

Computational Thinking Based Coding Environment for Coding and Free Semester Mathematics Education in Korea

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Abstract : In recent years, coding education has been globally emphasized, and the Free Semester System and coding education were introduced to the public schools from the beginning of 2016 and 2018 respectively in Korea. With the introduction of the Free Semester System and the rising demand of Computational Thinking (CT) capacity, this paper aims to design 'Coding Environment' and Minecraft-like Turtlecraft in which learners can design and construct mathematical objects through mathematical symbolic expressions. Students can transfer the constructed mathematical objects to the Turtlecraft environment (open-source codingmath website), and also can print them out through 3D printers. Furthermore, we design learnable mathematics and coding curriculum by representing the figurate numbers and patterns in terms of executable expression in the coding context and connecting them to algebraic symbols, which will allow students to experience mathematical patterns and symbolic coding expressions.

Keywords : coding education, computational thinking, mathematics education, TurtleMAL and Turtlecraft

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