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Learning congruency-based proofs in geometry via a web-based learning system.

Smith, C. (ed.), Proceedings of the British Society for Research into Learning Mathematics (BSRLM). Vol. 33, No. 1. Proceedings of the day conference, University of Bristol, UK, March 2, 2013. London: British Society for Research into Learning Mathematics (BSRLM). 31-36 (2013).

Summary: Congruence, and triangle congruence in particular, is generally taken to be a key topic in school geometry. This is because the three conditions of congruent triangles are very useful in proving geometrical theorems and also because triangle congruency leads on to the idea of mathematical similarity via similar triangles. Despite the centrality of congruence in general, and of congruent triangles in particular, there appears to be little research on the topic. In this paper, we use evidence from an on-going research project to illustrate how a web-based learning system for geometrical proof might help to develop Year 9 pupils' capability with congruent triangles. Using the notion of 'conceptions of congruency' as our framework, we first characterise our web-based learning system in terms of four different 'conceptions' of congruency by comparing the online tasks with activities from a Year 9 textbook. We then discuss how the web-based learning system would aid pupils when they are tackling congruency-based proofs in geometry.

Classification: G43 G53 E53 U73 U53

Keywords: Euclidean geometry; congruent figures; conceptions; congruent triangles; proving; similarity; congruent transformations; lower secondary; educational research; geometry software; web-based learning system; proof learning system; feedback; textbook analyses
<http://www.bsrlm.org.uk/IPs/ip33-1/BSRLM-IP-33-1-06.pdf>