Pedagogic case and specific course in which designed tasks and units are used

**Name of university:** Borys Grinchenko Kyiv University (BGKU)

**Contact person:** Yuriy Mazhuga, y.mazhuha@kubg.edu.ua

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| Pedagogic case: | * Inquiry-based introduction for different modules of general course in Mathematics for first year students of pedagogical institute |
| Description (including temporal scheme for design, development and implementation) | * 1st year students of pedagogical institute learn basic mathematics, and in particular theoretical foundation of Algebra and Geometry * ICT tools will be used to let student understand deeply and clearly how to explore different mathematical tasks * Rough planning:  design February-March 2019,  development February-April 2019,   implementation February-May 2019. |
| Aim of pedagogic case | * To include inquiry-based activity into learning and teaching selected topics in Algebra and Geometry. * To explore results of this activity with the current group of students, collect data in some forms, and make suggestions to improve this activity in the future. |
| Mathematical concepts | * Numeric expressions * Equation with one variable * System of two equations with two variables * Inequality with one variable * Functions * Graphs of functions * Geometric shapes |
| Addressed practice | * 1st year bachelor's program for students of specialization primary education; an introduction to mathematics in the program building on expectations of what students have learned in their pre-university courses. |
| Place in specific course Course name  Place of teaching units | * A one-semester modules in a modular program. * Title is: Mathematics and methods of teaching |

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| Learners profile orientation, year,  age, prior knowledge,  other such as math anxiety, special needs, .. | * Primary education students * First year students * High school mathematics background * Mathematics is not an attractive subject for a large number of students and many want to see applications |
| Organisation of specific course study credits/hours,  location, group size | * 8 credit course: 3 EC for mathematics part, 5 EC for methods of teaching part (which is also meant to be inquiry-oriented according to the co-teacher) * Course runs on weekly basis from February 2019 up to and including December 2019 as obligatory course: mathematics part takes 10 course weeks in total * Number of students: 48 |
| Expected learning outcomes | The student should be able to:   * use basic concepts and operations in Algebra and Geometry * solve equations and inequalities with one variable * solve systems of two equations with two variables * determine type of functions * build the graphs of functions * determine the geometric shapes * find the length, area, volume and other values * effective use of available software tools for visual imagination. |
| Envisioned use of digital technology | * Systems for classroom survey (Mentimeter, Kahoot) * GeoGebra, Go-Lab |
| Planning of tasks | * Analysis of available materials on Algebra and Geometry * Discussion with colleagues who are mathematicians and mathematics educators * Creation of the course team * Design of activities for inquiry-based teaching * Including new forms of activity into existing teaching program * Monitoring the process * Keeping a record of new tasks/approaches for the current group of students – to include specific details of tasks and approaches, and teacher reflections on the teaching and learning that takes place * Getting feedback from students (polls, interviews) |
| Names of persons involved | * Yuriy Mazhuga * Lyudmila Romanenko * Student assistant in the mathematics part of the course |
| Course: | Mathematics and methods of teaching, 2nd module “Theoretical foundation for the study of algebraic material” and 3rd module “Elements of geometry” |
| Learning objectives | Within framework of these modules, students should be able to:   * solve mathematical problems in the areas listed in the contents * work independently; * organize the material of the module to support own learning; * construct clear, logical arguments. |
| Learning contents | * Introduction to Algebra and Geometry * Basic concepts and operations in Algebra and Geometry * Equations and inequalities * Systems of equations * Functions * Graphs of functions * Geometric shapes * Length, area, volume and other values. |
| teaching /learning activities | * Lectures, seminars, practical work, independent work with materials of the course, obligatory and non-obligatory assignments. |
| Media | * Personal computers * Mobile phones for classroom engagement during the lectures and practical work * Appropriate software for computing and lecturer-class interaction (Kahoot, Menti, Padlet, GeoGebra, GoLab, SOWISO). |
| Evaluation | * Continuous assessment of the student throughout the course: practical tasks, passing tests, homework assignment * Written or oral exam. |
| **Instructor role** | * Developing the modules content (inquiry-based tasks/problems) * Encouraging students’ activity and discussion * Monitoring learning process/progress and providing support and feedback. |
| **Student roles** | * Active participation in learning during the lectures, seminars and independent studies * Engaging in inquiry-based mathematics tasks * Reasoning methods of solution and discussing ideas with peers/tutors * Reflecting on their learning. |