

Learning and Teaching Projects 2013/14 – Final Report

Accounting for Numeracy

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Project Aims

The overall aim of this project was to look at how to improve numeracy skills in students at the University of Bedfordshire. It focused on the diagnostic testing of students at levels 4, 5 and 6 and suitable interventions to improve skills that could be built into the curriculum. It also considered how maths is taught in schools to seek to understand more about why some students have poor scores in their tests so interventions can be more targeted at HE level.

Background/Previous Research

Numeracy has been a much discussed topic, amongst those in education and commerce. There is some evidence that GCSE standards have slipped and that employers see numeracy skills as lacking in the workforce. Earlier work observed that numeracy skills were lacking in students especially in areas such as percentages, fractions and basic algebra. In terms of interventions a significant number of students seemed reluctant to acknowledge or address needing/going for extra help. However, the students did acknowledge that they had gaps in their numeracy skills. This is then a significant consideration in how numeracy ‘interventions’ are delivered. It has also been important to consider the interventions within the wider context of the university and the support provided by the Professional Academic Development (PAD) team.

Key Results

Investigation – Student Engagement

The results would suggest that great consideration should be given to how students are engaged with interventions that include all students and their need to practise or revise skills. The results indicate that it seems difficult for students to engage in ‘needing help’.

Though 52% of students acknowledged that the numeracy diagnostic indicated that they had gaps in their numeracy skills, only 17% acknowledged that they needed help with numeracy skills (see Appendix). This suggests that students do not wish to be seen as ‘remedial’ or different so numeracy work needs to be built into the curriculum rather than as an add in for

students identified as needing help. Over 65% of student's surveyed preferred on-line learning as it is very flexible in terms of when and where they access it (see Appendix).

Investigation – Teaching and Learning Maths Skills

Interestingly, the basic skills we are testing for in numeracy (percentages etc.), are taught in the earlier years of school (approximately ages 8 to 13), students are taught maths in a very modular way so don't necessarily build or revise on these theories/skills in later years. The comment from a level 4 student below backs this up well and indicates that revision/practice of skills is necessary for a lot of students.

Level 4 student

It was interesting numeracy test which took me to my grade 5 memories. I notice there was something and I am afraid to say that I have completely forgotten because I never actually use it from long time in that way for example the ratio and proportion portion in the basic numeracy test. Then I revised them and now I am ok with it.

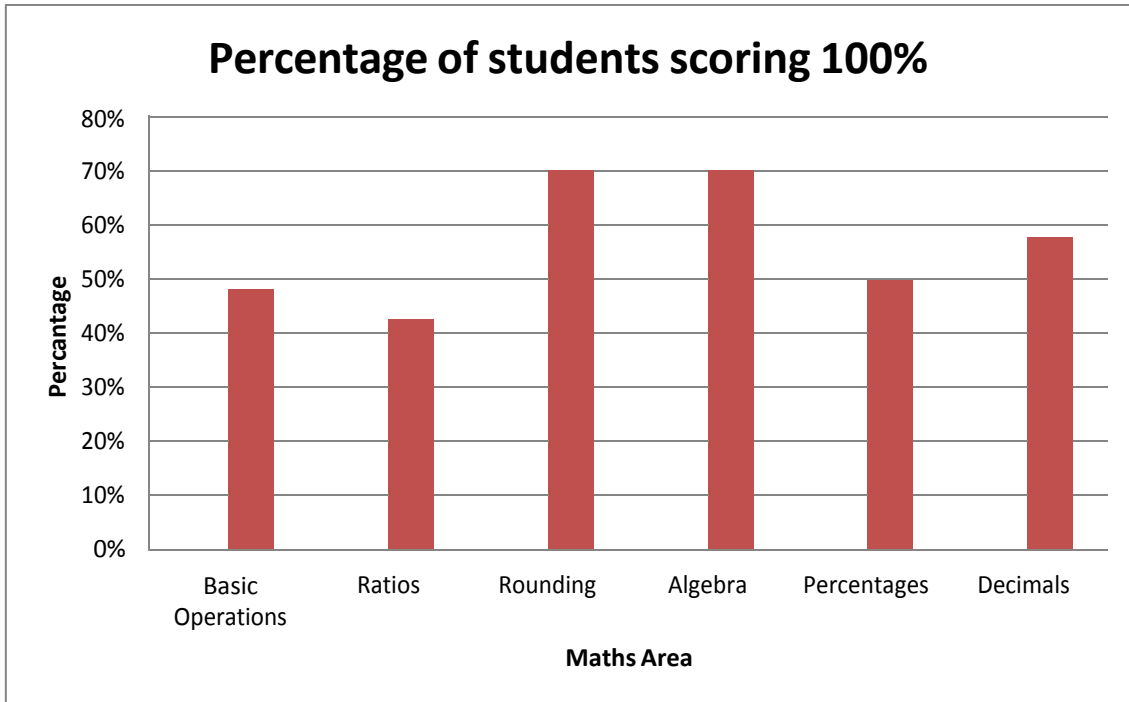
The new curriculum for post-16 maths looks to address some of these issues and focus on using maths for day-to-day problem solving, which should help students to revise and practise these skills before coming to university.

Data Collection

Diagnostic testing was carried out for all undergraduate levels in the Accounting and Finance Department. At level 4, students were surveyed to understand their attitude towards intervention and the type of intervention they preferred.

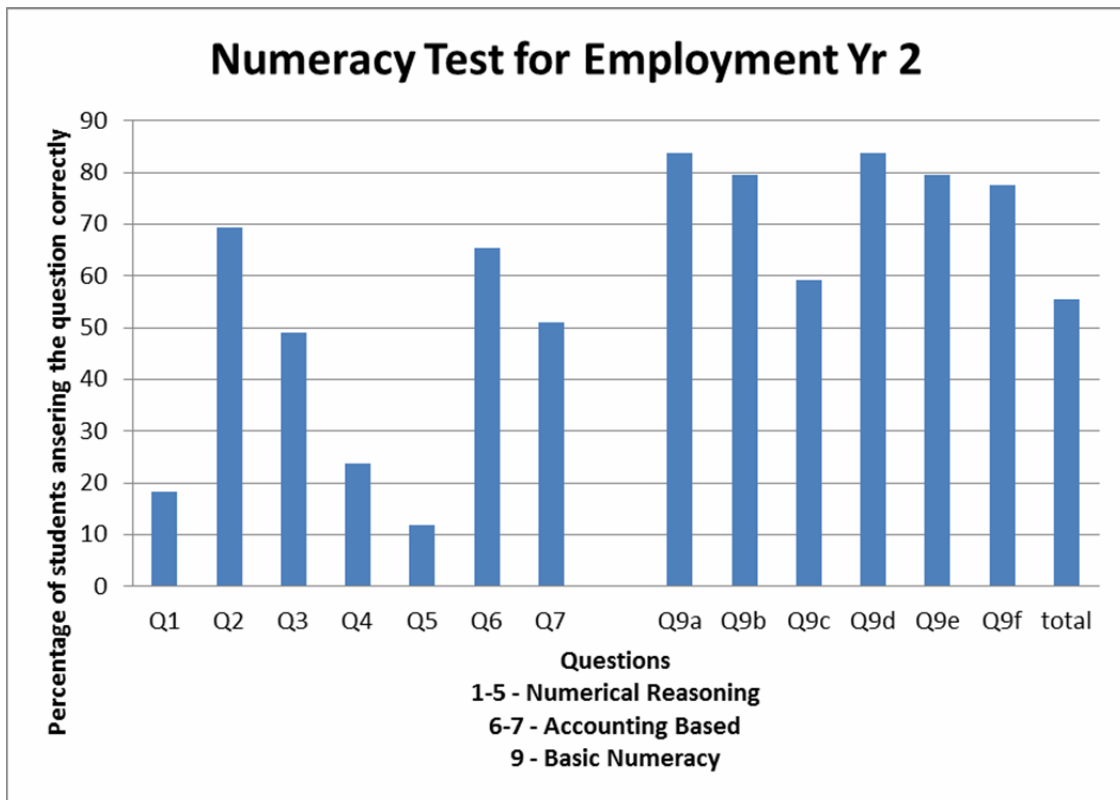
Level 4

73 students took the diagnostic test at level 4, which was taken as part of a scheduled class. Students not attending the class were given the opportunity to take the test at a later date. Results were better than the original sample, but still indicated that numeracy and basic maths skills is an area that a significant number of students need to focus on.



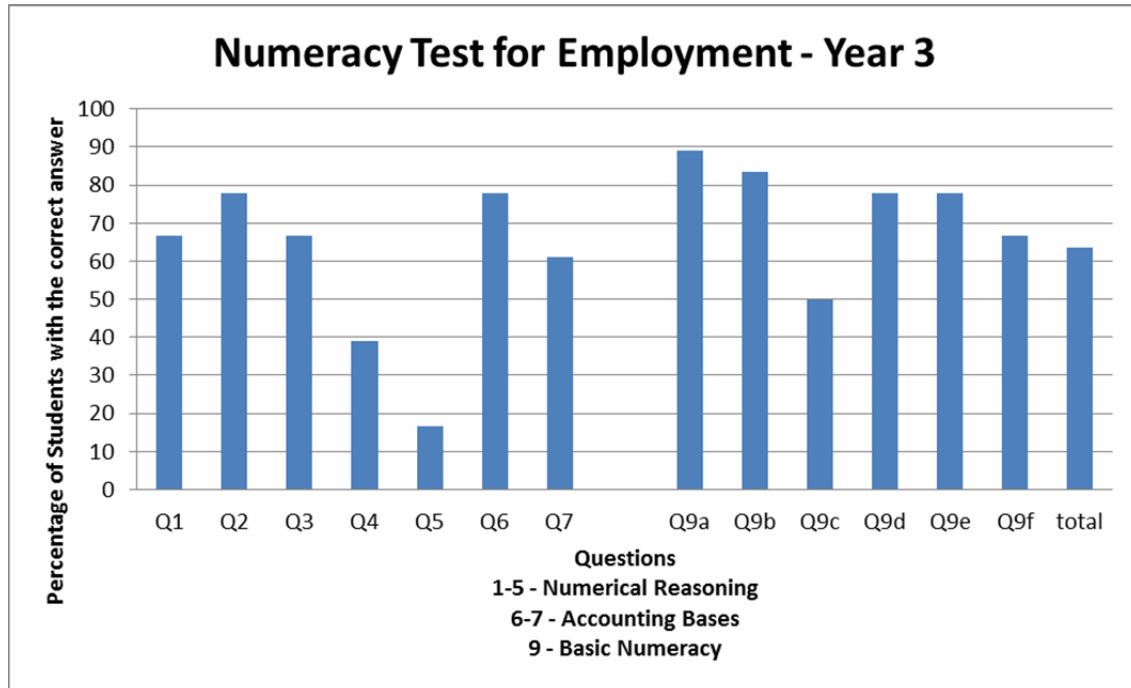
Level 5

49 level 5 students took a numeracy test which was based on the numeracy tests used by graduate employers (as an activity in the Personal Development Accounting and Finance unit). As well as basic numeracy questions this also contained numerical reasoning questions. From the results it can be seen that the students found some of the numerical reasoning questions very challenging and this amplifies the need for the students to practise this type of test.



Level 6

18 level 6 students took the same employer's test. (As an activity in the Future You Practice Weeks). Again students struggled with some of the numerical reasoning questions, although on the whole the results were better than level 5, which would be a reasonable expectation for students working in a numerate discipline.



Development of Interventions

The Project looked at the detail of interventions and how these would be incorporated into the curriculum. Key to this is the online software (*Conquer Maths*), which can be configured to deliver on-line lessons to students in which test and progress are monitored by the tutor.

Level 4

Numeracy and diagnostic testing will form part of the guided learning in the level 4 unit Introduction to Accounting and Finance, and the schedule are detailed below. Additional drop in sessions will be provided by PAD (Professional Academic Development) which fit with the e-learning topics outlined.

Accounting and Finance Level 4 Numeracy Schedule

Provisional Schedule

Week	Topic		In Class	e-learning (Conquer Maths System)	Extra Taught sessions
1	Diagnostic Test 1 *	17 th Nov	√		
	The Number System			√	
2	Results of Test and Intro to Numeracy Resources *	24 th Nov	√		
	Integers (basic Operations)	24 th Nov		√	
3	Fractions	1 st Dec		√	
4	Decimals	8 th Dec		√	
5	Percentages and the calculator and percentages	15 th Dec		√	
6	Ratios	5 th Jan		√	
7	Rates	12 th Jan		√	
8	Algebra 1	19 th Jan		√	
9	Problem Solving	26 th Jan		√	
10	Representing Data	2 nd Feb		√	
11	Recap – Numeracy Resources *		√		
	Applications of Number	9 th Feb		√	
12	Statistics	16 th Feb		√	
13	Probability	23 rd Feb		√	
14	Diagnostic Test 2 *	2 nd March	√	√	

- These sessions take place as part of the Introduction to Finance and Accounting lectures (taught in blocks in the shaded weeks)

Level 5

It is planned that a similar schedule will be set up for level 5 units (currently 8 units) which will provide guided learning for more advanced maths needed for Management Accounting, Financial Management and Statistics.

Level 6 and Practice Weeks

It is intended that the employment test work will be incorporated as part of the Level 5 and Level 6 practice weeks.

Dissemination Strategy

As a whole, the profile of numeracy is increasing in the University, with PAD setting up a new inter-departmental Numeracy Group, which will work across disciplines.

Engagement of Students

Students engaging with the numeracy testing and diagnostics have found it very helpful. A selection of student comments are below.

Level 6 student

I greatly encourage students to attend the Future you event. you learn many things the employers would expect from you it provides you with what you can expect at the interview and it also helps you to improve your numeracy skills.

Widespread Impact

The project has promoted the issue within the department and more widely within the business school and the University with the work receiving a commendation in the recent course reviews. A new interdepartmental working group has also been set up to look at improving numeracy skills for students across the university.

Level 4 student

I feel it's good that the students are supported in this way and they are encouraged and motivated to brush up on the skills that they may have not used for a while.

Spending

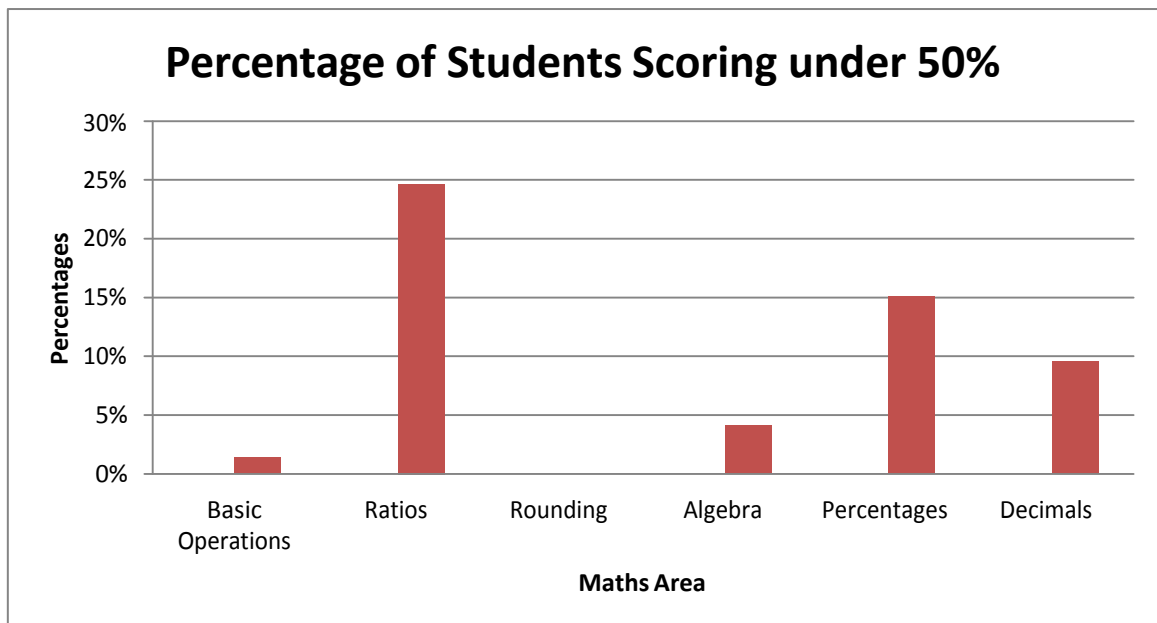
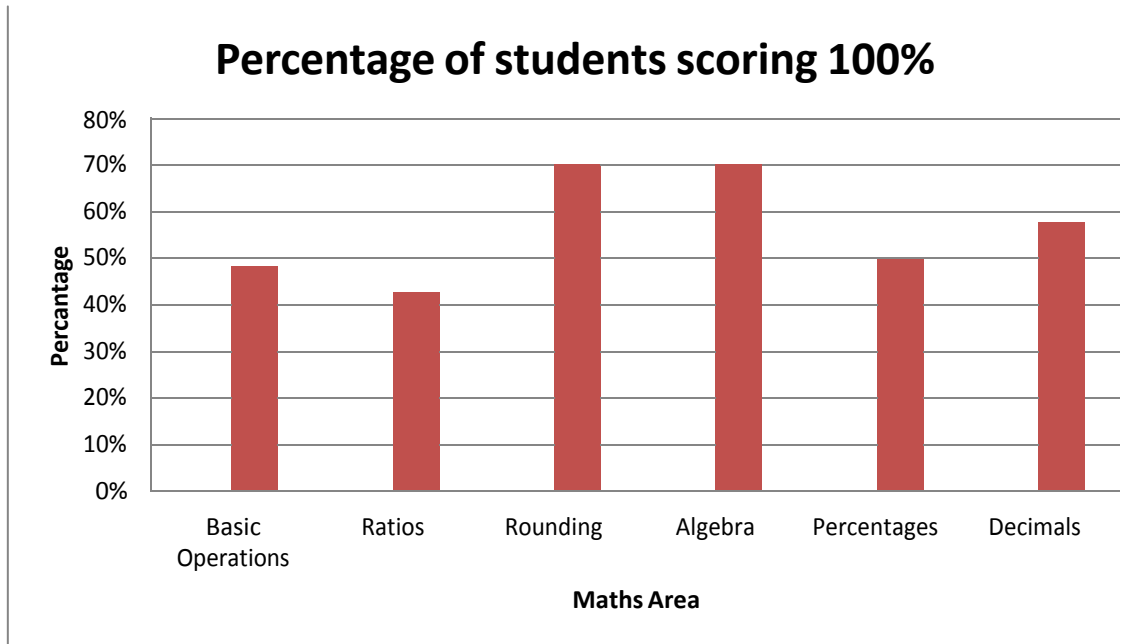
The project spend was lower than anticipated, this was mainly due to conference attendance in the UK and monies were not used for help with gathering evidence and analysis. Conference attendance included the Congress of British Maths Education, Conference for National Association of Numeracy and Maths in Colleges and the BETT technologies in education conference. The biggest expense was the purchase of on-line learning resources for students.

Next Steps

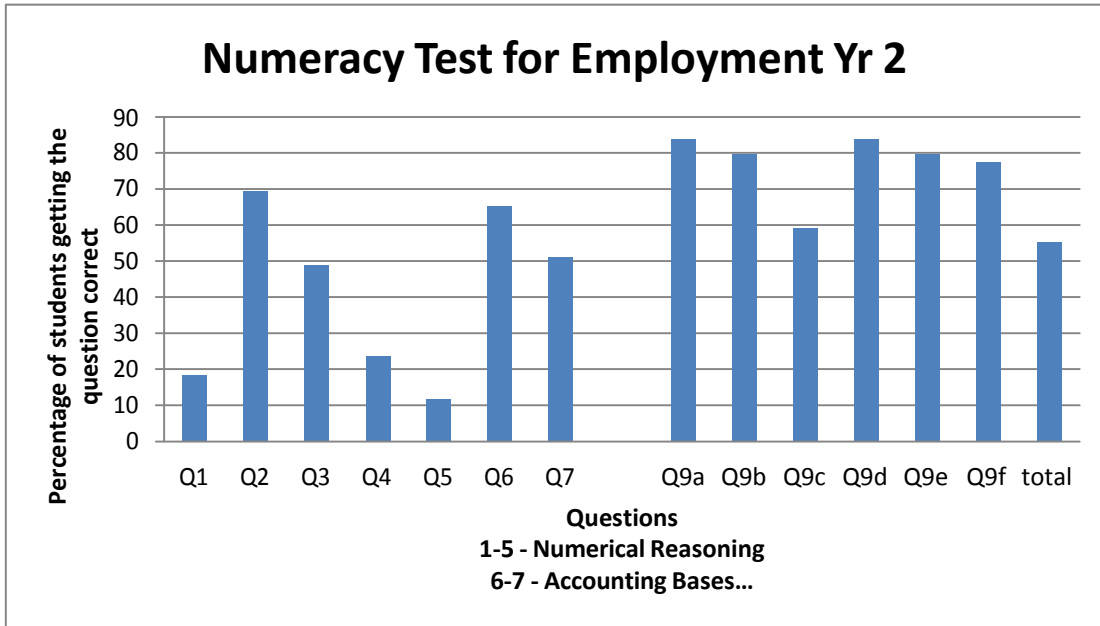
The work of the project is already informing curriculum design in the department and this will continue for different levels and courses. Furthermore, it is hoped that the work will help other departments to develop their own strategies to support students' numeracy skills across the university.

Appendix

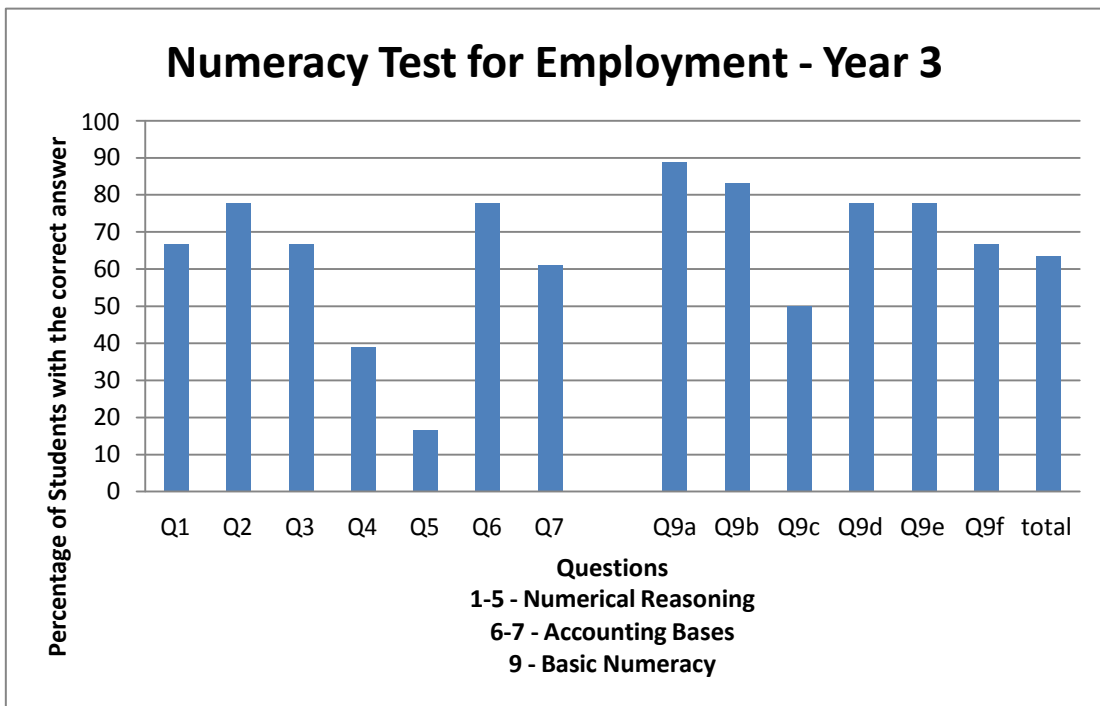
L4 Results – Diagnostic Numeracy Test (73 Students)



L5 Results – Numeracy Test for Employment (49 Students)



L6 Results – Numeracy Test for Employment
(18 Students)

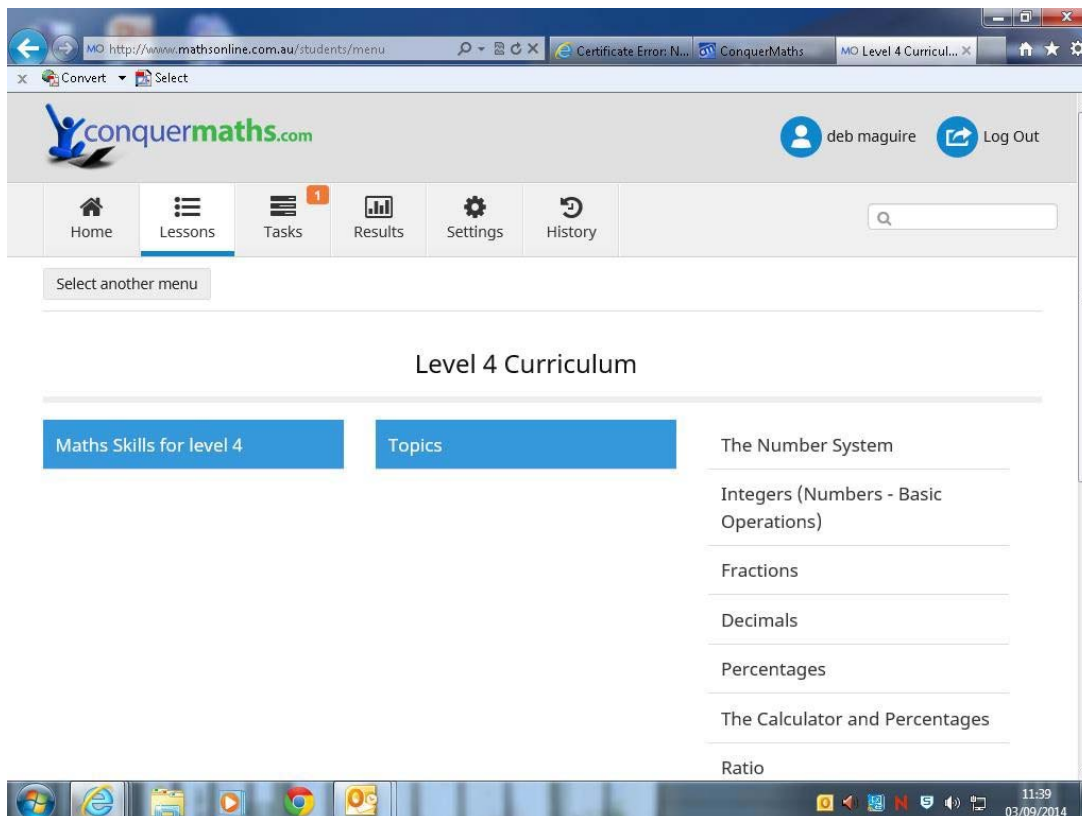


L4 Results – Numeracy Survey

Attitude to Interventions	Yes	No
Did the numeracy test you took earlier in the year identify that you needed to improve your skills in certain areas of numeracy?	52%	48%
Do you feel that you need help with numeracy skills?	17%	83%

Preferred Interventions	No of student stated as preferred	No of students Actually Used
Online Resources	17	15
1 to 1 with a tutor	7	2
Other	5	0
Used None	0	12

On-line Learning Software – Conquer Maths



The screenshot shows a web browser window displaying the Conquer Maths website. The URL is <http://www.mathsonline.com.au/students/menu>. The page features a navigation menu with options: Home, Lessons, Tasks (with a notification badge), Results, Settings, and History. A search bar is also present. Below the navigation, there is a section titled "Level 4 Curriculum" with two tabs: "Maths Skills for level 4" and "Topics". The "Topics" tab is active, showing a list of subjects: The Number System, Integers (Numbers - Basic Operations), Fractions, Decimals, Percentages, The Calculator and Percentages, and Ratio. The user is logged in as "deb maguire" and can click "Log Out". The Windows taskbar at the bottom shows the time as 11:39 on 03/09/2014.