## Mathematical Knowledge for Teaching and Student Learning at Second Level

Teaching and learning mathematics at second-level has gained much attention in recent years. In Ireland, research has raised concerns about common approaches to teaching and learning mathematics within the classroom which, to date, have largely been recorded as teacher-centred and procedure-led. High-quality mathematics instruction emphasises students' communication of their mathematical thinking, the incorporation of high-level cognitive tasks and the role of the teacher as a facilitator of student learning. In order to support students who may wish to pursue mathematics based courses at third level, second level teaching and learning requires further support and investigation.

In this mixed-methods project, the significance of teachers' content and pedagogical content knowledge for high-quality instruction and influence on students' progress in second-level mathematics will be investigated. As well as generating quantitative data through a large-scale survey of both teachers' and students' learning experiences, qualitative data will be generated on case studies of mathematical classroom practices. Revised forms of mathematics teacher professional development, suitable within the Irish educational context, will be trialled as part of the research and recommendations will be made to support teaching and learning at second level.

Interested candidates should contact Aoibhinn Ni Shuilleabhain at <u>aoibhinn.nishuilleabhain@ucd.ie</u> or Andrew Parnell at <u>andrew.parnell@ucd.ie</u> for further details.

## References

- Boaler, J. (1998). Open and Closed Mathematics: Student Experiences and Understandings. *Journal* for Research in Mathematics Education, 29(1), 41-62.
- Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., . . . Tsai, Y.-M. (2010). Teachers' Mathematical Knowledge, Cognitive Activation in the Classroom, and Student Progress. *American Educational Research Journal*, 47(1), 133-180. doi:10.3102/0002831209345157
- Lyons, M., Lynch, K., Close, S., Sheerin, E., & Boland, P. (2003). *Inside Classrooms: The Teaching and Learning of Mathematics in Social Context*. Dublin: Insitute of Public Administration.
- Ni Shuilleabhain, A. (2016). Developing mathematics teachers' pedagogical content knowledge in lesson study: case study findings. *International Journal for Lesson and Learning Studies, 5*(3), 212-226. doi:10.1108/IJLLS-11-2015-0036