

Scaffolded & Incremental Lab Report Writing Guidelines – A Pedagogical Model Used in 3rd Year Human Biology Laboratory Classes

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Extended Abstract

Students often enter upper year laboratory courses with limited scientific writing skills. Troubling issues include confusion about what to include in each section of a report (abstract, introduction, methods, discussion/conclusions), how to properly report observations using well formatted figures or tables, and a lack of knowledge on how to properly support data with the scientific literature. Over the last several years, all the core 3rd year laboratory courses in the Human Biology Program (HBP) at the University of Toronto have been structured to try and address these issues by using an incremental and scaffolded lab report writing strategy (Fig. 1).

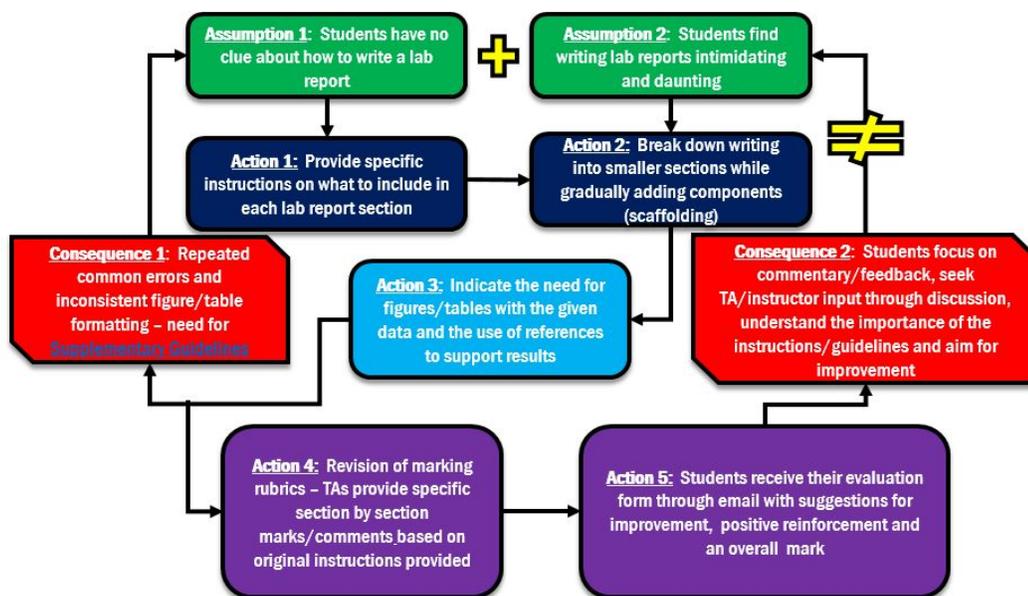


Figure 1. The roadmap to implementing the scaffolded model. Two key assumptions were made regarding student understanding and views which led to actions 1, 2 and 3. Consequences 1 and 2 are a result of further review and refinement of the model while actions 4 and 5 describe outcomes for both students and TAs. Consequence 2 was considered key in unlinking and eliminating assumption 2.

In order to facilitate this process selected breakpoints in a course were identified in laboratory modules that span several weeks in a semester. As opposed to a student writing a full lab report after the completion of entire lab module, they were instead instructed to complete one or two lab report sections at a time during the course of their experiments. Moreover, they were provided with detailed instructions on constructing these required sections. Examples of instructions that were given to the students included direction in content (e.g. relevant background information in an introduction), data that was necessary to process (e.g. make a relevant plot of the independent vs. dependant variable), an emphasis on supporting data with the literature (e.g. supporting laboratory observations with literature observations), and the need to point out any sources of error that could significantly affect experimental results or account for unexpected observations. This process was further augmented by the provision of supplementary lab report writing guidelines which outlined common student errors and formatting instructions on how to construct figures and tables. After completing several smaller reports over the course of a semester, students were finally required to complete a full lab report for a selected lab module but only after going through the incremental process described above. This novel pedagogical approach was also accompanied by a revision of evaluation procedures. New rubrics were designed for each incremental lab report assignment in which TAs were instructed to give section by section grades and comments resulting in an overall mark contingent on the specific weighting of each section. TA comments focused on positive reinforcement of student strengths while also highlighting areas of improvement. Overall the student response to this strategy was overwhelmingly positive. Survey results from the last three years of implementation have indicated an increased interest in the scientific literature, a positive response to the structure and fairness of the marking rubrics and high value for the incremental writing instructions provided (Fig. 2).

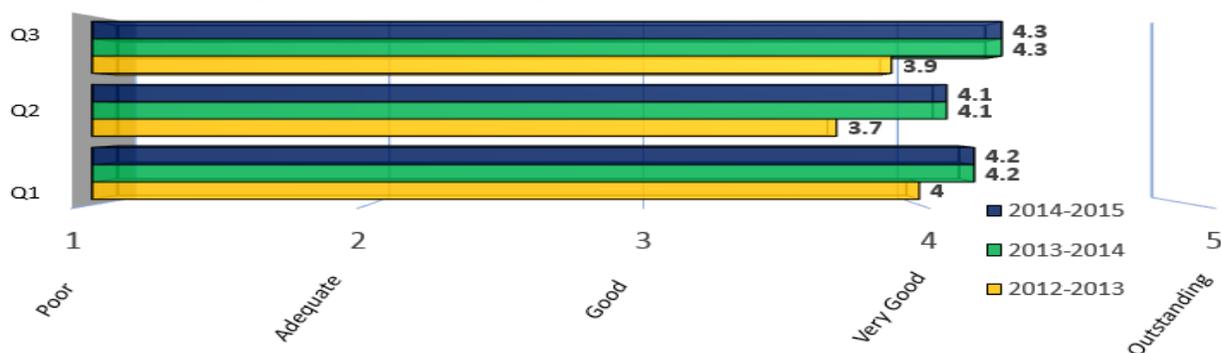


Figure 2. Overall student evaluation of laboratory course components. Q1 = How effective was this course in stimulating your interest in the scientific literature and research? Q2 = how would you rate the fairness of the evaluation schemes/rubrics? Q3 = How would you rate the value and contribution of the lab reports and the writing instructions given in the course? Response rate per year for all students was 60% (2012-2013), 73% (2013-2014) and 63% (2014-2015).

Keywords: writing skills, scaffolded, science, pedagogical

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