PROPER
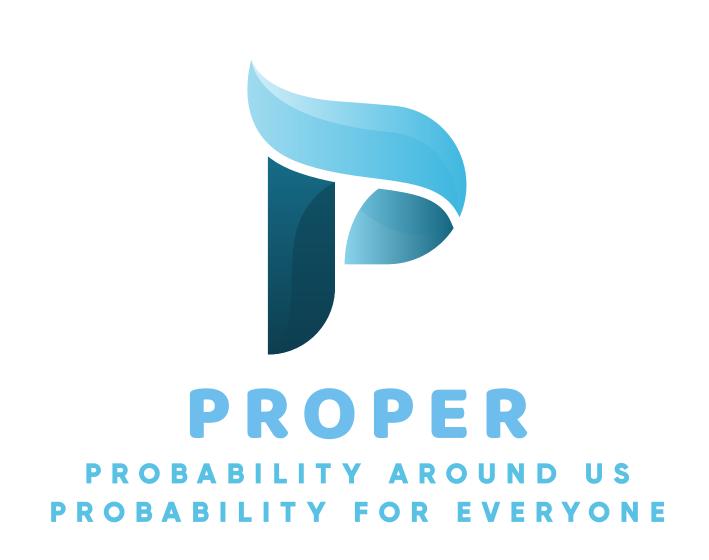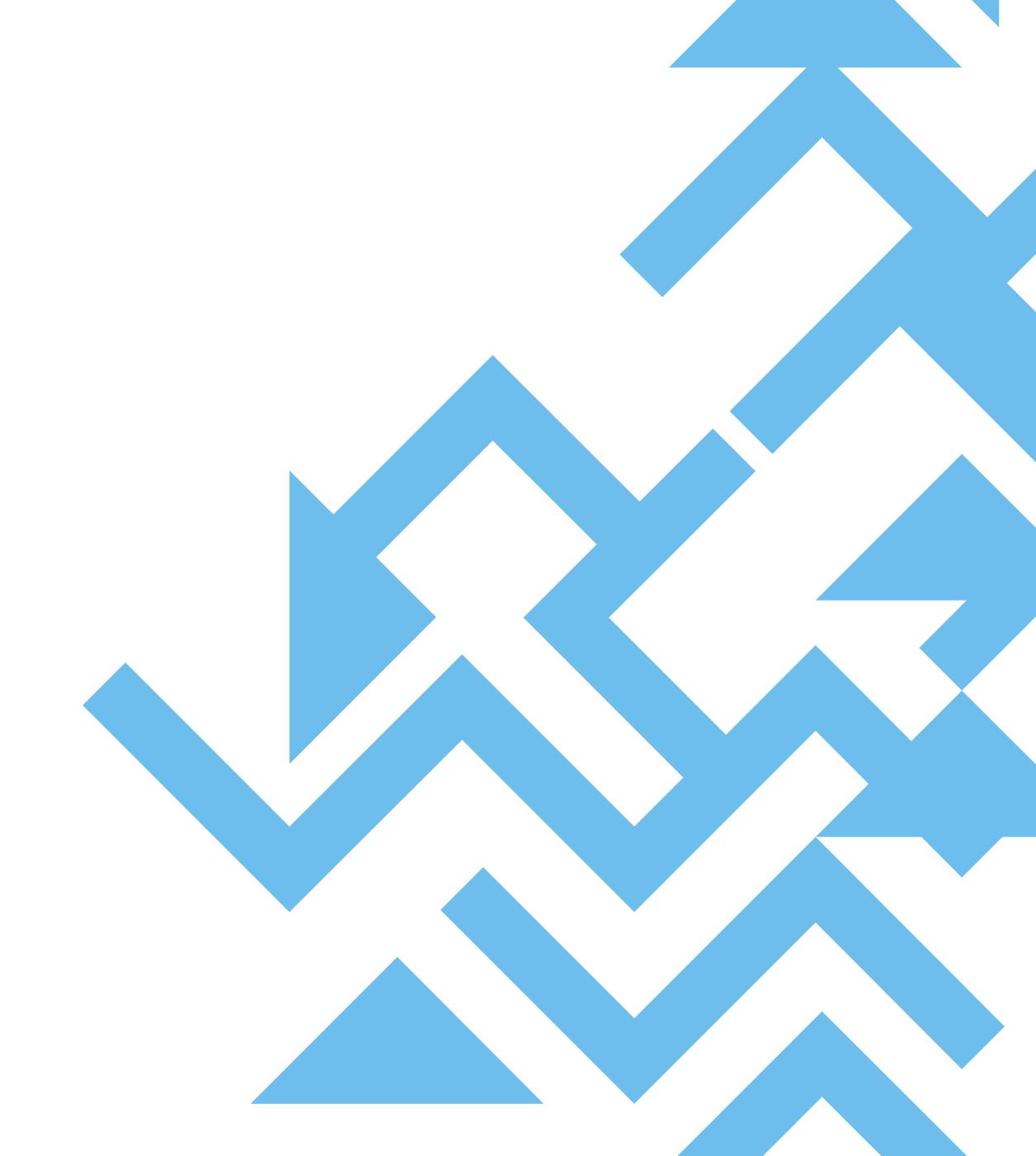# PROBABILITY AROUND US
PROBABILITY FOR EVERYONE

Press Release

PROPER

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The PROPER (Probability around us – Probability for everyone) is a European project co-funded by the European Commission under the Erasmus+ KA210-SCH Programme, with an implementation period of 13th months (September 2023 to September 2024).

The project is coordinated by the University of the National Education Commission, Krakow (Poland).

The project concerns the improvement of teaching probability calculus, also with the use of STEME (Science, Technology, Engineering, Mathematics, Entrepreneurship) methods for secondary school students. The project aims to develop, introduce to schools and evaluate the method shaping robability, which is practically absent in the current teaching in schools in Poland and Czech Republic (and many other European countries). Proposed probability input concept will be developed according to the constructivist method and active teaching methods and then it will be transferred to a higher level of mathematical education.

Theoretical and didactic mathematical foundations of this approach are new. The theoretical description of the concept was published in the authors' monograph project from the applicant and executive institution - Pedagogical University of Cracow and South Bohemia University in Ceske Budejovice:

(1) Krech, I. & Tlusty, P.: Stochastic graph and its applications, Jihoceska univerzita v Ceskych Budejovicich, Ceske Budejovice 2012.

The project aims to develop educational materials based on the described teaching concept probability and practical

verification of the effectiveness of the proposed methods on a small scale of partnership in schools in Poland and the Czech Republic. The project includes carrying out two main groups of activities, in achievieng the goals:

Activity 1: develop, introduce and evaluate a method for shaping the concept of stochastic graphs.

Activity 2: develop, introduce to schools and evaluate a method of shaping the concept of probability
based on an educational game based on the concept of stochastic graphs.

If our project will achieve didactical success, the next step will be to disseminate the method and the game, prepare an Android and/or iOS application to facilitate learning in a wider range of partnerships in school education - and thus horizontal addressing the goal of the continuation of the project: digital transformation through developing digital readiness, resilience and capability.

Target groups includes:
1. School students of secondary school;
2. Mathematics teachers supporting school students,
3. Educational authorities interested in developing STEAME learning,
4. Researchers interested in mathematics education.

Probability is presented in the mathematical literature as a preparation of the deductive theory, own self function used in the form of mathematical statistics. Expansion of concepts of probabilistic and statistical methods in various areas of knowledge and practical activity makes stochastics an important application of mathematical education already at the elementary level.

In the aspect of mathematical education of the of the broad masses of socjety problems were born:

-- what to teach in probabilistics and what in mathematical statistics;

-- how to teach and why;

-- how to inspire, motivate, organize and support the process of teaching probabilistics;

-- how to use stochastic problems for general education, and thus for education through math.

Along with what was created as a result of education methods in probability calculations, combinatorics and mathematical statistics.

It is about the content of this education, but also the methods (traditional lecture on the calculus of probability as a student's theory of impracticable deduction to teach probability calculus in school). The modernization of teaching includes, among other things, bringing the idea of teaching closer to modern mathematics, i.e. building the

concept of school mathematics on the foundation of those ideas that are the foundations of modern mathematics that convey the gulf between mathematics as a science and its teaching can be
reduced by duplicating ready-made mathematical theories in teaching lectures. Probability is the result of this phenomenon. In the proposed method, mathematics is understood as a specific activity intellectual, and its teaching is creating mathematics, and thus discovering its concepts and methodology by the student. So it is a production of mathematics. In this approach, teaching is the presentation of mathematics in statu nascendi, i.e. under construction of the stadium.

The failures of the early years of probabilistics at the end of the twentieth century (also in Poland and the Czech Republic) have their roots in the tendency to use the theory by the student axiomatic without its propaedeutics. Transferring the method of teaching ready-made knowledge from the university to primary school (and even primary school) cannot be crowned with benefits. The proposed method presents the calculus of probability as mathematics in statu nascendi, it is oriented towards a separate sense of abstract concepts, their origin from the real different ways of application.