Cognitive and Psychosocial Effects of Persuasive Technology Use on Mathematics Instruction

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Abstract: The current study aims to investigate the effects of mathematics instruction realized through web-based persuasive technology on students’ academic achievement, self-efficacy beliefs regarding educational Internet use and attitudes toward the use of search engines as an information retrieval tool. The study further aims to investigate the participants’ views on instructional processes involving different CBT approaches. In this regard, computer algebra system (CAS)-based instruction, web supported instructor-led training and web-based persuasive technology use were examined. A pretest-posttest control group design is implemented. The participants are 113 second-year students at Eskişehir Osmangazi University, Department of Elementary Mathematics Education. The experimental design will be conducted in Calculus II, a compulsory course with seven credits. The instruments are a semi-structured interview form and the Calculus II Achievement Test both of which will be developed by the researchers, “The Attitude Scale Related to the Use of Search Engines as an Information Retrieval Tool” developed by Liaw and Huang (2003), and “The Self-Efficacy Beliefs Scale Related to Educational Internet Use” developed by Şahin (2009). Within the scope of the experimental intervention, the web-based education group is provided with activities implementing the semantic search engine called “Wolfram Alpha”. For the first control group which is exposed to the CAS-based instruction, Mathematica is used. Finally, the instructors use linear web pages within the second control group, which is exposed to web supported instructor-led training. The analysis of the quantitative data is realized through reporting descriptive statistics and conducting relevant parametric or non-parametric tests. The qualitative data is analyzed through descriptive analysis. Both quantitative and qualitative data are interpreted in a holistic manner.

Keywords: Mathematics instruction, Computer Algebra Systems, persuasive technologies, web-based education, Wolfram Alpha.

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