

policy at the regional level (Sakalova et al., 2019), expanding the participation of scientists and students in international scientific and educational programs (Denysyk et al., 2019; Kolomiets et al., 2020).

Our observations showed that the active participation of students of the Pedagogical University in various types of citizen science for several years contributed to an increase in the number of those willing to obtain master's degree, and among master's program students the share of those, engaged in scientific activities in the future, is significantly increased (from 13.2% to 24.8%).

Conclusions

Thus, despite some differences in the levels of personal readiness of future teachers of different specialties for research, citizen science at the Pedagogical University is one of the most effective methodological approaches to improve the quality of professional training of teachers, a means of integrating science and education, and a powerful tool for promoting scientific knowledge among young people and strengthening students' motivation for scientific research activity.

The main, most effective forms of intensification of research activities of students of pedagogical universities are defined as follows: interactive problem-based lectures that require analytical and critical thinking; performance of individual scientific-research tasks; solving practical problems that require scientific research; conducting a mini-experiment during practice in school; performance of term papers and thesis.

Personal qualities and skills formed by students while their study at the university, taking into account the basic conceptual provisions of civil science, form the personal and professional readiness of the future teacher to carry out innovative pedagogical activities in accordance with the principles of science, nature and culture. The teacher-researcher will always be interesting for students and will be able to form the relevant research personal qualities and skills.

References

- Bonney, R., Cooper, C.B., Dickinson, J. et al. (2009) Citizen Science: A Developing Tool for Expanding Science. Knowledge and Scientific Literacy. *BioScience*, 59 (11), 977–984.
- Bonney, R., Shirk, J.L., Phillips, T.B. et al. (2014) Next Steps for Citizen Science. *Science*, 343, 1436–1437.

- Brovchak, L., Starovoit, L., & Likhitska, L. (2018) Pedagogical Conditions for Creative and Artistic Development of Children of Senior Preschool Age by Means of Art. *The New Educational Review*, 52 (2), 206–217.
- Burgess, H.K., DeBey, L.B., Froehlich, H.E., et al. (2017) The science of citizen science: Exploring barriers to use as a primary research tool. *Biological Conservation*, 208, 113–120.
- Cooper, C.B., Shirk, J., & Zuckerberg, B. (2014) The Invisible Prevalence of Citizen Science in Global Research: Migratory Birds and Climate Change. *PLoS ONE*, 9(9), e106508. <https://doi.org/10.1371/journal.pone.0106508>
- Denysyk, G., Kolomiiets, A., Gromov, I., et al. (2019) International Scientific and Pedagogical Communication as a Constituent Part of the Tourism Activity. *Ukrainian Geographical Journal*, 4, 28–39.
- Indian schoolgirls discover asteroid moving toward Earth. By Swati Gupta and Amy Woodyatt, *CNN*. Updated 1946 GMT (0346 HKT) July 28, 2020. Available at: <https://edition.cnn.com/2020/07/28/india/india-schoolgirl-asteroid-intl-scli-scni/index.html>
- James-Creedon, J. (2016) The Whole Truth. Citizen Science Community Resources. Available at: <https://jackiejamescreedon.wordpress.com/>
- Kasperowski, D. & Kullenberg, C. (2019) The many modes of citizen science. *Science & Technology Studies*, 32(2), 2–7.
- Kącka, K., Michalak, B., & Piechowiak-Lamparska, J. (2018) Impact of Scholarly Publications and the Selected Socio-Demographic Factors. *The New Educational Review*, 52, 11–21.
- Klochko, O., Fedorets, V., Maliar, O., et al. (2020) The use of digital models of hemodynamics for the development of the 21st century skills as a components of healthcare competence of the physical education teacher. *E3S Web Conf.*, 166, 10033.
- Kolomiiets, A., Gromov, I., Kolomiiets, L., et al. (2020) Work with Foreign Scientific Editions as an Effective Factor of Motivating Undergraduates to Improve Their Foreign Language Competency. *The New Educational Review*, 60, 96–107.
- Kolomiiets, A., Kolomiiets, D., & Gromov, I. (2017) Implementation of The Latest World-Class Scientific Achievements in Training Process of Future Teachers. *Science and Education*, 8, 72–77.
- Kostiukevych, V., Lazarenko, N., Shchepotina, N., et al. (2019) Management of athletic form in athletes practicing game sports over the course of training macrocycle. *Journal of Physical Education and Sport*, 19 (1), 28–34.
- Matiash, O., & Mykhailenko, L. (2020) Opportunities for Method Competence Development of Mathematics Teachers: The Role of Participation in Competitions with Colleagues. *Universal Journal of Educational Research*, 8 (3), 747–754.
- McCaffrey, R.E. (2005) Using Citizen Science in Urban Bird Studies. Urban Habitats. Available at: http://www.urbanhabitats.org/v03n01/citizenscience_full.html
- McKinley, D.C., Miller-Rushing, A.J., Ballard, H.L. et al. (2015) Investing in Citizen Science Can Improve Natural Resource Management and Environmental Protection. *Issues in Ecology*, 19, 1–27.

- National Advisory Council for Environmental Policy and Technology (2018). Information to Action: Strengthening EPA Citizen Science Partnerships for Environmental Protection. Report for the Environmental Protection Agency. Report no. 220-R-18-001.
- Ottinger, G. (2009) Buckets of Resistance: Standards and the Effectiveness of Citizen Science. *Science, Technology and Human Values*, 35 (2), 244–270.
- Prainsack, B. (2014) Understanding Participation: The ‘citizen science’ of genetics. In: Prainsack, B., Werner-Felmayer G., & Schicktanz, G. (eds) *Genetics as Social Practice*. Farnham: Ashgate, pp. 147–164.
- Sakalova, H., Malovanyy, M., Vasylynych, T., et al. (2019) Cleaning of Effluents from Ions of Heavy Metals as Display of Environmentally Responsible Activity of Modern Businessman. *Journal of Ecological Engineering*, 20 (4), 167–176.
- Silvertown, J. (2009). A New Dawn for Citizen Science. *Trends in Ecology & Evolution*, 24 (9), 467–471.