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A Mobile Game Algorithm for Programming Education

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ABSTRACT

Software education currently being implemented is programming education, and the scope of the curriculum is adjusted to suit each school level. In the case of elementary school, experience- and activity-based activities are used to learn problem-solving methods through play and educational programming languages, and in the case of junior high school, the basic concepts and principles of software are understood through education-oriented programming languages and learn to apply to problem solving. In the case of high school, the contents are designed to improve the ability to creatively and efficiently solve problems in other academic fields while learning more advanced contents with advanced contents linked to careers. In this article, the authors develop an algorithm game using a robot so that students can think of programming and unpacking functions expressed in pictures to solve the problem of losing interest due to difficulties in understanding and applying programming or algorithms.

KEYWORDS

Algorithm, Algorithm Game, Programming Languages, Software Education, Unpacking Functions

INTRODUCTION

In the future era, software becomes the center of innovation, growth, and value creation, and it can be said that it is a software-oriented society that determines the competitiveness of individuals, companies, and countries (Choi et al., 2015). Then, in order to cultivate talented people with software skills that will lead this era, education needs change above all else (Philippe et al., 2003).

The software education currently being implemented is programming education, and the scope of the subject content is tailored to the level of each school level (Choi et al., & Hong 2015). In this case, students learn to understand the basic concepts and principles of software through educational programming languages and apply them to problem solving in real life (Grönlund et al., 2010). In the case of high school, it is intended to improve the ability to creatively and efficiently solve problems in other academic fields by learning more in-depth content with in- depth content linked to career paths (Pan et al., 2013).

In this paper, we develop an algorithm game using robots so that students feel that they are programming by solving the functions expressed in pictures as they are in order to solve the problem of

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losing interest due to difficulty in understanding and applying programming or algorithms (Jacobson et al. 1999).

The proposed study design a mobile game algorithm for education that allows students to find the logic of problem-solving instructions by themselves through visual games, not text, and to compare and evaluate different results by considering various environmental variables.

RELATED WORK

Programming Education in Major Countries

Major countries such as the United States, the United Kingdom, China, Israel, and India recognize that informatization is a key strategy of national competitiveness leading the transformation of the global economy and society in the 21st century and are preparing various policies to foster information science (Park et al., 2016). The current status of software education in IT advanced countries is as follows (Shin, 2012).

First, in these countries, information subjects were designated as compulsory subjects in elementary and secondary schools.

Advanced IT countries designate information as a required subject since elementary school to cultivate IT literacy, while at the same time operating a curriculum that allows talented students to be discovered early and nurtured IT talents. In addition, in middle and high schools, information is designated as mandatory or mandatory optional subjects, and various information subjects are opened for education.

Second, various educational systems are being established to cultivate excellent information teachers. Since the quality of education cannot exceed that of teachers, major countries are making various efforts to cultivate excellent information teachers.

Third, we are striving to develop excellent information curriculum.

Recognizing that the lack of information science education in elementary and secondary education has been a major cause of the lack of a curriculum similar to that of other subjects, research and development of information science education standards for elementary and secondary students It is spreading.

Fourth, the direction of information education is shifting from education using ICT to education of computing thinking skills (Wang, 2012).

It focuses on cultivating creative problem solving through the concept and principle of information, moving away from the existing ICT education. To this end, the elementary school recognizes computers as a familiar tool and develops the ability to use them to solve various problems, and middle and high schools operate information education centering on concepts and principles. It understands that the principles of information science are being used to solve problems in various fields through convergence with other subjects, and it is educated so that they can be used as core principles necessary to solve problems efficiently rather than simply using them.

Fifth, we are investing intensively in programming education from early on.

In Israel and India, various fields of computer science are taught by dividing them into several subjects, and they devote a lot of time to problem solving, especially through programming.

In 2015, Korea also recognized these changes and reinforced the information subject by emphasizing the role of software education. In other words, software education-centered information curriculum was designated as a required subject so that students can fully acquire basic knowledge about software (Grover et al., 2013).

Game Programming

The name of this game is ” Game Workshop ” and it is a 2D graphic Quarter View viewpoint method. The Quarter View viewpoint is a view of viewing from a diagonal direction while compromising