

# Cluster analysis of assessment in a compulsory Human physiology course for health science undergraduates

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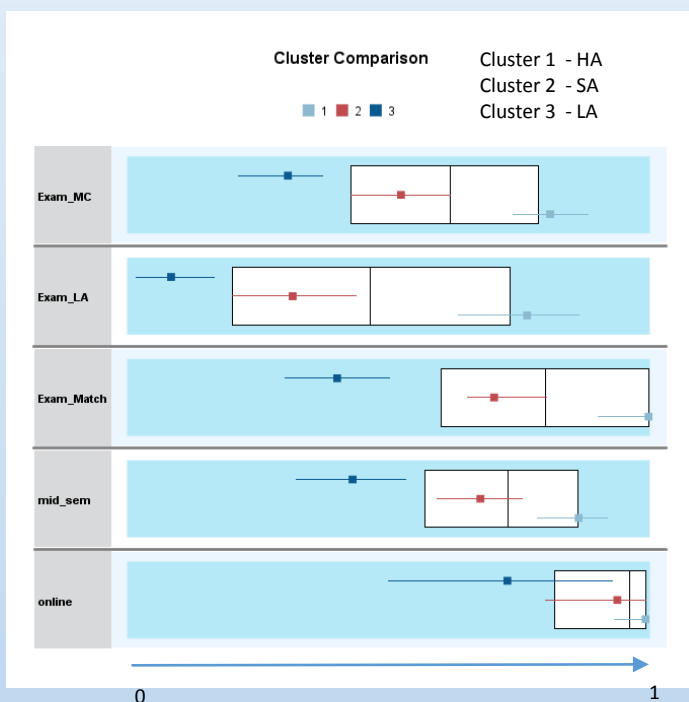
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Academic content which is common to different health science programmes is often taught to large multi-disciplined cohorts, although the assessment of this content may be consistent irrespective of programme. Teaching and assessing these courses, for example, introductory Human anatomy and physiology, in large groups of students with diverse career aspirations remains challenging, particularly when the academic performance of the students is variable.

This study used a retrospective two-step cluster analysis on such a cohort, firstly to identify high and low achieving students, and secondly, to determine the distribution of students within clusters based on their chosen programme of study.



Using a two-step cluster analysis based on five summative assessment scores for 773 undergraduate students, three distinct groups of students were identified and described as High Achievers (HA, n=339), Standard Achievers (SA, n=280), and Low Achievers (LA, n=154).

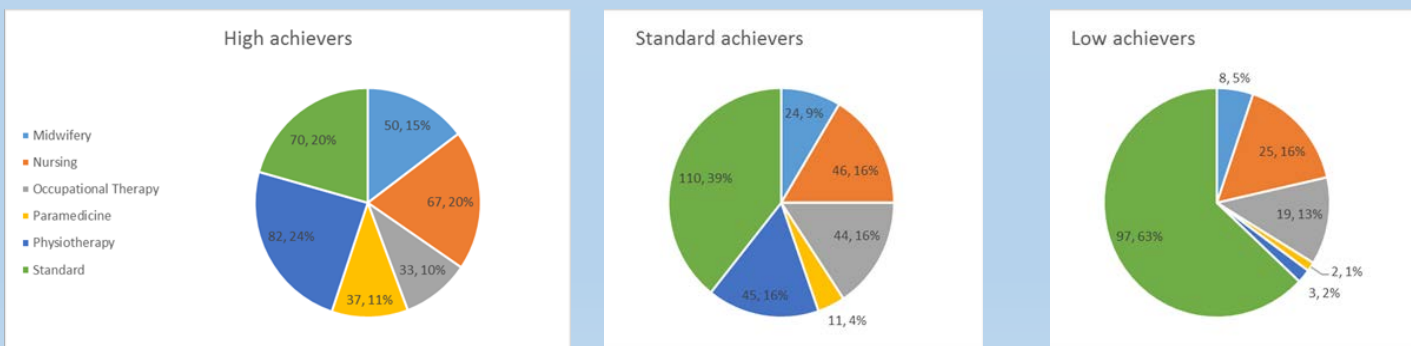
**Figure 1:** Comparison of clusters based on five assessment scores. These are ranked in importance on the far left, and are:

1. Multiple choice section of the final exam (Exam\_MC)
2. Long answer section of the final exam (Exam\_LA)
3. Matching section of the final exam (Exam\_Match)
4. The mid-semester test (mid\_sem)
5. The weekly on-line tests (online)

All input variables are standardised such that the maximum score and minimum scores achieved are scored as 1 and 0, respectively.

High Achievers scored higher in all five assessments compared with both Standard Achievers and Low Achievers (all  $P < 0.01$ ). Also, Standard Achievers scored higher (all  $P < 0.01$ ) than Low Achievers in all assessments.

**Figure 2:** Cluster membership based on student's chosen programme of study.



Performance in assessment continues to represent a pivotal role in students' conceptions of learning science. A cluster analysis is a form of data mining which identifies clusters embedded in data, where a cluster is a collection of data objects that are similar to one another. When applied to academic scores, this novel approach provides an opportunity for quantitative reflection on assessment in a large group of students with diverse career aspirations. It may be used to distinguish levels of achievement relative to peers within a group, and potentially identify students within a programme of study in need of academic assistance.