Summer school versus term-time for fundamental mathematics at the tertiary level

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At the University of Sydney, there exists evidence that students undertaking first year mathematics units achieve superior teaching and learning outcomes and experience higher overall course satisfaction by completing these units at Summer School rather than during standard term-time. We discuss relevant issues, with far-reaching implications for intensive, short-duration type teaching and learning in general, and with the particular aim of improving teaching practices and quality of learning during term-time. This is especially important due to the mandatory nature of first year mathematics for Science degrees at the University of Sydney, which becomes problematic for students with an inadequate background in mathematics from high school, with learning difficulties or phobias, or returning to study after long absences. Many such students enrol into Fundamental Level units, which form the focus of this research. We make qualitative observations about students' relative rates of progress and development of mathematical skills and maturity, inspect quantitative data about relative performances in term-time and in Summer School, discuss possible reasons for the differences, and attempt to place the findings within the contexts of modern theories of learning, such as the theory of threshold concepts, constructive alignment and the SOLO taxonomy.