A Collaborative Laboratory for Geometry: A Case Study at Portugal and Serbia

Vanda Santos
CISUC, University of Coimbra
Coimbra, Portugal
vsantos7@gmail.com

Milena Marić
Faculty of Mathematics
University of Belgrade
Belgrade, Serbia
milena.maric.f@gmail.com

Helena Campos
CM-UTAD; CIDTFF
Universidade de Trás-os-Montes e Alto Douro,
UTAD, www.utad.pt
Quinta de Prados, 5000-801 Vila Real, Portugal
hcampos@utad.pt

Pedro Quaresma
CISUC/Department of Mathematics
University of Coimbra
3001-454 Coimbra, Portugal
pedro@mat.uc.pt

Abstract

The *Web Geometry Laboratory* (WGL) platform is a collaborative blended-learning Web-environment for geometry, it integrates a dynamic geometry systems (DGS) and it provides a collaborative environment for students and teachers. Its use is possible in the context of a classroom or remotely. Apart from its development its evaluation is being done through a series of case studies, sustained through a qualitative approach (interpretive research), being conducted in Portugal and Serbia [1, 2, 3] [1].

An initial case study in Portugal, with groups of secondary students (17 years old) was done, using various gathering information techniques: quizzes; tests; direct observation; record interactions on the platform; challenges. We analysed the use of the WGL collaborative environment by the students.

Another case study, in Serbia, was conducted in the context of remote access to the platform (homework). The study included 50 secondary students (15 years old). All students attended the traditional classes in school. Half of the students used WGL platform for homework and the other half did their homework the traditional way. We investigated the impact of collaborative work to the motivation level and level of achievement.

Using an action research approach, the platform is being developed. These studies revealed some aspects that could be enhanced, e.g. a chat feature. More and wider case studies are being prepared allowing the validation and further development of the WGL platform.

These studies also indicates that there is a significant improvement in the motivation of students and a slight improvement in their achievement when using the WGL platform.

The WGL platform will include in future stages of development the implementation of an adaptive environment allowing the construction of students' profiles and learning paths. A final stage will be the integration of a geometric automated theorem prover and its use in the learning process.

References

[1] Milena Marić. Web Geometry Laboratory: Mogućnosti i primjene, korelacija matematike sa drugim nastavnim predmetima. *Zbornik radova*, pages 248–256, 2013. Pula, Croatia.

[2] Vanda Santos and Pedro Quaresma. Integrating DGSs and GATPs in an Adaptative and Collaborative Blended-Learning Web-Environment. In *First Workshop on CTP Components for Educational Software (THedu'11)*, volume 79 of *EPTCS*, 2012.

[3] Vanda Santos and Pedro Quaresma. Collaborative aspects of the WGL project. *Electronic Journal of Mathematics & Technology*, 7(6), 2013.

[1] Prototype in `hilbert.mat.uc.pt/WebGeometryLab`