

Assessing and Improving Numeracy Skills in Undergraduate Psychology Students

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Psychology and Number

Psychology is a numerate discipline. The key practical skills of a Psychology Degree: the collection, analysis and interpretation of behavioural data, all require a strong numerate sense. However Mulhern and Wylie (2005) found a worrying decline in the numeracy skills across two cohorts of Level 1 psychology students a decade apart (1992 and 2002). Research and experience suggest the need for early assessment and linked instruction to prepare Psychology students for the demands of their chosen degree.

Local Context

At Aberdeen the Psychology degree is split into two strands of distinct courses “Theory and Concept” and “Methods and Applications”. Recently the teaching of statistics within the “Methods” strand has been rationalised into linked sets of lectures running through the first 3 years. Considering the concerns above, it was decided that before the Level 1 set of statistics lectures there would be an opportunity for students to be formatively assessed and receive instruction on key numeracy skills.

The Resource:

There were two key parts to the resource:

- An online formative assessment on Key Numeracy Skills
- A set of instructional webpages linked to the assessment’s topics.

Both elements were implemented within the Level 1 course’s Blackboard site.

Assessment

Within a lab class students completed two short assessments covering “Calculation” and “Decimals”. The “Calculation” test was concerned with the calculation of simple formula and functions (square roots etc.). This was in preparation for the calculations of the basic statistical formula that would be introduced in the lecture set. The “Decimals” section concerned the properties and calculation procedures associated with decimals. These are considered important as a clear understanding of decimals is essential for the understanding of a number of statistical concepts, not least the ubiquitous and nefarious “p-value”. The students were not allowed the use of calculators. Figure 1 has example items.

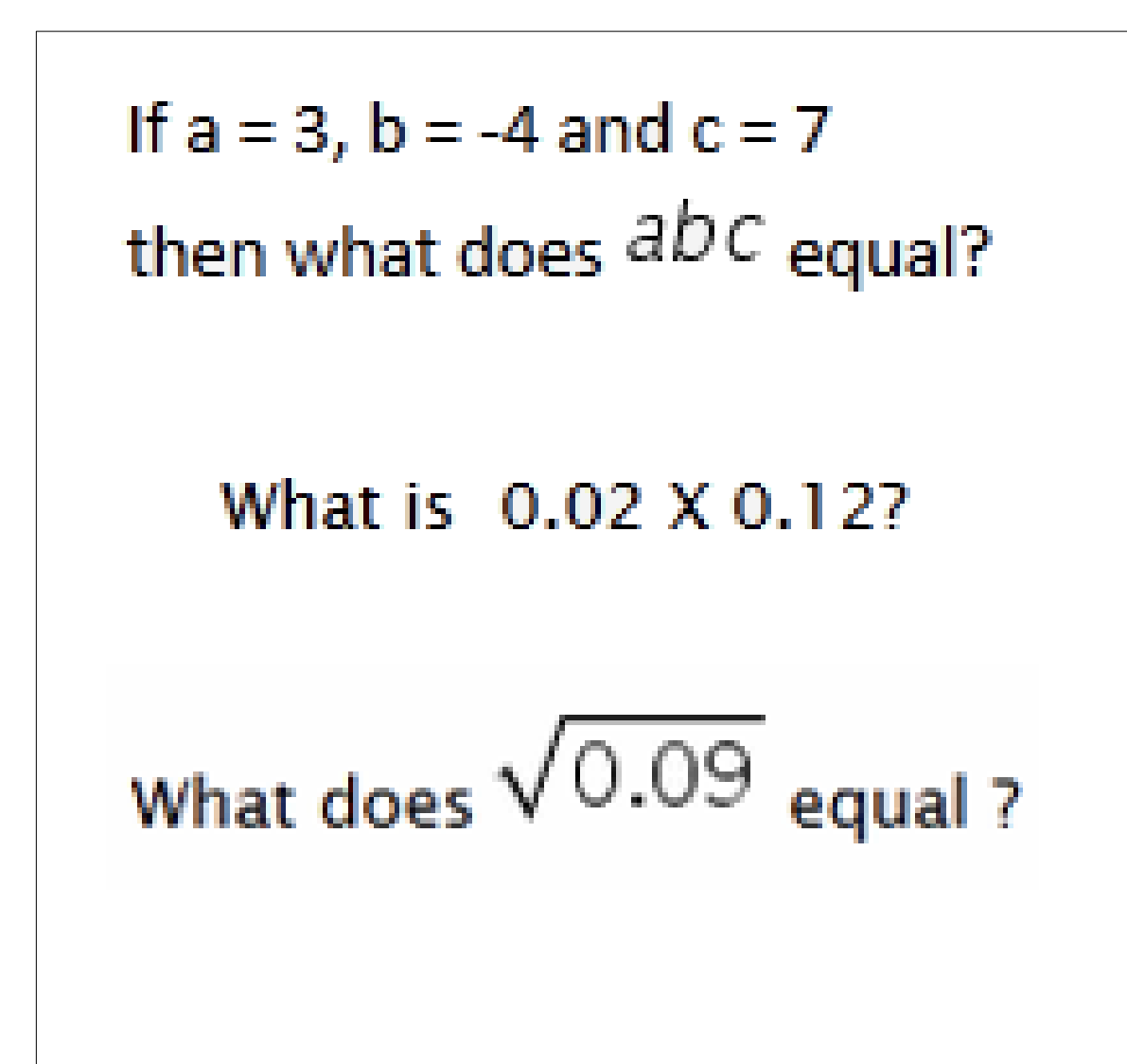


Figure 1: Example of items from both assessments

Instructional Materials

Once the students had completed each assessment they were given feedback on each question and if an answer was incorrect they were shown the correct calculations. If they had answered incorrectly they were also directed to a set of webpages by a link within the feedback. There was a webpage developed for each form of calculation which included worked examples and link to external sites. These materials were developed by an undergraduate summer intern who had the brief of making the instructional material engaging and supportive (figure 2).

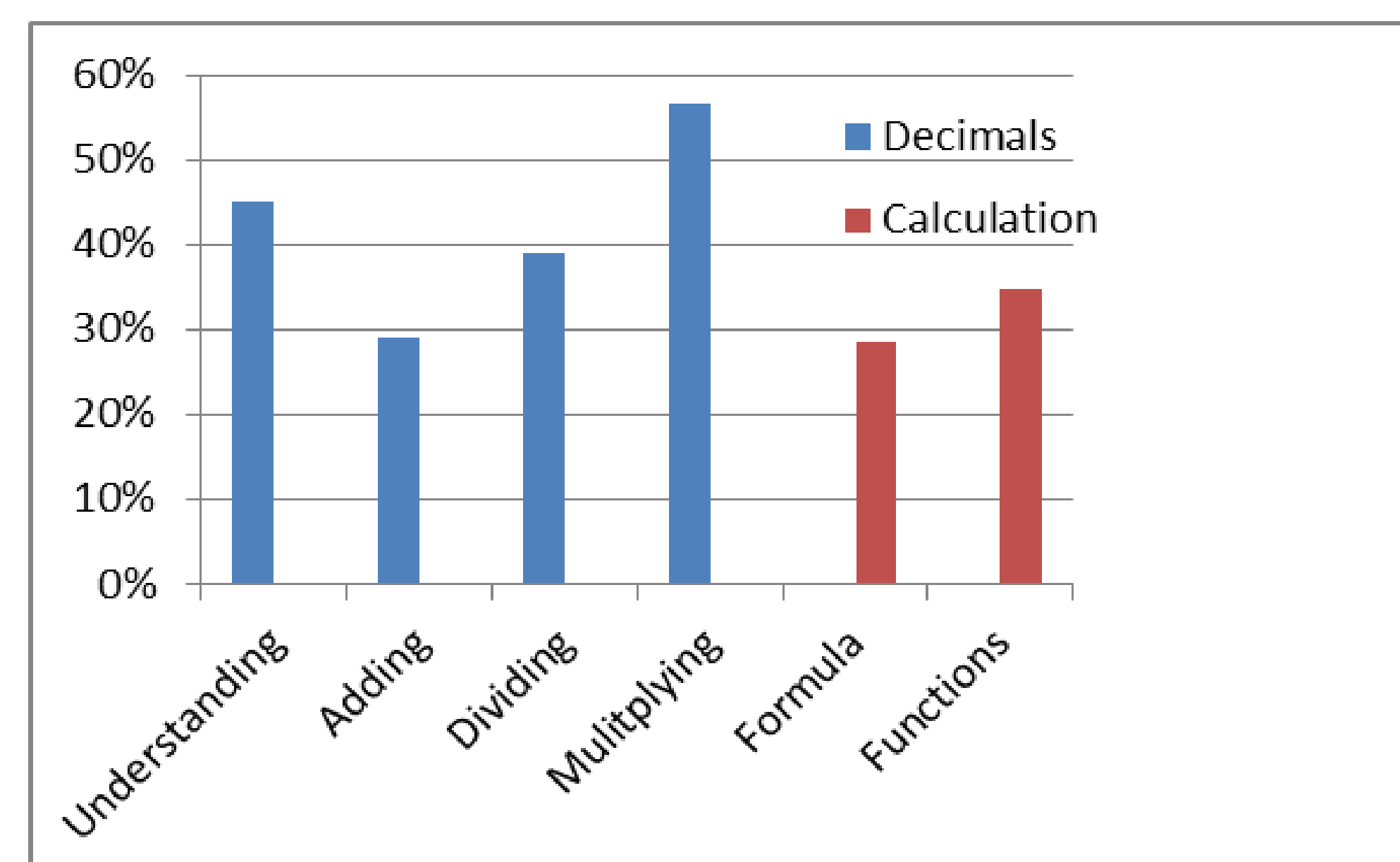


Figure 3: Percentage of items incorrect for each subtopics with the assessments

Students’ use of the Webpages

The number of times each individual webpage was viewed was tracked. The average number of views of for the webpages on Calculation was 14.5. The average number of views that each of the Decimal webpages were viewed was 49.4 (73 students took the tests). The larger numbers of visits to the Decimal pages are perhaps a reflection of the difficulty the students had with the topic. One concern was that the 24% of the students who attained 50% or less correct for Decimals test made up only 25% of the visits to the webpages. There may an issue with the weaker students not utilising the resources as much as is needed.

Overall.

There does seem to be issues with the key numeracy skills with a proportion of Psychology Level 1 students and use of online resources does appear to be a popular and useful method to provide targeted instruction. However more thought needs to be given to ensure those who need the most assistance make use of the resources. The School now intends to extend this general approach to other levels, for example there now a set of resources supporting the interpretations of graphs for level 2.

Reference:

Mulhern, G. & Wylie, J. (2004). Changing levels of numeracy and other core mathematical skills among psychology undergraduates between 1992 and 2002. *British Journal of Psychology*, 95, 355-370.

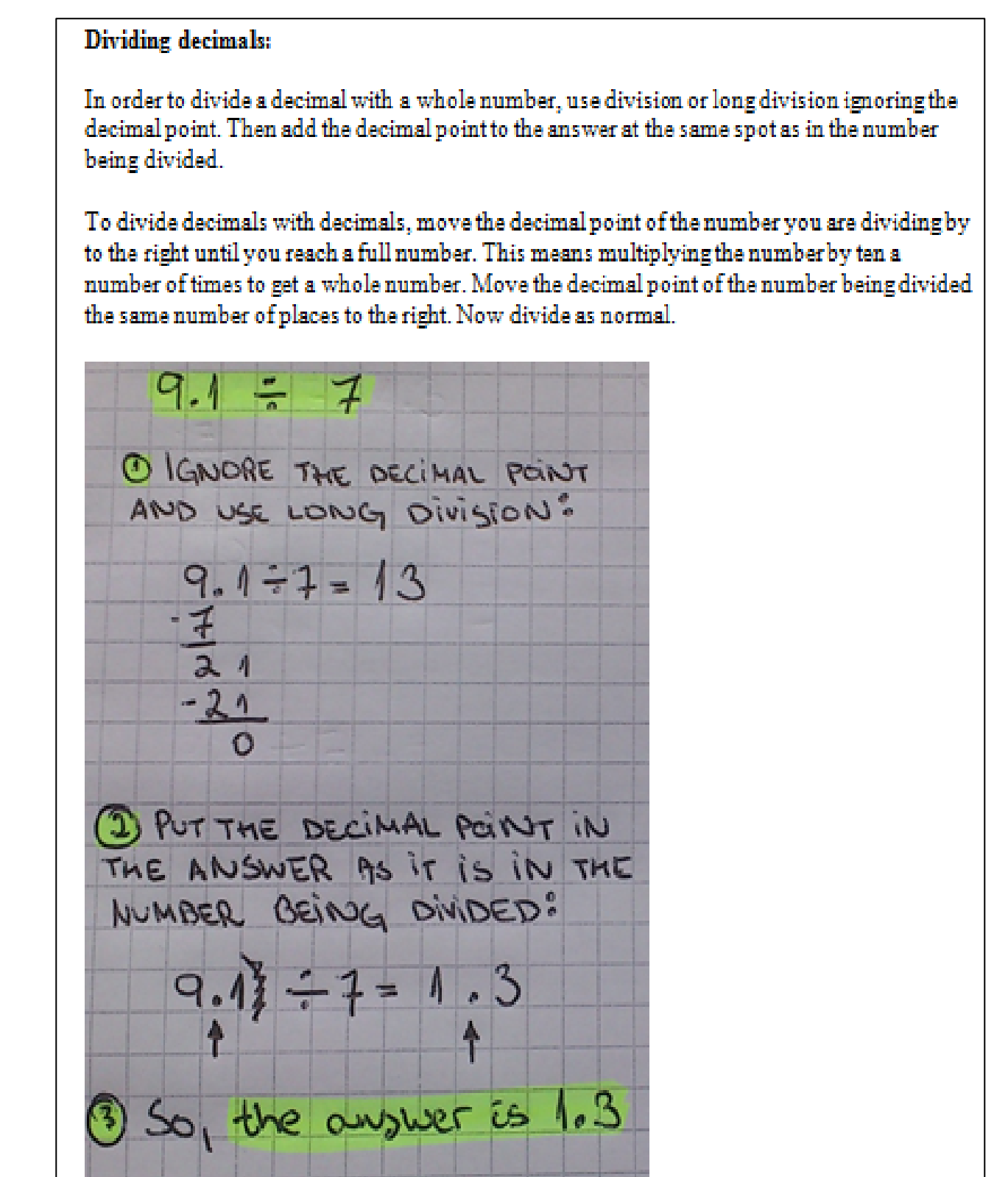


Figure 2: Example of an instructional webpage

Students’ performance on Assessments

The performance on the assessments is given in figure 3. The incorrect scores are broken down by topic for each test. The result for the Decimals test are concerning. A significant minority of students have difficulty with the basic principles and calculations in this topic. The results from the Calculation test are better but there is still room for improvement. Overall there does seem to be a case for intervention.

Acknowledgments

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