Introductory university economics and prerequisite conceptual change: an exploratory analysis of mathematical thresholds

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Davis and Mangan (2007) argue that, when considering threshold concepts in learning, single discipline-based threshold concepts are likely to be nested within other concepts through which students must have progressed in order to engage the discipline- based concept. They suggest, for example, that within the discipline of economics, students need to pass through basic personal concepts (economically-oriented perspectives on everyday life) and various procedural concepts (ways of practising or articulating economics) before being able to demonstrate a grasp of the discipline-based threshold concepts.

Shanahan, Foster and Meyer (2008) demonstrated measureable variation in students' acquisition of concepts that aligned with Davis and Mangan's categorisation of personal, procedural and discipline threshold concepts, while Shanahan, Foster and Meyer (2010, forthcoming) suggests that one pre-requisite (personal) threshold concept that must be acquired for persistence in an economics course is self-identification as a student and the ontological shift embedded therein.

This paper examines a parallel notion, that of another personal threshold concept that surrounds more discipline specific notions in economics. This is associated with a student's ability and willingness to adopt a world view that seeks to make sense of relationships based on the quantification of those relationships. This approach is more fundamental than having prerequisite mathematical skills, but it is, we suggest consistent with this more traditional expression common among some scholars in economics education (See Shanahan et al 1997, Meyer and Shanahan 2001).

This paper reports on a study based on data collected from two separate intakes of first-year economics students totalling around 600 students. A proxy measure of students' aptitude for quantification and mathematical literacy was developed and given to students in the first week of their economics course. The focus of the assessment was on quantification skills that aligned with basic concepts needed in the first year of an economics course (such as an understanding of ratios, and slopes, an ability to visualise relationships using graphs etc). The aim was to assess concepts that have previously been overlooked as necessary 'personal concepts' in economics and to identify far more basic world views than would be revealed in a more traditional test of 'mathematical ability'.

The same students were also assessed using the previously well-tested measure of student learning in economics; the learning inventory (Meyer 2004). These measures are also compared against the students' final results in the economics course.

The results reveal the variation in students' grasp of quantitative concepts compared to their measured approaches to learning. The paper thus attempts for the first time, to identify the impact of some measures of students' personal quantitative outlook compared with other factors associated with student learning including their preferred approach to learning - measured in dimensions such as motivation; approach to learning etc. We suggest that a better understanding of variation in the liminality of personal concepts may go

some way in explain variation in the liminatlity other threshold concepts, particularly in a social science discipline such as economics.

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