

Survey of recent literature on report writing: current practice and trends in research

“One of the most problematic study-skills areas in which to work out how and what to advise students to do to develop their approaches.” (Race, 2001, 62)

“As a science, engineering or technology student, you may hate writing.” (Silyn-Roberts, 1996, v)

The written communication of research in Higher Education is often seen as challenging, by both students and those who teach them. However, reports on research may be required by various disciplines, including business and management studies, life and earth sciences, psychology, engineering and archaeology. As a result, resources which effectively support learning development in report writing are useful to both students and instructors over a broad demographic.

Writing is often seen as a particular problem for science, engineering and technology students, regarded as more action-oriented (witness, for instance, the imperative title of Robert Barrass’s *Scientists Must Write*). Consequently resources aimed at students tend to focus on these topics, with guides to business and management reports targeted at those already in employment. However there are also particular issues for students in these and other more writing-oriented subjects: understanding differences between the discursive style of essays and the informative style of reports, for instance; working to a fixed structural format; or knowing which writing style to adopt for different sections.

This paper offers a brief survey of both current practice in advice on report writing and trends in research. Its scope is restricted to works published after 2000. It is followed by an annotated bibliography with full details of both the texts mentioned and other useful (sometimes earlier) texts. Included is advice on the basic tenets of report writing, and on how to improve existing practice. Publications aimed at both students and instructors, and in monograph and journal article formats are reviewed.

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While the survey focuses particularly on scientific report writing, notes in the bibliography explain how works could be used for other disciplines.

Guides and advice for students and teachers

- Advice in general study guides
- Genres of writing within disciplines
- Structured models
- Writing styles
- Audiences
- Graphical formats
- Self Regulated Learning

Advice for students on scientific report writing is found in two types of literature: guides to study practices generally, and guides to academic writing practices.

Basic advice on report writing is found in most general guides to study practices. These may be aimed at all students, or at those studying particular disciplines. Among the guides aimed at all students, Cottrell (2003) and Drew & Bingham (2001) both use structural models to illustrate the form and purpose of scientific reports for the inexperienced report-writer. The general nature of these guides enables the comparison of report writing with other genres of academic writing, such as essays: especially useful for students who are accustomed to writing in other disciplines.

Subject specific guides to writing in particular disciplines also offer the opportunity to compare report writing with other writing genres. Ebel et al (2004) describes various forms of scientific communication and the tools used to compile them. Reports comprise the first section, with a detailed account of their purpose followed by an examination of each component. While extremely thorough, the text-heavy presentation of this guide makes it more useful for recommending to postgraduates or adaptation for teaching purposes, rather than for reading by undergraduate students. Written in a less dense style, Gilpin & Patchet-Golubev (2000) also organise their discussion by genre, again beginning with reports, and supporting

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descriptions of section contents with box sections containing bulleted key points. While placing more emphasis on scientific writing styles and audiences, Barrass (2002) also includes a section on genres (dominated by a prescriptive account of report writing).

With formal organisation a common feature of reports in all disciplines, guides which clearly explain the function of each section are easily adapted to different academic disciplines. This approach is well demonstrated in Malmfors et al (2000). Katz (2006) similarly begins its guide to each section with a 'skeleton' of what it should contain: e.g. for the Conclusion, "One paragraph statement of the point of the paper" (101). Such segregated models could be used with a building block approach to teaching report writing, selecting the sections appropriate to reports for different purposes and in different disciplines.

The development of basic report writing may be addressed by focusing on one aspect, like writing style. The orthodoxy that scientists have particular issues with writing mean that most guides targeted at the sciences include sections on writing style (see especially Barrass (2002)). Gustavii (2003) (writing about papers) offers good and bad examples of clear and effective communication at every stage. There are also whole monographs on the issue of clarity in scientific writing. Kirkman (2005), for instance, goes into considerable depth, basing his suggestions on a survey conducted among scientists of 'readability'.

All report writing requires attention to the brief, and for students who may have to produce professional reports in future careers, this is especially important. Riordan & Pauley (2002) focus on reports as an act of communication to a particular audience, giving exercises and examples which include considering how to present the same information to different audiences. Barrass (2002) also has an extensive discussion of writing for audiences.

In addition to writing, students may also be asked to communicate information in graphic formats. Gustavii (2003) has two chapters devoted to graphs, charts and tables, proceeding as he does with written style by explaining what is good and bad

in examples. Riordan & Pauley (2002) also have an extensive chapter on visual aids, including production, discussion and when to use them.

Meta-approaches to learning development in report writing are found in works which promote Self-Regulated Learning techniques. For instance, Drew & Bingham (2001) offer a useful series of questions to structure reflexive critique, applicable to all disciplines. More suggestions for development are found in Race (2001). Writing for HE lecturers, he suggests various strategies to promote self-critical approaches to report writing, including getting students to evaluate past reports, and using peer-assessment and collaborative approaches. Haines (2004) has suggestions for the whole process of teaching and assessing reports, including examples from subject teaching practitioners.

Research

- Writing as learning
- Use of models
- Online study tools
- Using academic feedback

A recurring theme in research focuses on embedding writing tasks into programmes of science learning: conceptualising writing as part of the learning process. Campbell et al (2000) observe that student understanding of rules for scientific discourse influences not only reporting, but also procedural aspects, concluding that communication skills must be explicitly taught alongside procedures and concepts. Ellis (2004) discusses a study of first-year university students' responses to a writing programme in science, concluding that science students respond better when the connections between science writing practice and science learning are made explicit. In a later article, Ellis et al (2005) use evaluative research methodologies to consider ways of improving teaching of scientific genres. Results include the need to consider students' previous writing experiences.

Another topic is the use of models. Tilstra (2001) discusses a program in which 1st year American college students use an existing scientific journal article as a model to develop their science writing skills. Willmott et al (2003) also describe a programme in which students closely examined sections of academic articles, before putting the knowledge gained to use in writing reports. An alternative way of using models is described by Florence & Yore (2004). In a process in which research supervisor and students co-authored reports, writers rather than writing acted as models. The authors report that students became ‘encultured’ into scientific research and discourse communities.

Online tools are assessed, especially the skills program LabWrite (<http://www.ncsu.edu/labwrite/>). Carter et al (2004) examine the use of LabWrite to teach report writing as a genre, using a control group study. They conclude that LabWrite promoted both better quality assessments and a more positive attitude towards writing tasks among science students. Ferzli et al (2005) provide a general assessment of the program as a “process-oriented tutorial” (31).

A final strand is the use of academic feedback to encourage a Self Regulated Learning model of development. Chuck & Young (2004) describe an initiative to develop report writing skills through early feedback on first drafts and the opportunity to re-submit. Assessment for the task used a cohort-specific marking scheme based on the deficiencies in the group revealed by the first drafts, with the areas which most needed improvements best rewarded.

Kim Shahabudin, University of Reading, May 2007

Annotated Bibliography

[For students – study practices generally](#)

[For students – report writing and other writing practices](#)

[Guides for teaching staff](#)

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For students - study practices generally

Cameron, Sheila, *The Business Students' Handbook*, 3rd ed. (Harlow: Pearson Education, 2003).

Looks at how to adapt academic skills for employment. A useful short section on reports which bridges the gap between academic and business report writing. Looks at how reports are read in a business context.

Cohen, Jack & Medley, Graham, *Stop Working and Start Thinking: A Guide to Becoming a Scientist* 2nd ed., (Abingdon; Taylor & Francis, 2005).

Aimed at postgraduate students. Includes accessible and thorough explanations of terms and processes in scientific practice (e.g. explanation, observation, hypothesis). Useful model of a 'pre-abstract' – method of planning and structuring to get started.

Cottrell, Stella, *The Study Skills Handbook* 2nd ed, (Basingstoke; Palgrave, 2003).

Brief guide to writing and structuring reports included in general guide to study practices. Includes useful and concise plan for structure.

Drew, Sue & Bingham, Rosie, *The Student Skills Guide* 2nd ed, (Aldershot; Gower, 2001).

Starter and development level advice included in general guide to study practices. Takes the reader through each stage of a written report.

Race, Phil, *How to Get a Good Degree* (Buckingham; Open University Press, 1999).

Accessible guide helping students to make the most of their time at university

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by taking charge of their learning. A concise and pertinent summary of how to write reports by focusing on the audience's needs.

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[For students – report writing and other writing practices](#)

Ashby, M., *How to Write a Paper*, 6th ed. Available at <http://www.grantadesign.com>

Very thorough guide suitable for postgraduate students. Uses the idea of a 'concept sheet' to help design reports which would especially appeal to engineers, graphic artists and designers.

Barrass, Robert, *Scientists Must Write* 2nd ed, (London; Routledge, 2002).

Two very thorough chapters on writing reports, with checklists and tips on layout. Includes explanations of graphical data, and chapters on writing style.

Davies, John W., *Communication for Engineering Students*, (Harlow; Longman, 1996).

Contains a chapter on report writing with a number of good exercises on structuring reports. Also contains summaries of the different kinds of reports engineers may have to write.

Ebel, H.F., Bliefert, C. & Russey, W.E., *The Art of Scientific Writing* 2nd ed (Weinheim; Wiley-VCH, 2004).

Text-heavy but thorough guide to scientific writing genres, including section on reports. Especially useful for postgraduates, or for teaching purposes.

Evans, David, *How to Write a Better Thesis or Report* (Melbourne; Melbourne University Press, 1995).

Friendly and very accessible guide which focuses on structure. Works from case studies and examples.

Gilpin, Andrea & Patchet-Golubev, Patricia, *A Guide to Writing in the Sciences* (Toronto; Toronto University Press, 2000).

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Guide to better writing in the sciences produced following a course for undergraduates combining teaching from writing specialists and scientists. Various genres including lab reports.

Gustavii, Bjorn, *How to Write and Illustrate a Scientific Paper* (Cambridge; Cambridge University Press, 2003).

Advice on writing papers but equally applicable to reports. Organised by sections of report. Includes extensive discussion of graphic formats. Gives good and bad examples throughout.

Harris, Peter, *Designing and Reporting Experiments in Psychology* 2nd ed (Maidenhead; Open University Press, 2002).

Aimed at undergraduate psychology students, but including some tips for students working at a higher academic level. Clear and thorough guidelines conveyed in an accessible style.

Katz, Michael Jay, *From Research to Manuscript: A Guide to Scientific Writing* (Dordrecht; Springer, 2006).

Treats writing as part of the research process. Includes examples throughout. Explicitly science-orientated.

Kirkman, John, *Good Style: Writing for Science and Technology* 2nd ed (Abingdon; Routledge, 2005).

Guide to various issues in writing style. Includes choice of vocabulary, phrasing and sentence structure. Aimed at scientific and technical writers.

Malmfors, Birgitta, Garnsworthy, Phil & Grossman, Michael, *Writing and Presenting Scientific Papers* (Nottingham; Nottingham University Press, 2000).

Brief but useful guide to various types of scientific writing including scientific papers. Good chapter on improving writing style.

McMillan, Victoria E., *Writing Papers in the Biological Sciences*, 4th ed, (Boston; Bedford/St Martins, 2006).

Contains a chapter on writing lab reports, interspersed with examples of good

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and bad academic writing suitable for reports. Also includes an example of a lab report.

Peat, Jennifer, Elliott, Elizabeth, Baur, Louise & Keena, Victoria
***Scientific Writing: Easy When You Know How* (London; British Medical Journal Publishing, 2002).**

Targeted at medical students. Focuses on writing papers for publication, but very useful chapter which works through each section and concludes with a clear set of construction guidelines.

Pechenik, Jan & Lab, Bernard, *How to Write About Biology*, (London; Harper Collins, 1994).

Detailed chapter on writing lab reports in Biology, with sections on presenting data, and also analysis of extracts from students' reports.

Riordan, Daniel G. & Pauley, Steven E., *Technical Report Writing Today* 8th ed (Boston; Houghton Mifflin, 2002).

Comprehensive guide which focuses on writing for an audience. Includes different types of report (formal and informal, recommendation and feasibility reports) with examples and exercises throughout. Written for US audience.

Silyn-Roberts, Heather, *Writing for Science* (Auckland; Longman, 1996).

Aimed at undergraduate science, engineering and technology students. Includes chapter on correcting common mistakes in writing, and advice on the process of producing a research report.

Smyth, R.T., *The Principles of Writing in Psychology* (Basinstoke; Palgrave Macmillan, 2004).

Contains thorough chapters breaking down the process of writing reports for qualitative and quantitative psychology experiments.

Van Emden, Joan, *Effective Communication for Science and Technology* (Basingstoke; Palgrave, 2001).

Aimed at new students, covers communication skills generally. One chapter on reports and dissertations, includes examples of spidergrams for structuring.

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Van Emden, Joan & Eastal, Jennifer, *Report Writing* 2nd ed (London; McGraw Hill, 1992).

Guide to the production of management and technical reports including sections on data presentation and revision, and specimen reports.

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Guides for teaching staff

Haines, Catherine, *Assessing Students' Written Work: Marking Essays and Reports* (London; RoutledgeFalmer, 2004).

Starts from the idea that assessment of a piece of work must include reflection on the process which produced it. Includes comments and examples from teaching practitioners, assessment grid, learning contract and checklist.

Race, Phil, *The Lecturer's Toolkit* 2nd ed (London; Routledge, 2001).

Suggests strategies to promote self-critical approaches to report writing, including evaluating past reports, and using peer-assessment and collaborative approaches.

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Research

Campbell, Bob, Kaunda, Loveness, Allie, Saalih, Buffler, Andy & Lubben, Fred 'The communication of laboratory investigations by university entrants', *Journal of Research into Science Teaching* 37 (2000), 839-853.

Study which compared actual laboratory activities with their description in student reports. Concludes that what is reported depends on student perceptions of a task's purpose and their understanding of lab procedure and discourse rules.

Carter, Michael, Ferzli, Miriam & Wiebe, Eric, 'Teaching genre to English first-language adults: a study of the laboratory report', *Research in the Teaching of English* 38.4 (May 2004), 395-419.

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Investigates the teaching of report writing as a genre through explicit teaching (using the LabWrite program <http://www.ncsu.edu/labwrite/>) in lab work situations. Concludes that explicit teaching of writing genres is successful if used in authentic contexts.

Chuck, Jo-Anne & Young, Lauren, 'A cohort-driven assessment task for scientific report writing', *Journal of Science Education and Technology* 13.3 (Sept 2004), 367-376.

Describes a project in which students used peer and self review to revise reports in response to academic feedback. Cohort-specific marking was used to measure tangible success for students at all levels.

Ellis, Robert A., 'University student approaches to learning science through writing', *International Journal of Science Education* 26.15 (Dec 2004), 1835-1853.

This study investigates the approaches adopted by students in a university writing programme designed to help them learn first-year undergraduate science. The results showed that students' understanding of the process would be greater if instructors made them more aware of the learning which is made possible through writing a report.

Marshall, S., 'A Genre-Based Approach to the Teaching of Report Writing', *English for Specific Purposes* 10 (1999), 3-13.

A study which regards report writing "not only as a means of teaching students how to express and present information effectively. It is also a means of facilitating the development of scientific thinking". The study examines lecturers' feedback on reports as a genre of writing in its own right, and designs a computer programme to help lecturers give feedback.

Sheehan, R.J. and Flood, A., 'Genre, Rhetorical Interpretation, and the Open Case: Teaching the Analytical Report', *IEEE Transactions on Professional Communication* 42.1 (1999), 20-31.

Looks at how reports do not just provide a formal structure for writing, but they also impose a conceptual order on an experiment or investigation. This study analyses the use of open-ended case studies based in real world scenarios as a means of helping engineering students develop both their problem-solving and their report writing abilities.

Walker, K., 'Using Genre Theory to Teach Students Engineering Lab Report Writing', *IEEE Transactions on Professional Communication* 42.1 (1999), 12-19.

Examines a collaboration between a university writing centre and lecturers teaching an Electrical and Computer Engineering course. Staff from both areas shared expertise on the genre of report writing. The successful interdisciplinary collaboration helped identify differences in reports *within* the department, as well as between departments, and generated discussion about academic writing amongst faculty members and students.

Willmot, J.R., Clark, R.P., and Harrison, T.M., 'Introducing Undergraduate Students to Scientific Reports', *Bioscience Education E-Journal* 1 (2003), available at: www.bioscience.heacademy.ac.uk/journal/

Describes a staged introduction to report writing for first year undergraduates, using scientific journal papers as a model. First, students analysed a journal article to deduce the structure and style of a scientific report. Then they used this as a model for designing and reporting their own experiments. Group discussion and formative feedback was provided throughout.

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