

# Humanitarian knowledge in higher education: on the issue of training scientific and scientific-pedagogical personnel (on the example of graduate ecologists)

*Natalia V. Kornienko*<sup>1,\*</sup>, *Lamara L. Mekhrishvili*<sup>2</sup>, and *Nina A. Tkachyova*<sup>2</sup>

<sup>1</sup>Saint Petersburg State Institute of Psychology and Social Work, Saint Petersburg, Russia

<sup>2</sup>Industrial University of Tyumen, Tyumen, Russia

**Abstract.** The purpose of the research is to peruse the dynamics of the real-life context for young graduates in Russia with regard to socio-cultural, axiological and pedagogical perspectives. Under the pressure from accelerating social demand to stimulate economic advancement, the tertiary education strives to align graduate research programmes with national priorities. Being a part of the Humanitarisation Project of the Industrial University of Tyumen, this research presents an analysis drawn from the perceptions of graduate students in ecology as the key stakeholders in their scientific pursuit.

## 1 Introduction

According to the Strategy for Development of the Mineral and Raw Material Base of the Russian Federation until 2035 one of the key problems is enhancement of efficiency of processing of strategic mineral raw materials of natural and technogenic origin based on the eco-friendly technologies.

Multiple federal initiatives in the Russian Federation seek to promote competitiveness in the global educational and labour market to stimulate economic advancement while preserving the ecological stability. «Project 5–100» for supporting leading Russian Universities focus on excellence in academic ranking. The goal of the national projects “Education” (2018–2024) and “Science” (2018–2024) is to sustain system-wide acceleration of industry-university cooperation and to construct paths for academic mobility of highly qualified personnel. The projects ensure investment attractiveness by scientific research and development spending in order to position Russia among strategic leaders of environmental initiatives for the community.

In tertiary education, there is a high demand for aligning postgraduate programmes with national priorities as a pre-requisite for recruitment and retention of prospective scholars. Thus, the share of scholars under the age of 39 is estimated to increase up to 50.1% in 2024. A review of the trends affecting academic discussions shows some concern about the postgraduate research enterprise. The current emphasis on the efficiency of postgraduate

---

\* Corresponding author: [nvkornienko07@gmail.com](mailto:nvkornienko07@gmail.com)

research module reflects some challenges associated with an authentic structure of the three-tier system of higher education [1].

The hierarchy of postgraduate degrees in Russia offers multiple tracks to postgraduate study including traditional Candidate of Sciences degree and Doctor of Sciences degree. The prerequisites for admission to postgraduate course are the award of the Specialist Higher Diploma or the completion of Bachelor and Master's degree programs. PhD study aims at imparting in-depth theoretical knowledge and carrying out an independent research. Doctoral study awards an advanced level of academic degree, which does not necessarily have a worldwide equivalent.

There is a diversity of disciplinary models for rethinking the traditional research inventory. Advocates of «the dissertational approach» are concerned with a potential erosion of postgraduate study without a sustainable dissertation rationale. They view research agenda as a high-impact practice and believe that likening master's and postgraduate curricular will have an adverse effect on professional training [2, 3].

Proponents of «the educational approach» claim that getting qualification of “researcher” could become a potential target at postgraduate study level. They advocate reformatting postgraduate curriculum in order to decrease the share of the research module and increase the pedagogical focus that would add value to the training of future-to-be instructors for higher institutions [4]. The «competency» view substantiates postgraduate functions as a market of highly intellectual labour through a range of trajectories, which should be coordinated with a specific employer, both in and outside academia. A relatively small amount of coursework could be complemented by a comprehensive thesis to realize the postgraduate syllabi.

Being a part of the Humanitarisation Project of the Industrial University of Tyumen, this research shows the dynamics of the real-life context for young graduates in Russia with regard to socio-cultural, axiological and pedagogical perspectives. As establishing an integral cultural and educational environment at the Industrial University, the project is aimed at modernising educational activities at the IUT [5]. Thus, the research presents an analysis drawn on the perceptions of postgraduate students as the key stakeholders in their scientific pursuit. The study has been carried out at the Industrial University of Tyumen with approximately 60 candidates enrolled in postgraduate programmes annually. The mission of the Industrial University is to ensure competitive training of the world-class technical elite, and to perform research that would provide an innovative breakthrough in the mineral raw materials industrial complex.

The objective of this study is to evaluate graduate ecologists' perceptions of their research-related experiences as well as their interest in, appreciation for, and comfort with their research inquiry. The following questions have been addressed:

1. How do the graduate ecologists self-identify their attitudes toward the trajectory through and beyond science?
2. What degree of self-sufficiency and confidence do they experience in the research domain?
3. How proactive are the graduate ecologists with regard to their research dissemination?

## **2 Literature review**

### **2.1 Socio-cultural perspective on research agenda**

Humanitarian aspects penetrate in all spheres of human life, including commercial and industrial spheres. Humanitarian perspective is a necessary component in order to improve industrial performance. Both the industrial complex and science suffered from the lack of

humanitarian aspects in previous years. Globalization, for instance, has made English lingua franca for scientists around the world, and linguistic and cross-cultural competencies have been added to the technical ones. Nowadays the gender aspect has become the central point in science as well as in technology in general. As for ecology, its importance cannot be stressed upon enough for a number of reasons related to the energy transition, the necessity to reduce greenhouse gas emissions, especially for the enterprises of the mineral and raw materials complex. In addition, ecology serves as a link between industrial sectors and a man reducing burden on the environment and preserving habitats of a man, who is both a source of environmental problems and a doer to solve them.

To achieve technological sovereignty and provide high-tech industries of Russia, it is necessary to concentrate scientific research on enrichment of mineral raw materials on the basis of physicochemical and energy effect with maximum extraction of valuable components and obtaining finished products with required characteristics. Various economic and technological factors, caused by the current world situation, may hinder the increase in the rates of reproduction and processing of solid minerals. The peculiarity of the current historical stage of development of the national economy, which is within the global context of change of technical and economic modes of the Russian Federation, is the implementation of the strategy of reproduction of the mineral resource base and processing of solid minerals in conditions of eco-friendly technologies [6].

Sustainability of an educational institution for social change depends on the historical context. Educational trends on a global scale have multiple implications for historically established educational norms in different countries. Gershunskyi (1998) calls for spiritual convergence of different human communities via the global connectedness in higher education in order to save the civilization [7]. Demchenko (2003) reiterates that socio-cultural practices are patterned by power relations; to preserve multiple textual cultures, the cross-cultural dialogue in the educational and scientific domains is an imperative [8]. Gerasimova (2022) points out that the necessity of the retention and transfer of expertise and scientific knowledge to the future generations has been the primary concern of researchers [9].

Some controversies involve the global spread of English which impact the inclusion of geographically peripheral scholars. Philipson (1997) claims «linguistic imperialism» promotes the hierarchy of languages. Holmes (2001) concurs that the majority language has the tendency to show glamorous norms which many minority language speakers find simply irresistible. The expansion of English has manifested itself in the dominance of the western discourse. Some scientists argue that perceived or real power is not innate to any language, and depends on a larger context of the history and reiterate that no nation has been given a permanent credit, and it doesn't make any sense to differentiate between native and non-native English speakers any more [10, 11]. Focusing on gender aspects of postgraduate studies Oblova (2022) provides an analysis of gender diversity among researchers and women's outcomes in STEM-related fields in academia [12].

The diversification of non-native speaking stakeholders in the English-dominated world is facilitated by professional objectives to ensure academic success. According to the theory of situated cognition, co-participation in cultural practices sustains the sense of belonging to the community of practice and becomes a matter of success [13]. Taking justifications of professional competitiveness into consideration, strategic initiatives in Russia focus on integrating research design into a wider academic environment. As part of the scientific and ecological initiatives the study by Gerasimova leveraged the major trends in the Arctic labour market paying special attention to the population dynamic as well as the impact of the demographic factor on the economic indicators of the region [14]. According to the national project «Science» (2018–2024), the scope of publications in the international citation databases is expected to advance from the eleventh place in 2019 to the fifth top-rating in

2024. The number of Russian scientific journals indexed in WEB of Science and SCOPUS databases is estimated to reach 500 by 2024 with a target of 4000 articles in Q1/Q2 journals [15-17].

Thus, it is necessary to emphasize the linking role of ecology between the current rate of industrial development and sustaining the natural environment for future generations within the process of training of graduate ecologists. This implies a wide-format dialogue between scientists, technologists, and humanitarians, which, in its turn, is impossible without a humanitarian component in the educational system and well-developed soft skills of all participants of the dialogue.

## **2.2 Axiological dimension of research agenda**

Under the pressure from accelerating social demand, value-based attitudes to the research agenda define a vector in the pursuit of novel skills for future generations. Ideological variability within the system of personal values is rooted in the modern sociocultural context. The diverse academic environment shifts the emphasis on metaphysical epistemic outlook in the science philosophy curricular [18].

Current growth of institutional schemes to support young researchers faces dilemma of perceived benefits for the science trajectory. From axiological perspective, scientific ways of thinking and the virtue of academic integrity are indispensable for sharing research ethics through and beyond science. Apprehended self-realization is a major drive behind postgraduate's research aspirations. It is manifested in the desire to enable individual's full potential [19].

Ismailov (2009) contends that financial viability of educational institutions to satisfy research ambitions is a priority factor determining career choices for university graduates world-wide [20]. Collaborative pedagogical framework that provides individual routes for self-realization should be accentuated to ensure feasibility of postgraduate research agenda. To increase the effectiveness of knowledge sharing among mining and ecological specialists in the world, as well as to overcome cultural barriers the training concept named Empowerment Teaching based on practical teaching experience gained in various mining universities was suggested. The "physical" and "emotional» models of participatory training have been portrayed in order to develop the potential of highly motivated and well-educated graduate ecologists being diminished by the lack of ability to apply their knowledge [21]. Environmental issues of global warming and greenhouse effect continue to call for the attention of the international community and increasingly cry out for the adoption of attitudes and signs of solidarity with the help of carbon dioxide sequestration technologies, which are implemented as CC(U)S (carbon capture, utilization and storage) projects involving the capture, disposal and, in some cases, use of CO [22, 23].

## **2.3 Pedagogical approaches and instructional practices**

Debating ambiguity of the graduate tracks, scholars claim that holistic approach rather than conflicting transformations are required to promote scientific rigor. Social inertia is bound to be observed among some young researchers. According to Raychuk & Minina (2016), functional disparities of the mainstreamed model may result in the deficit of scientific culture [24]. Shestak & Shestak (2011) reiterate that semantic and structural discrepancies in academic writing may manifest in speculative hypotheses and faulty rhetoric. The authors argue that scaffolding research competence is a means of developing scientific mentality [25]. Zimnyaya (2010) correlates applicable degree of students' autonomy and research sustainability with the levels of a three-tier system of higher education. According to her classification, research at the bachelor level is initiated and directed by the instructor; master

students carry out an independent research under supervision while postgraduates perfect from being the object of instructional interventions to the subject of research activities [26]. The Federal State Educational Standards of Higher Professional Education in Russia link the synergy of competence continuum to the spiral curriculum. Comparative analysis of elevated standards for both master’s and postgraduate levels shows that relevant competences can evolve exclusively within an independent research enterprise [27].

The rationale of the three-tier structure of higher education progressively amplifies research agenda in the graduate syllabi. According to the Federal State Educational Standards of Higher Professional Education (2019), research module takes up to 85% of the graduate program. Approximately 10% involves variable components, and 5% is assigned to the exam preparation in foreign languages and philosophy. Autonomy of studying should be maintained to meet the needs of a broad graduate population with full awareness of time commitments, benefits and burdens of such approach.

Graduate coursework is undergoing a shift in recognition of studying-research nexus. An emerging theme of peer-reviewed publications has become an indispensable commodity. Requirements to publish in academic journals indexed in international citation databases are embedded in the graduate curricular. A range of opportunities for disseminating research are available, so that students should focus on presenting research for communication from the outset.

**Table 1.** A sample of selected target competences in the graduate ecologists’ curricular.

<b>Master’s Competencies</b>	<b>Postgraduate’s Competencies</b>
Student is capable of developing the overall research plan as well as individual assignments for its implementation.	Postgraduate is capable of designing a comprehensive interdisciplinary research scheme based on a holistic scientific approach.
Student is able to use Russian and foreign languages as a means of business communication.	Postgraduate is able to utilize productive techniques of academic discourse in the native and foreign languages.
Student will develop skills of physical and mathematical modeling in the professional domain.	Postgraduate will successfully apply theoretical methodology to carry out experimental research.

### 3 Materials and Methods

Due to the interpretive nature, our study follows a qualitative method that offers descriptive statistics. A survey using structured questionnaire was administered to analyze perceptions of incoming and second year graduate ecologists. The data were collected on an anonymous basis via online survey application at the Industrial University of Tyumen.

The theoretical foundation of the study is based on scholarly discussions in Russian and western academic publications. A range of primary sources was analysed, including official documents of the Russian Ministry of Higher Education, as well as internal institutional regulations.

### 4 Results

In the first part of the survey, value categories were appraised to analyze graduate ecologists’ attitudes through and beyond science. The ecologists’ motivation in earning a graduate

degree has been viewed as an important attribute. In determining the benefits of the graduate study, almost half of the respondents (45%) place career promotion at the top of the list, while one third of the sample (34%) accentuate that their genuine interest in science was the major drive behind enrollment in a postgraduate programme. About 13% of the respondents directly link self-realization to their interest in science. Other criteria, such as financial benefits are last with an overall 8%. It can be assumed that all the respondents take prospective professional opportunities offered at the graduate level seriously.

Some 62% of the graduate ecologists in this study won't consider a teaching career at a higher educational institution as their job target. 33% of graduate students rejected this idea as well while 45% doubt that they would follow that path in the future. Such results may account for the fact that the mission of the Industrial University of Tyumen is professional training in the technical domain.

One of the most significant outcomes drawn from students' viewpoints is the premise that research agenda is the most functional attribute for the graduate study. The data presented in Table 1 show that the overwhelming majority of the respondents (99%) identified research inquiry as their priority.

Furthermore, the questionnaire inventory probed participants' confidence in carrying out research and writing the thesis paper. This batch of questions focused on different facets mirroring the re-search process from developing objectives statements and data collection to dissertation defense. Some 46% of graduates who filled in the survey report challenges associated with their experimental work. About 15% of the respondents highlight that class attendance on a regular basis impede implementation of practical experimental ideas, which is at the core in technical projects. Consequently, data collection and interpretation of the results are regarded as the most challenging sections of the thesis by 48% of the respondents.

The difficulties associated with writing the dissertation paper rank second among respondent' concerns (39%). Survey results show that there are no apparent disparities in perceived complexity of the dissertation sections and deviations don't exceed 3%.

The third research question was addressed in the final part of the questionnaire. The study revealed high level of confidence among the respondents in publishing their research results. 73% of the surveyed graduate ecologists have high esteem of their project value, and are positive that research results will be applicable for academic publishing. Moreover, the majority of the respondents (77%) declared their intention to publish a scholarly article in the English language (Table 2).

**Table 2.** A sample of selected target competences in the graduate ecologists' curricular.

<b>Publishing choices</b>	<b>Response data</b>
Russian journal	7.69
English journal	76.93
Not important	15.38

Evaluation of respondents' feedback with regard to their choices clarifies their position. In the comment box, half of the sample agrees that publishing both in Russian and English is essential for disseminating research results; a minority of 15% believes that the location of the publication is not significant. At the same time, respondents appreciate the utility of opportunities offered by western academic journals and recognize benefits of sharing their work with the international community. They highlight the fact that publishing in Russian doesn't allow such opportunities.

According to 33% of respondents, lack of publishing experience is the major deterrent for communicating graduate research with wider audience both in native and foreign

languages. At the same time, respondents clearly identify further challenges that place them at a disadvantage for publishing in English. Some 40% report insufficient information and unawareness of English academic requirements as the main barriers. Quite a few respondent (18%) highlighted financial costs associated with publishing in English. About 30% of the samples are critical of their English proficiency that needs improvements and refinements to achieve adequate academic standards. Their interest in mastering the English language is twofold - to keep abreast of the current developments in the professional domain and to add their distinctive voice to the academic discourse.

## 5 Conclusion

The study yields comprehensive results to attest to the value of the graduate research in ecology at postgraduate level in the tertiary education in Russia. Some limitations of the study involve a selective nature of the sample that represents the context of one technical educational institution by case of the Industrial University of Tyumen.

In the light of international feedback, we have discussed multiple perspectives to determine a potential disconnect between academic narrative and real-life demands. Our findings highlight similarities as well as some notable differences against other approaches in scholarly spheres. In particular, the study generates further insights about the functional role of the English language for the graduate research module in Russia.

The study has shown the urgent need to include the humanitarian aspect in the training of graduate ecologists due to the increased role of ecology in all human activities. The humanization of environmental science education creates a platform for the dialogue of all stakeholders and helps them speak the same language, which will contribute to solving the serious environmental problems humanity faces.

## References

1. D.YU. Rajchuk, N.V. Minina, *Vysshee obrazovanie v Rossii*, **4 (200)**, 33–41 (2016).
2. B.I. Bednyi, *Vysshee Obrazovanie v Rossii*, **4**, 5-16 (2017).
3. N.G. Popova, E.V. Biricheva, *Vysshee Obrazovanie v Rossii*, **1**, 5-14 (2017).
4. G.V. Osipov, V.I. Savinkov, *Aspirantura Dynamics and Perspectives till 2030: Statistical and Social Analysis*, (Moscow: TSCPIM, 2014)
5. L.L. Mekhrishvili, R.K. Kasimov, and N.V. Kornienko, *Global Journal of Engineering Education*, **1 (24)**, 59 - 64 (2022).
6. T.N. Aleksandrova, *Journal of Mining Institute*, **256**, 503-504 (2022) <https://pmi.spmi.ru/index.php/pmi/article/view/16064>
7. B.S. Gershunskiy, *Philosophy of Education: A Handbook for Students of Pedagogical Universities and Colleges* (Moscow: Moscow Psychological-Social Institute, 1998)
8. Z.A. Demchenko, *Students' Research Activities in Higher Education in Russia (1950-2000): Historical Perspective, Concepts, Approaches* (Arkhangelsk: IPTS SAFU, 2003)
9. I.G. Gerasimova, I. S. Oblova, *Scientific heritage of professor G. V. Illyuvieva, Obogashchenie Rud*, **4**, 52-56 (2022). 10.17580/or.2022.04.09
10. D. Crystal, *English as a Global Language* (Cambridge: Cambridge University Press, 1997).
11. J. Swales, *The English Language and its Teachers' thoughts: past, and present*. (Cambridge: Cambridge University Press, 1993).

12. I. S. Oblova, I. G. Gerasimova, I. V. Goman, *Global Journal of Engineering Education* **1(24)**, 21-27 (2022).
13. E. Wenger, *Communities of Practice: Learning, Meaning and Identity*, (Cambridge: Cambridge University Press, 1998).
14. I.G. Gerasimova, I. S. Oblova, E. I. Golovina, *Resources*, **10**, 117-133 (2021). <https://www.mdpi.com/2079-9276/10/11/117>
15. National Project «Science»: Target Indicators and Major Outcomes (2018). <http://static.government.ru/media/files/UraNEEbOnbjocoMLPOnnJZx4OT20Siei.pdf>.
16. Passport of the National Project «Science» (2018). <http://government.ru/info/35565/>
17. K. V. Matrokhina, A. B. Makhovikov, E. N. Trofimets, *E3S Web Conf.*, **266**, 90011-90018 (2021). [https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/42/e3sconf\\_ti2021\\_09001.pdf](https://www.e3s-conferences.org/articles/e3sconf/pdf/2021/42/e3sconf_ti2021_09001.pdf)
18. M. I. Mikeshin, *Non-Ferrous Metals*. **7**, 98-103 (2022). DOI: 10.17580/tsm.2022.07.12.
19. V. S. Litvinenko, I. Bowbrick, I. A. Naumov, Z. Zaitseva, *Journal of Cleaner Production*, **338**, 1-9 (2022). <https://doi.org/10.1016/j.jclepro.2022.130530>
20. E. Ismailov, *Vysshee Obrazovanie v Rossii* **7**, 24-34 (2009).
21. J. Kretschman, M. Plien, T.N. Nguyen, M. L. Rudakov, *Journal of Mining Institute*, **242**, 248 (2020). <https://doi.org/10.31897/pmi.2020.2.248>
22. I.B. Movchan, Z.I. Shaygallyamova, A.A. Yakovleva, *Journal of Mining Institute*, **254**, 217-233 (2022). DOI:10.31897/PMI.2022.23
23. M.A. Chukaeva, V.A. Matveeva, I.P. Sverchkov, *Journal of Mining Institute*, **254**, 97-104 (2022). DOI:10.31897/PMI.2022.5
24. D.Yu. Raychuk, N.V. Minina, *Vysshee obrazovanie v Rossii* **4**, 33-41 (2016).
25. V. Shestak, N. Shestak, *Vysshee Obrazovanie v Rossii*, **12**, 115-119 (2011).
26. I.A. Zimnyaya, *Students' Research Activity as the Subject of Competence-Oriented Curricular of Higher Education*, (Moscow: Quality Research Center for Professional Development, 2010)
27. Federal State Educational Standards. Portal of Federal State Educational Standards of Higher Professional Education. (2023). Retrieved from: <http://fgosvo.ru/fgosvo/95/91/7>. Accessed 09 February 2023.