

Identifying and helping Junior Science students at risk

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Background

- The transition from school to a more independent mode of learning at university is often difficult
- Science Faculty attempts to smooth the change via the Transition Workshop – 'jump start' the formation of peer groups,.....
- The Schools, Faculty, University all offer further resources but large cohorts of students in first year Bio, Chem, Maths and Physics make personal mentoring of students difficult.
- Assessment usually starts within weeks of the first lecture and ~15 weeks after commencing University they have completed first semester, leaving little time for the new student to adapt.

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The Project

- This project seeks to identify students 'at risk' of failing *early* in their Junior Science units and help them succeed.
- Failing is now more of a problem with semester-length units rather than year-long courses - affects progression especially in named degrees.
- PCON disappearing
- Workload outside Uni may put more people more at risk of failing
- Science Faculty Teaching Development Grant was obtained to identify and study students 'at risk' and develop a pilot program of academic and non-academic support for them, coordinated across Physics, Maths, Chemistry and Biology.

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The Plan

- Study how well past students at risk are identified by early assessment tasks. Determine the extent to which they are at risk in more than one discipline.
- Identify and contact students at risk.
- Conduct focus group interviews to determine why these students are performing poorly and what can be done to help them.
- Develop materials to help students at risk.
- Implement a pilot program of academic and non-academic support for these students.
- Evaluate the success of the project .

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Other projects

- Economics and Business (Michael Jackson, Michele Mowbray-d'Arbela/Jenny Beatson)
 - interested in students who fail one semester
 - driven by 'show cause' requirements
 - starting an on-line Discussion Forum within the University
- What has arisen today....?

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In the literature e.g. selection from Uniserve FYE bibliography

- Cox – initial assessment of a range of knowledge and skills to assess 'probable preparedness'
- McKenzie & Schweitzer – study of 197 students showed **previous academic performance best predictor of uni performance** – also other factors – identifying factors can improve targeting of interventions and support services for students at risk.
- Quinn et al. - pilot mentoring program employing a science/education specialist found at risk students just as motivated as others but a **relatively low numbers of self-referring students**
- Wagner et al. – **specially developed pre-semester assessments** were best predictor - further demographic information added little
- William et al. – student **'self-reports'** for various purposes including identification of students at risk

Also

- Rodda – what is and is not important for failure in CS1 – attendance and time spent on revision is not! **Self assessment of their situation may be best.**

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How big is the problem?

Failures

- Biology 168 of 1108
 - Chemistry 217 of 1644
 - Maths 217 of 2332 (Science only)
 - Physics 182 of 899
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- 1 subject 491
 - 2 subjects 97
 - 3 subjects 29
 - 4 subjects 8
 - Total 615

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Assessment and Resources

e.g. Chemistry

Mid-semester assessment

- MCQ quizzes held in tutorials (~20 min) in weeks 3, 6, 9 & 12.
- Continuous assessment in the lab plus lab test.

Resources

- On-line 'Self-help problems' with full worked answers
- Comprehensive set of on-line learning modules (ChemCAL) covering the content of the course
- Important resources highlighted in the header of weekly assignments
- Duty tutor available for consultation 4 days/week and by e-mail
- First Year enquiry office

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Assessment used

Mid-semester assessment marks plotted v. final mark and exam mark

Biology

- Weekly lab quiz - first 5 averaged

Chemistry

- MCQ quizzes held in tutorials - first 2 summed

Mathematics

- 2 tutorial quizzes and 2 marked assignments - all used

Physics

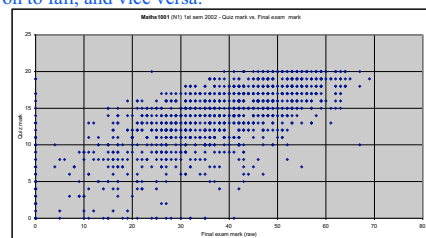
- Progressive and Skills tests summed

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Results

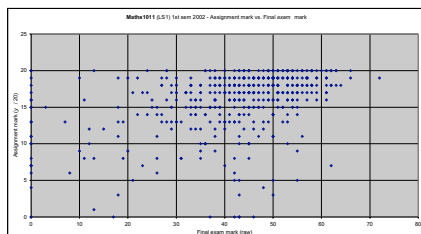
- A correlation between assessments and final exams was evident in most plots, but many students who performed well in assessments went on to fail, and vice versa.



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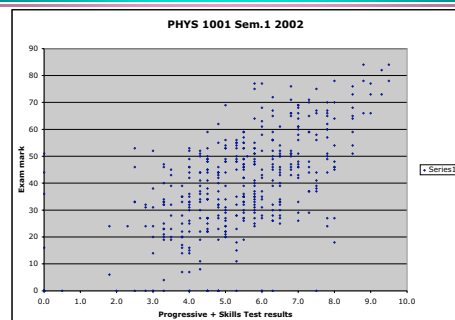
Results



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Results



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Results

- Correlation was similar for students who had failed the course before and those who were attempting it for the first time, and was similar in all four subjects.
- Chemistry students who failed > 1 subject were compared to those who failed Chemistry only - not distinguished by assessment marks
- Any selection of students based on a mark in mid-semester assessment seems certain to
 - catch many who will pass anyway, and
 - fail to pick many who will fail.

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Discussion

- is assessment misaligned with the exam? (certainly no for some - e.g. Physics Progressive Test)
- is the exam well aligned to the unit outcomes?
- is student attitude 'misaligned'? Quinn ref. suggests that 'at risk' students are just as motivated as others.
- Is there a significant difference in the way students approach assessment and final examination?
- how do students respond to mid-semester assessment result? – work harder or slacken off?
- Is self-selection the best way? Ref's and other experience suggest perhaps yes **IF** they will volunteer. We can only help them if they choose to turn up to help sessions or use resources provided – which would be more likely if self-selected?

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What to do with them anyway?

- We planned to interview but have not so far since we haven't identified a group.
- We can't cope with too many - any identification of at risk students needs to be done using a quantitative approach because of the numbers involved (e.g. ~1000 in semester 1 Physics)
- What is practical in an on-going way?
 - Science and Economics and Business have both used letters to at risk students (who have already failed in semester 1) - produced few useful responses.
 - Feedback suggests that students favour remedial tutorials - will they turn up?
 - more extensive use of WebCT Discussion pages - with the benefit of forming self-help networks among the students.
 - further on-line problem solving practice tailored to this group of students.
- a mix of these is likely to be the best way to engage students and match their individual learning needs.

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What to do with them anyway?

- The departments involved all have a raft of learning resources to support different modes of study and the University also possess support services (learning centre, maths learning centre, counselling, time management courses)
 - another TDG project encouraging all students to use the resources
- To a significant degree we must help the students make maximum use of these resources already available.
- Is advice about these resources and how to use them is sufficient to get a student 'back on track'.

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