

GIFTED STUDENTS VERBALLY COMMUNICATING VISUAL INFORMATION IN A VIRTUAL ENVIRONMENT

Beltrán-Meneu, María José¹; Ramírez, Rafael²; Jaime, Adela¹; Gutiérrez, Ángel¹

¹ Universidad de Valencia (Spain). ² Universidad de Granada (Spain)

To promote learning of mathematically gifted (mg) children, teachers should pose them challenging tasks (Diezmann & Watters, 2001). Grouping mg students together to solve problems in collaborative teams is not always possible in schools, but virtual environments allow such interactions. Researchers have reported benefits for mg students of collaborative problem solving in online environments using e-mail, chat..., but there is little information on virtual real-time interaction (Alagic & Alagic, 2013).

We report here a case study of two pairs of mg students (12-15 years old), living in different cities. We analyse the interactions of each pair while collaboratively solving a task by communicating in real-time via Skype. The use of visualization is important for mg students (Ramírez, 2012), so the task concerned the development of this ability: a set of buildings had to be built on a squared grid, to fit with the four orthogonal projections provided. Each student had only two projections, which could not be showed to the other student. They were provided with grid paper and Multilink cubes. The researchers were next to the students, but they only participated when the students were blocked. Data were screen captures and video recording of students.

The virtual environment proved to be useful for our mg students, and provided us with information on characteristics of mathematical talent related to verbal communication of information, and exceptional verbal and reasoning abilities while finding, sharing and justifying the placement of buildings. The oldest pair had no problems of communication, and showed a higher level of use of cognitive strategies, including analytical reasoning to discard impossible configurations of buildings. The youngest pair had difficulties due to a misunderstanding when fixing a coordinate system, and they preferred the visualization of multilink cubes for solving the task. Both pairs showed a high commitment with the task, even in the most critical moments, and they were motivated by the collaborative character of the task.

Acknowledgement: This is part of research project EDU2012-37259, funded by the Spanish government.

References

- Alagic, G., & Alagic, M. (2013). Collaborative mathematics learning in online environments. In D. Martinovic, V. Freiman, & Z. Karadag (Eds.), *Visual mathematics and cyberlearning* (pp. 23-48). Dordrecht, The Netherlands: Springer.
- Diezmann, C. M., & Watters, J. J. (2001). The collaboration of mathematically gifted students on challenging tasks. *Journal for the Education of the Gifted*, 25(1), 7-31.
- Ramírez, R. (2012). *Habilidades de visualización de los alumnos con talento matemático* (unpublished doctoral dissertation). Granada, Spain: Universidad de Granada.