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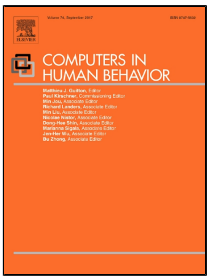

The Effects of Teaching Programming with Scratch on Pre-Service Information Technology Teachers' Motivation and Achievement

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ABSTRACT

The aim of this study is to examine the effect of programming instruction with Scratch on student motivation and their programming achievements. The study group consisted of 52 sophomore students attending the Department of Computer Education and Instructional Technologies of Mehmet Akif Ersoy University's Faculty of Education, Turkey. Participants were randomly divided into two groups in order to have 26 students in both the test group and the control group. During the first seven weeks of the study, it is aimed that the students will understand programming logic and learn basic programming structures. For this purpose, participants in the test group were instructed using Scratch, whilst in the control group, flowcharting and problem-solving activities were conducted as per the curriculum. During the second seven weeks of the study, C# programming language instruction was conducted using the same method for both the test and control groups. Achievement Test and Motivated Strategies for Learning Questionnaire were utilized as data collection tools in the study, and a 3 x 2 (measurement time x groups) factorial design was employed. Study findings revealed that programming achievement scores for both the test and control groups increased at the end of the whole process; however, the increase was significantly different in favor of the test group at the end of the whole process. It was observed that motivation scores decreased in the control group, while the test group's scores increased.

Keywords: Programming, Scratch, Flowcharts, Motivation

1. Introduction

Especially in basic courses for beginners in programming, the objective is to teach the students both the basic concepts of programming and programming logic in order to prevent potential problems experienced in advanced programming courses, where coding instruction is delivered. In this process generally daily language and flowcharts, which are designated as so-called codes, are the tools utilized to teach programming logic by developing algorithms. The fact that algorithm instruction is such an abstract process causes beginner programmers to only comprehend programming logic at a low level and then fail to transfer this knowledge to other programming languages in the future (Kinnunen & Malmi, 2008; Kurland, Pea, Clement, & Mawby, 1986). Problems experienced in algorithm and programming instruction

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