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Belarusian experience in reducing gender gap in Natural Science using heuristic learning approach in physics education in university

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Digital technologies, having become an essential attribute of modern life, have caused changes in many fields, including education. Implementation of modern teaching methods and approaches in the field of physics makes it possible to train competitive specialists with skills required to solve practical problems, establish a constructive dialogue "teacher-student" and can thus reduce the gender gap in Natural Science, see Fig. 1. In Belarus, one of the nation's oldest universities – Belarusian State University – conducts training of lecturers and professors on technologies of heuristic learning in order to develop heuristic qualities of the teacher who will be capable to individualize the teaching process, improving students' curiosity and creativity.

This work aims at demonstrating how the implementation of problem-heuristic approach can be used effectively to encourage girls' achievements and interest in Natural Science. Based on outcomes of the voluntary educational project "Heuristics in Physics" ("HiP") created for IT students by I.I. Tashlykova-Bushkevich in 2018 at the BSUIR the goal of this study is to reveal the effect of the author's technology of physics lectures organization with elements of heuristic learning on involving girls as well as boys in creative activities to make their own educational content on physics in the study of general physics course.

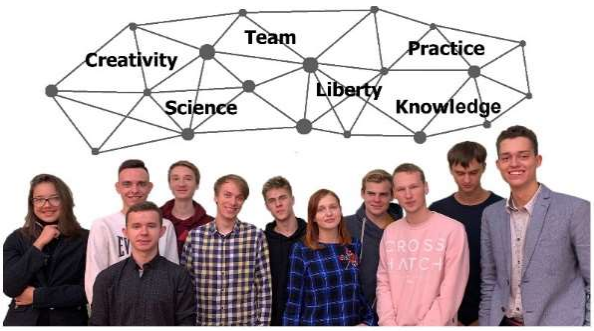

Figure 1. "Heuristics in Physics" project is a place where female and male students are involved into Natural Science and develop hard and soft skills in the study of general physics course

Engineering and IT students are more often male, which makes it important to create a healthy atmosphere for the educational training of female students. This is particularly true of the BSUIR that is the leading university in Belarus in the field of computer engineering and telecommunications. To illustrate the results of 5-year implementing heuristic learning approach in the physics educational process, the topics investigated were the analysis of students participating in the project, purpose of their participation, and impact of the project activities on their academic performance and development of hard-skills and soft-skills in the process of studying physics. Students were analyzed by gender, and among the group of female students the most popular sector of the project was determined. In summary, the gender evaluation' findings revealed a high level of participation of girls in the production of creative works and showed the benefits of applied approach for girls studying physics. The facts above indicate the effectiveness and reveal the prospects of the given heuristic educational approach in universities to increase the involvement of girls in physics and reduce the gender gap in Natural Science.