, retained due to the integrated

sociocultural synthesis of the interests of an individual, the society in general, and the particular industrial establishment in the process of activity of mining and metallurgical schools. Ecclesiastic spiritual upbringing and implantation of the standards of civil conduct to the students constituted a certain harmony. Alongside that, historical realia of 18-19<sup>th</sup> centuries Russia may not be omitted, as the religious aspect was prominent in an average person's life. This found its reflection in the educational process at mining and metallurgical schools, where the *Law of God* was taught "especially". The most prominent places in the library of Nizhniy Tagil school funded by the Demidov family were held by books in ecclesiastic education. On holidays including Sundays, the teachers and students attended to the church to participate in *vespers, matins, and mass*, learning to sing (Telkov & Koryakov, 2005). A specific example is taken from N.A. Shubina (2007). Thus, among the disciplines of the three-grade women's college (the city of Tagil) were the *Law of God*, as well as didactic discussions about the attitude towards God and neighbors. The central role of the spiritual and ecclesiastic component was retained even after the college was reformed into a gymnasium, where *Law of God* remained one of the most important disciplines. The classes in the gymnasium began with the gathering of all students and teachers in the assembly hall for incantations and prayer, and only then did they go to the classrooms. The prominent part in the development of the spiritual and moral education content was played by the mining and metallurgical school "ideologist" V.N. Tatishchev (Nechaev, 1956; Pyatnitsky, 1948). He, diving all laws into divine, ecclesiastic, and secular, attributed the moral values to the divine laws. According to him, secular laws have no absolute value, as they depend on many circumstances. Secular laws are, in his opinion, short-term and volatile: good is oftentimes considered evil and vice versa. At the same time, as the reader may have already noticed, the training process at mining and metallurgical schools was not limited by religious education.

### ***The openness of mining and metallurgical education***

The phenomenon of openness of education to society, including industry, stems from many circumstances. Particularly by the ability of education to perform the socio-mental and productive-economic functions. The openness of education for sociocultural demands of the society is a necessary prerequisite for both its own functioning and that of the society in general. This quality is, so to say, a genetic trait of education and is of a historical, and, therefore, volatile nature. In some periods this quality of education may be, for a number of reasons, latent or manifest itself spontaneously, randomly, without any properly explicit policy. Ignoring the social conditions for education was (and by far is) expressed by, for example, underestimation of its socially forming role, its reduction to personal disturbance, interests, and desires. Mining and metallurgical schools are an example of implementation of the ideas of openness under the specific conditions of their time. By solving specific issues of personnel training, they strictly followed their customers' requirements. Along with solving the issues of vocational education, the purpose of mining and metallurgical schools was to perform the function of reproduction means for the whole social connections and relations structure of the incipient Urals industrial region, providing the sufficient level of sociotativity thereof. A tangible expression of mining and metallurgical school openness is the social partnership, which was widely used in their operation. Modern researchers (Tkachenko et al., 2003)

have built a three-level system of social partnership: The 1<sup>st</sup> level – forming and fulfillment of the education order; 2<sup>nd</sup> level – employment of graduates; 3<sup>rd</sup> level – workplace adaptation and career advancement. All these levels were more or less taken into account in the operation of the mining and metallurgical schools of the Urals. Thus, a substantive part of the activities of mining and metallurgical manufacture management was taken by forming an education order. In mining and metallurgical schools, the problem of graduates' employment was solved quite effectively. For example, the collaboration between the school and the industrial management as to the allocation of future graduates of the Urals mining college began just after the first year of study. They were allocated "according to the students' abilities and aptitude, as well as the requirements of the factories" (Pyatnitsky, 1948). It is important that the allocation of graduates was approved by the chief head of the Urals' factories. The allocation was supplemented by the monitoring of graduate allocation (Sergeev, 2004).

The openness of the mining and metallurgical schools is also evidenced by the multitude of social categories of their attendants. Its manifestation may be seen in the creation on their basis of conditions for educating children and juveniles of different social classes. It was common for children of clergy and clerks, commoners and peasant serfs, craftsmen and workers, i. e. "every inhabitant of the factories", to sit at one desk; sometimes there were children of the nobility and even the boyar. There were even instances when French in the mining and metallurgical schools was taught by the descendants of peasant serfs, who themselves had studied at those schools. The diversity of social categories in the mining and metallurgical schools was explained by the fact that they served the purpose of forming a new social class structure of the society, as well as the development of a social partnership between these categories. It is common to distinguish three approaches to the definition of the nature of interrelation between education and social class structure of the society. The first gives priority in forming of this structure to education. The second approach empathizes the par value of the influence of both social class structure of the society and education. The third concept acknowledges the dominance of the society in this interaction, whereas education is ought to reflect its structure. The first two approaches "work" with the mining and metallurgical schools. As it was shown above, the line-up of their students amply reflected the social structure of the day. At the same time, mining and metallurgical schools contributed to the formation of this structure. These schools were not only making an isomorphic reproduction of said structure but also made significant changes thereto.

### ***Innovativeness***

Mining and metallurgical schools have made an invaluable contribution to the development of Russian and global vocational education (Chapaev, 2016). Mining and metallurgical schools have laid the foundation for the origination of basic and middle vocational education school not only in Russia but also worldwide. The most sophisticated pedagogic process organization technologies were "harnessed" on their basis. For the first time in world practice teaching literacy, math and other common subjects was tightly bound with learning the factory manufacture technology by the students and their direct participation in the enterprises' manufacturing activities. Mining and metallurgical schools have a



vast experience in “specializing” of such subjects as physics and chemistry. Alongside that, the theoretical knowledge of these subjects is widely used at practical classes. A unique “sandwich” of theory and practice was being formed. There is a well-justified opinion among researchers that the mining and metallurgical schools were a completely new distinctive type of establishments of vocational education, not by far seen neither in Russia nor in the West. There were yet no specialized schools in Europe where theoretical studies were complemented with students working at factories. “In early 18<sup>th</sup> century, this was, without doubt, a novelty not only for Russia but also for the European countries” (Nechaev, 1956). Mining and metallurgical schools became, so to say, the precursors of the famous Russian school of training of engineers. There are three pinnacles of its foundation: 1) sound practical training based on actual work of the students under realistic circumstances of factories and plants; 2) theoretical subject study at the level equal to that of a classical university; 3) constant and mutually profitable connection of the high school and the industry (Chapaev, 2016). All of these characteristics appropriate for mining and metallurgical schools.

### ***Mutual interconditionality of pedagogic and industrial factors in the activities of mining and metallurgical schools of the Urals***

The indices thereof are as follows: the existence of a unified management system, direct dependence of the educational process by the industrial factors, vocational education orientation of educational content.

The existence of an unified management system. What was its display? Firstly, the mining and metallurgical schools and factories were an integrated operational system, wherein the management of educational and manufacturing processes was implemented by a single person – the chief of Mining and factories bureau. Private entrepreneurs did not separate mining and metallurgical business from mining and metallurgical schools either. Secondly, it was the content of official documents regulating the operations of mining and metallurgical enterprises. For example, it is shocking that in a document of a seemingly pure industrial character named “Collectives of state mining facilities”, 1847 (Pyatnitsky, 1948), the most deliberate attention is given to the matters of mining and metallurgical education. Thirdly, the unity of organization was reached via specialist employment: on the one hand, many of school teachers, those of the specialized subjects, for the most part, were recruited from the ranks of factory employees: on the other hand, schools provided specialists for the factories, who were their principal customers and, therefore, business partners.

The direct dependence of the educational process on the industrial factors. From the very origination of mining and metallurgical schools, their unique task for the time was to create an educational system which, along with the school and general education systems, would solve issues of industrial purpose, namely providing the factories with skilled employees. Throughout two centuries mining and metallurgical schools had been the main suppliers of human resources, as well as the means of its recreation and satisfaction of the labour market’s demand of the Urals. The direct dependence of educational activities on the industrial factors may result in both positive and negative consequences. On the positive side, the basis for the professional socialization of an individual a key

element of general socialization is laid already within the educational facility. Such evaluation of professional socialization is explained by the system-forming role of the professional activity in within the structure of a human life. At mining and metallurgical schools favourable conditions were formed for forming the students' approach to life (view of life), expressed as an aim for a certain social and professional future within the mining and metallurgical industry. Although here there is a notable restriction of potential capabilities and personal skills which may have been developed under other circumstances. However, in real life, a bird in the hand is worth two in the bush. Even more so that many students were materially impaired and had no second thought of any other occupation. And if in certain situations a mining and metallurgical school student suffered a loss as a personality, he was gaining as a man, as a subject to social and professional activity, and a society member. The unambiguously negative aspect of the direct dependence of educational activities on the demands of the industry was that the training of a large number of children had to be interrupted due to arising production necessity. Sometimes the fulfillment of the demands of the industry manifested itself in the form of direct interference in the pedagogical work of the educational establishment: the students were engaged in performing different manufacturing and even general labour tasks, being remotely connected with the prospector's trade. But more frequently the students were separated from studies to be engaged in the performance of more or less specialized work, in one way or another related to their future profession. Wanton growth of factories required more skilled employees, the lack of which was evident. In the toughest times for the industry, when the bureaus were filled with unattended papers and documents, the students were employed as clerks. They, for instance, "railing notebooks", "binding books" etc. Sometimes students did not endure past the required term of study. Many were assigned by the mining authorities to work as acceptors, supplies flow control officers, accountants and to tend to other paperwork. It wasn't uncommon to be assigned to labour in punishment. Thus, at the Vyysk factory delinquent students were made to carry baskets filled with ore and perform other kinds of hard and low-qualification work. There is much to think about here. Namely, the limits of acceptable interference of the industry into the matters of education. Nowadays this problem is still on the agenda, and in some cases has escalated further (Shelepov, 2006).

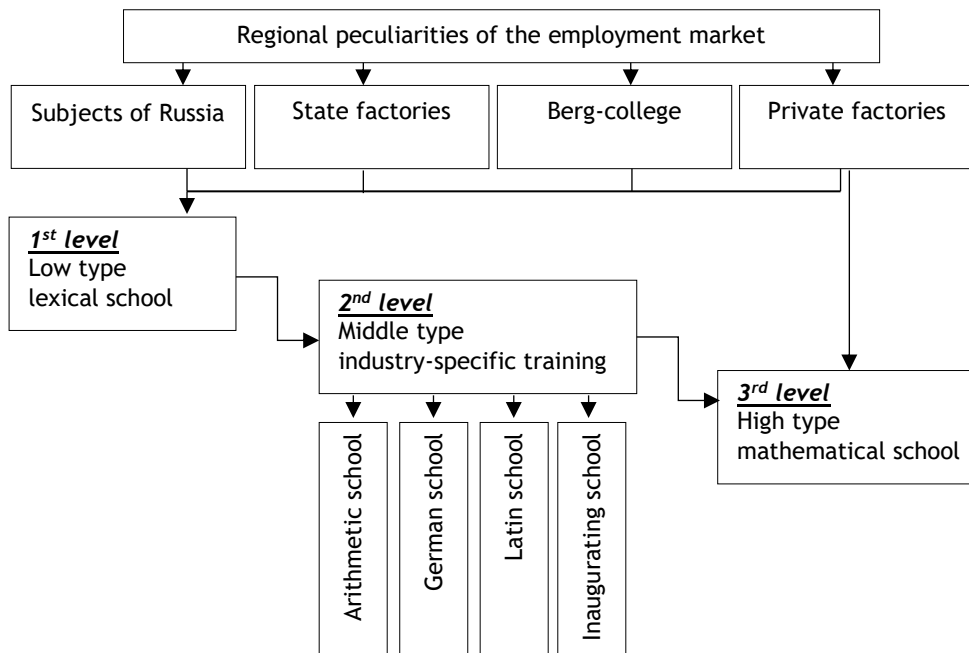
Vocational education orientation of educational content. Within the content of mining and metallurgical school training, this phenomenon reflects such quality thereof as fundamentality – the original trait of the Russian educational culture. The fundamental nature of mining and metallurgical schools and at the same time their commitment to the integration of general education and professional training were evident at the earliest stages of their development. The contents of the curriculum of Vyysk mining and metallurgical college shall serve as an example (Telkov & Koryakov, 2005). There, on the one hand, they studied *Law of God*, Russian language, language arts, arithmetic, algebra, geometry, trigonometry, Russian and world history, geography, physics, natural history, geometric draftsmanship, and art, and on the other hand – mining and mining engineering and geodesy, metallurgy, mineralogy, classical and applied mechanics, organic and analytical chemistry (including assaying), perspective geometry, botany, forestry, woodworking technology, elementary geodesy, accounting, and technical drawing. Disregard that, "outlandish" languages, such



as Latin, German, and French, were diligently learned at mining and metallurgical schools.

### *The diversity of mining and metallurgical schools of the Urals*

The diversity of mining and metallurgical schools may be seen from the model of continuous education presented by V.N. Tatishchev (created by modern researchers (Sergeev, 2004), and actually realized in the activity of mining and metallurgical schools. This system of continuous education closely interacted with the industrial and other environmental components (figure 1).



**Figure 1.** Continuous education model

As may be seen from figure 1, in mining and metallurgical schools both the vertical and the horizontal profilizations were used. Upon finishing the low-type study, the students had the opportunity to continue their study at the middle school which had several education profiles. There was a choice between the arithmetic, German, Latin and Inaugurating (one of art and technical drawing) schools. Within those types there were sub-profiles. Mining and metallurgical schools prepared not only technicians but also accountants and scribes. However, all of them were generally familiar with the manufacturing processes. That taken into account, it may be rightfully stated that the educational content of training at mining and metallurgical schools was of a polytechnic nature.

### **Discussions**

Pedagogics has never shunned, nor is it shunning the problems of mining and metallurgical education of the Urals. The traditional subjects for discussion are the problems of chronology; defining the role of the Demidov family in the development of mining and metallurgical schools; the importance of mining and

metallurgical schools for education both in Russia and the world, as well as for the development of metallurgy. For example, researchers have yet to come to an agreement on when the first mining and metallurgical school appeared. One theory states that it was opened in 1709 on the grounds of the Nevyansk factory by Nikita Demidov himself. The other theory states its opening occurred in 1721 at the instigation of the Russian scientist and statesman V.V. Tatishchev (Sergeev, 2004), who at that time was the supervisor of the mining works of the Urals. The main conclusion stemming from the analysis of works researching the problems of defining the value of mining and metallurgical schools (Veselov, 1961; Nechaev, 1956) is that we require a principally new apprehension of the experience of mining and metallurgical schools activity from the point of view of requirements of modern-day vocational education development. There is current research proving the relevance of mining and metallurgical schools experience for modern education (Sergeev, 2004; Shelepov, 2006; Chapaev, 2016). In this article, an attempt was made to solve the problem of actualization of the mining and metallurgical schools experience in light of consideration of the peculiarities of their environmental traits. We shall bring up three issues, arising from the logic of our research.

1. ***Paternalism in education.*** Contrary to the modern “contractual” nature of social partnership, the social partnership in the context of mining and metallurgical schools activity was, most likely more like a partnership. And rightly so. Social partnership is paternalistic by implication. An educational organization and a manufacturing enterprise are quantitatively unequal. Collaboration between an educational facility and an industrial establishment may become not formal but equal only in the latter provides considerable financial aid to the former. Of its own part, the educational facility provides to the industrial establishment aid in training employees. As a result, we have an instance of equivalent exchange. The relations between mining and metallurgical schools and mining industry built upon a paternalistic basis had led to diversification and multiplication of connections profiles between them, as well as mutual sharing of experience. As a result, the students of mining and metallurgical schools were not only getting the knowledge and professional skills but also absorbed the spirit of mining and metallurgical manufacture, mastered the basics of living in specific conditions of mining and the metallurgical sociocultural environment.

2. ***General and specialized training.*** Today, in the 21<sup>st</sup> century, it is common to encounter the thought (and even official and scientific conclusions) that too much knowledge is not what should be given to specialists of lower ranks and that narrow background should be sufficient. Is that progress at the expense of human degradation? The experience of mining and metallurgical schools of the Urals proves that it is crucial and effective to integrate these types of training. We require the fusion of general and vocational training, which shall result in fundamentalization of education. At present the available approaches to their convergence are largely limited to general education parallelism, sometimes dualism or reduction of one step to the other: within the regular school vocational education is reduced to general, and within the professional school general education is reduced to special. To reach this interfusion, the general, the general polytechnic, professional and polytechnic, and special education must be merged together in the pedagogic process. And to ensure this fusion, the entire educational pyramid must be represented in the content of

education: the general education, the general polytechnic, professional and polytechnic, and special education. In other words, the extensive basis principle must be utilized, the one successfully used in the operation of mining and metallurgical schools of the Urals.

3. *Spiritual and moral establishment of the personnel.* It is known from the analysis of the operation of mining and metallurgical schools of the Urals in the open educational environment that, firstly, spiritual and moral training is a crucial part of vocational education; secondly, an educational establishment may provide such training only in collaboration with other entities of the social environment.

## Conclusion

From this research three main conclusions may be derived:

1. Mining and metallurgical schools are an open educational system for spiritual, intellectual and professional development of a human being.

2. The experience of mining and metallurgical schools which existed on the basis of backbone enterprises proves that the existence of robust relationship with the industry and the social environment does not diminish the effect of pedagogic influence of an educational establishment, but quite the opposite – it encourages the enhancement and extension of human capabilities, as well as multidimensional discovery of genetically predefined and acquired properties. A wide range of tasks is solved within the educational environment:

— creation of prerequisites for self-reveal and self-fulfilment of inner potential of the individual;

— aiding the individual in finding the sense of life in the context of radical social and economic transformations;

— forming the students' the generic life and civil values;

— forming the responsibility for the fate of the Motherland, respect for their country's laws and constitution of;

— adoption and inoculation of working skills with representatives of different cultures and mentalities;

— the development of the ability to collaborate, communicate, build a balanced human relationship; forming an integral trait of inner dignity (rights), self-respect together with the respect towards the dignity of others;

— the development of group/staff work attitude;

— the development of motivation towards an unfettered conduct backed with the ability for self-restriction, unbiased self-evaluation, and self-direction;

— forming the ability and readiness for self-reflection etc.;

— preparation for life within an integral sociocultural environment, where every aspect of human life is exercised, where the upbringing and socialization, as well as personal and professional potential realization of a person, occurs.

1. Mining and metallurgical schools, at their day, offered a solid and even universal education: the students gained knowledge, skills and abilities in a wide variety of subjects. Particularly peculiar is the flexible nature of study manifesting in the interconnection of general and specialized subjects, theoretical and practical studies.

Summarizing the aforesaid. Researching the particular patterns of their formation and development shall help to understand not only the regional peculiarities of the development of modern-day national education but also its development in general, to foresee the trends for its further improvement.

### Recommendations

This work may be recommended for researchers and practitioners in the field of education, as well as magistrants and aspirants; for persons engaged in educational policy development; for entrepreneurs; for everyone interested in the present and the future of education.

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