Mathematical Voyages: The factors which influence students' involvement in mathematics

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The focus of this conference session was a small scale qualitative study involving thirteen mathematics students at the start of a four year Bachelor of Education degree (Secondary). The students were invited to describe their experiences of mathematics using a mathematical autobiography. These writings were then used as the basis for subsequent individual interviews.

Working in three small groups, conference participants were invited to read interview transcripts (with the student identities concealed), to focus on high and low points in the students' mathematical careers, and to put forward ideas for analysing the data.

Comparisons were drawn between these approaches and those used by the researchers who had used three main headings to categorise student experience: Influences, Critical Points and Constraints.

Influences are those factors (positive or negative) which are important to the student in forming their view of mathematics and their attitude to the subject. They can be likened to the wind or a current - it is hard to work against them. Examples of positive and negative influences are given below:

Positive influences	**Negative influences**
Teacher/lecturer enjoyment of the subject	Teacher expectation of student failure
Public recognition of success	Conflict with friends' life style
Mathematics in context	Pressure from family and friends to do well

Critical points are moments of crisis or sudden change when positive and negative influences become more extreme, e.g. a lower than expected examination result; a change of school or college. Both of these examples could be positive or negative critical points. For example, a low examination result could have a motivating or de-motivating effect. What determines the direction of change are the other influences acting on the student at the critical point.

Constraints are those personal factors which override counter influences and critical points. These act as a barrier against success or failure. An example of a positive constraint would be a clear career goal which enables the student to overcome any setback.

One of the conference groups identified key points and categorised these as first and second order points. For example, a first order point of 'good, enthusiastic teachers' could produce the second order effect of a liking of mathematics. The group recognised an ambiguity in certain of their categories. For example, persistence, tentatively labelled as a second order effect could , in certain circumstances be seen as a first order factor.

The second group saw level of confidence as central to any analyses of student transcripts. Both positive and negative factors were closely related to a student's level of confidence; for example, supportive, approachable teachers could increase student confidence, whereas a lack of perceived relevance could reduce motivation and hence confidence.

The third group identified positive and negative factors for each of the students. Relationships between students and their maths teachers could be either positive or negative. Other factors were interpreted as entirely positive or entirely negative.

It can be seen from this limited discussion that there were similarities between the groups' approaches to transcript analysis and that of the researchers. All groups saw the teacher's role as central. Teachers were strong positive and negative influences. Teachers had made a difference.