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## Summary

Entry profiles of 70 students studying a level 4 science module were examined, and linked to an assessment of student engagement with coupled formative and summative assessment. Students that engaged fully with the formative process achieved significantly higher marks in their summative work compared to students who only partially engaged with the process. Age (and not entry level science qualification) was an important determinant of engagement with formative work, and concomitant with higher achievement in summative assessment. The findings suggest that mature students are particularly motivated learners and are receptive to tutor intervention and dialogue.

## Aim

To investigate whether entry profiles influence students' academic development and achievement (as measured by their engagement / performance in staged formative work and linked summative assessment).

## Methods

The study involved 70 students (of which 54% were registered on Honours degree programmes) studying a level 4 science module during 2010-11. Profile data (see Fig. 2) were compiled, and were subject to multivariate analyses; inferential analysis was by Spearman's rank correlation ( $r_s$ ) and Chi-squared ( $\chi^2$ ).

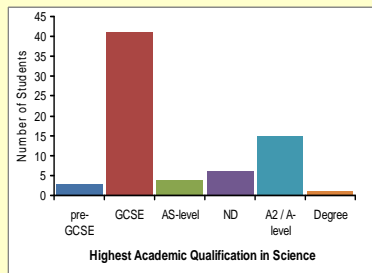
All students had the opportunity to undertake two elements of formative work, as staged practice towards summative assessment. Marks were compared statistically using Kruskal-Wallis, followed by *post-hoc* testing (pairwise Mann-Whitney *U*-test).

Data were grouped on the basis of age categories (i.e. 18 - 21 y; 22 y and older), or by highest entry-level science qualification (i.e. GCSE and lower; AS and higher).

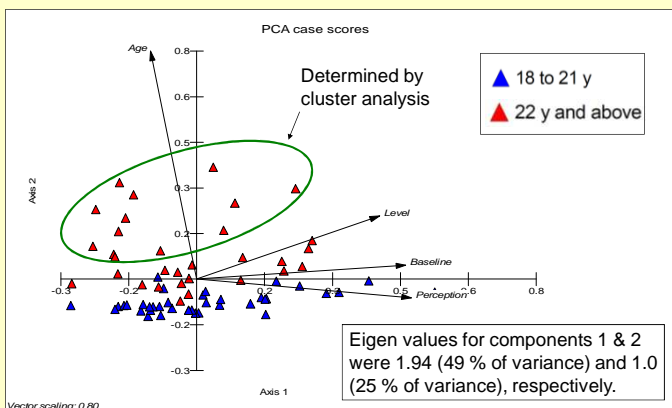
## Results

Student ages ranged from 18 to 61 y (median 21 y), with 56 % in the range 18 - 21 y. Only 37 % of students possessed an entry science qualification above GCSE-level (Fig. 1).

Principal Components Analysis (PCA) separated age from the other profile parameters (Fig. 2).



**Figure 1.** Number of students with highest entry level of study in science.

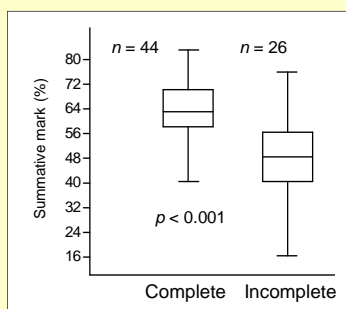


**Figure 2.** PCA of student profile data (i.e. age on entry, highest entry-level science qualification, perception of science knowledge, and results from a baseline test).

Forty-four students (63 %) completed all the formative work; this was not influenced by entry-level science qualification, but was associated with age ( $\chi^2 = 10.77$ ,  $p < 0.002$ ).

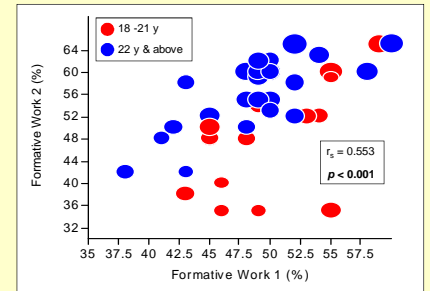
Students who completed all formative work obtained significantly higher summative marks than those who did not complete all formative elements (Fig. 3).

**Figure 3.** Comparison of summative marks achieved by students completing all and some / none (i.e. incomplete) formative work.

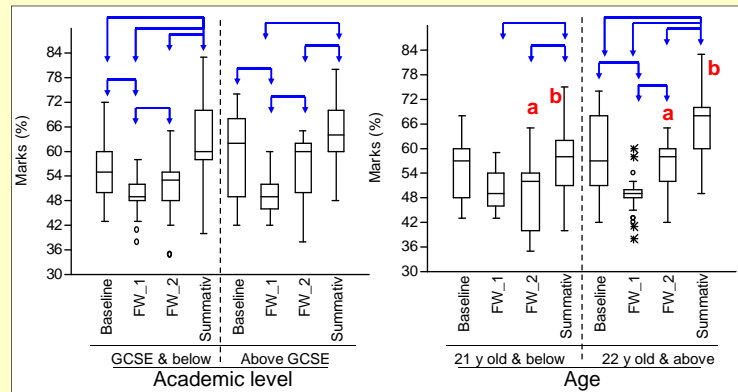


A significant positive correlation was apparent between marks achieved for the two elements of formative work, with higher marks achieved by the older age group (Fig. 4).

**Figure 4.** Relationship between the marks (%) achieved by students for formative work. Bubble diameter represents relative weighting for the respective summative marks.



Patterns of achievement were similar when the student cohort was grouped by academic entry level or age (Fig. 5), with significant improvements apparent in a step-wise fashion.



**Figure 5.** Comparisons of baseline, staged formative work, and summative assessment, grouped by academic level (left) and age (right). Blue horizontal lines represent significant differences in pairwise comparisons; data with the same (red) letters signify a significant difference ( $p < 0.005$ ) between respective achievement between sub-groups.

## Conclusions

Students who completed both elements of the staged formative assessment achieved significantly higher marks in their summative work than those who did not complete both formative elements.

Completion of both elements of staged formative work was associated with student age; no such association was evident when highest entry-level science qualification was considered.

The study indicates that age is a factor that influences students' academic development and achievement, and supports the supposition that mature students are motivated learners (but often lack academic confidence) who are particularly receptive to tutor intervention and dialogue.

## The Future

To develop the profiling approaches outlined here. This would be of value both in the context of a widening participation agenda and in contributing to discipline-specific and institutional reviews of learning and teaching, embracing curriculum design, assessment and underpinning pedagogy.

To capture student views on their academic development; we are currently trialling the use of video diaries for this purpose.

Our findings suggest that more emphasis is required to improve engagement with formative work by younger students. The challenge is 'How?'

## Acknowledgements

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