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Teaching Biomedical Engineering undergraduates how to keep a lab notebook

R.J. Yerworth¹, E. Hatten ¹, A. Vanhoestenberghé ^{2,1}

¹ Dept Medical Physics and Biomedical Engineering, University College London, London, WC1E 6BT. ² Aspire Centre for Rehabilitation Engineering and Assistive Technology, UCL, London, WC1E 6BT.

Introduction

Keeping a lab book is a key skill for biomedical engineers, but teaching on this is often inadequate^[1]. We have tried giving extensive personal feedback, and like others, have found this very time consuming^[2]. This year we trialled a method inspired by a driving instructor's competency chart; combining aspects of rubric and 'live marking'^[3].

Methods

Thirteen key aspects of good lab notebook keeping were identified by the authors, in consultation with colleagues. Each student was given an A4 sheet to stick at the front of their lab book. On one side was a list of the topics with an explanatory sentence for each, and on the other a grid, one row per topic, one column per lab session. During each lab session 2-3 topics were selected and a facilitator inspected each lab notebook, making brief verbal comments, relating to the selected topic (e.g. "clear methods section but you need to write down what you observed, not just the numbers on the oscilloscope"), and scoring that element from 0 (unsatisfactory) to 3 (best practice) in a dated column of the table. Lab notebooks will be collected at the end of the year and compared with those from the previous year.

| Lab book keeping | | | | | |
|----------------------|----------|----------|----------|----------|----------|
| | 04/09/17 | 11/09/17 | 18/09/17 | 25/09/17 | 02/10/17 |
| Checked on: | | | | | |
| Date | 3 | 3 | | | |
| Title/aim | 2 | 3 | | | |
| Strategy/Action plan | 0 | 1 | 2 | | |
| Method | | 2 | 2 | 3 | |
| setup diagrams | 3 | 2 | 3 | | |

Figure 1 Example of part of completed lab grid

Results & Discussion

Students responded well to the lab grids, and productive conversations were had during the live marking. The load on staff was much less than offline marking of lab books. It proved difficult for a facilitator to get round all the students (~20) in one session, but it was easy to spot which students were not improving and focus more time on them.

Conclusion

Observations show that the method enabled constructive feedback to be given in a timely manner, and shows more promise than other methods tried. It will be used again, with minor refinements, next year.

References

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3. Hance J *et al.* *European Journal of Cardio-Thoracic Surgery*, 2005; 28: 157-162