Abstract

Aspects of the research process are considered from the points of view of supervisors, students and researchers. The sequence of developing research capability is described in relation to conventional preparation through course work. The process of managing research is discussed in relation to the tasks that the people concerned complete. Successful strategies are outlined and problems identified.

Keywords

Research supervision, postgraduate research, research strategies, research process management

1. Introduction

People become involved in the research process for many reasons. The motivation required to persist in individual research at a publishable level over an extended period can be sustained by working with peers in a collaborative way. Few people engage in individual research. Introductions to research are part of the course work for a higher degree requiring the completion of a research methods course and an individual project or a directed study. Research methods courses are usually taught by active researchers and require a grasp of research as an academic activity and knowledge of the tools and techniques appropriate for the discipline. The research methods courses should also draw attention to the questions currently of pressing interest in the discipline as well as those of perennial interest.

The subsequent directed study following a research methods course involves the student in an individual piece of work that is closely supervised on a one-to-one basis by an active researcher. Early research takes many different forms. Among these are a survey of a topic in the literature, or the replication of a published study in the discipline, or an application of a well known technique to a local area or as a case study, or the development of a software tool meeting a specific research specification or the setting up of testing tools or schedules for evaluating competing software products in relation to a common task. For the supervisor and the independent researcher, selecting a topic for research should reflect a particular interest or competence. An outstanding grade in a particular subject suggests that further work in the discipline is likely to be of interest and therefore rewarding. The satisfactory outcome would be the completion of the tasks set within the time and the write-up of the research in a suitable and acceptable form.

2. Scheduling

The supervisor and student or collaborating colleagues should arrange to meet on a regular basis, perhaps once a week, more often when the task is being planned and less often during the research period with again more frequent meetings as the research period ends. Whatever the frequency of meetings the people involved should agree on
the tasks for the next work period. It is important to have clear agreement on what the next expected deliverable will be within the overall plan. An independent researcher could be expected to have a carefully prepared schedule of tasks and completion dates for the various elements of the research process. Expecting to complete drafts of proposals, literature reviews, methods, tools, data collection and results chapters, as the work moves through the various stages, reduces the pressure on the other people. More importantly, it lets those people involved share in the developing work so that, when completed, the form and substance can be agreed. Revisions become expected as a matter of course and both accept that research is a work in progress. Students and researchers get to see the work shape up over the period. Supervisors and collaborators ensure progress is steady and deviations are reduced to a minimum.

A similar process is followed at subsequent levels where the independence required of the researcher is increased as the intellectual performance expectation increases. At masters' level, the criteria for success are usually demonstrated competence in carrying out supervised research within a discipline. At doctoral level the criteria of success are demonstrated competence in contributing to developments of the discipline, the expansion of knowledge in the discipline and communicating to peers in the discipline. An independent researcher could be expected to choose tasks and projects that have a select audience. Writing for that audience is a highly focussed task and the skills required take several years to develop (Alley, 1996).

3. Performance Against Quality

Other measures of quality research are outputs that are communicated to a wider audience through poster sessions, short papers and full papers at Conferences. Later, acceptances of papers derived from research achieve wider audiences through publication in Journals and as chapters in books.

4. Performance Against Budget

Research costs time and money. Research proposals should present realistic costs for completing research proposals. There should be no surprises to the student/researcher in terms of the time required or the supervisor/manager in relation to the budget. Research should not begin unless budgeted costs have corresponding amounts of money available for carrying out the work. Full time dissertations can take 20 hours per week over a six-month period. Full time theses take about the same commitment of time for a whole year at masters level and that level of commitment is doubled per week and extends over three or more years. Realistically most doctoral work takes six or more years as a part time exercise.

Papers written out of research reports and theses take various amounts of time but rarely does average output exceed one page of text 300-400 words per hour for a rough draft. Taken over all a 4000 word paper may require anywhere from 10 to 100 hours work. A one hundred page research report represents over 100 to 300 hours writing to create a draft so will require at least a further 50 hours to edit into an acceptable form. That amount of work cannot be completed without careful planning and extended effort.

5. Is Research Possible?

Research planning is fundamental today when most students fit their research work around employment and raising a family and having something resembling a life outside of books and writing. On a day-to-day basis planning should include two or more hours each day set aside to research work. Some people find early morning best other find late evening better, but adopting the same time each day helps establish the research habit and assists flatmates or family to learn the selected time is not to be disturbed. One day per week should be left free so that catch-up activities can be managed. Within that time the research plan should include significant tasks and completion dates that will be agreed as assisting in getting the work done. Research plans are very individual agreements. What works for one person may not work for another person whose interests and circumstances are different. Sickness and other changes in circumstances alter productivity, can be expected and should be factored into any research plan in the form of an early completion date allowing at least a week
for contingencies. As a rough estimate, a conference in a field a researcher is working in is generally announced three to six months before hand. At two hours per day over a period of 12 to 25 weeks there is some 120 to 250 hours available in potential preparation time for a research paper.

The plan should also clearly identify the tools and skills required to complete all the identified tasks. Should there be special software or other resources then the plan should identify those items at an early stage and the research should not proceed until they are located or substitutes found. In similar fashion the plan should identify particular people required for their particular skills or if the skills are to be acquired during the course of the research then the plan should show how getting the skills is to be accomplished. Perhaps the most important aspect of the planning process is to ensure that the research is at appropriate level of difficulty and can be completed in the time available by the person. There should also be clear fallback positions should any aspect of the research not come to completion for unforeseen reasons. A common strategy would be to require beginning researchers to form a draft research proposal that identified a research problem and then suggested several ways of forming research questions related to the problem. Parallel ways of solving the problem employing different types of methods should also be suggested drawing from prior experience in a research methods course.

These expedient measures help the beginning researcher avoid the trap of "stuckness" in a particular approach and provide the supervisor/collaborators with ways of moving a stalled project forward to completion within what the student already has suggested. These strategies help enable people carry out the difficult tasks of research in the available time and using personal resources that are within the capabilities of most people.

6. Research Environment

Identifying and solving technical problems can often make the difference between research coming to completion and languishing unfinished. A significant and potentially easily solved problem for beginning researchers is that of locating a suitable computer, software and workspace. Most institutions have equipment available but a wise student could be expected to have an agreement as to work environment clarified before any research was begun. It is no longer reasonable to expect completed research without an appropriate word processing technology and an integrated software package. For a number a years my standard question of a research student was "do you own your own computer?". A positive answer indicated a commitment to the technology and the knowledge that should the work machines fail, the home machine was available to support continued research.

7. Web Sources

Proposals to conduct a particular piece of research may take up to a year to prepare and the work they describe almost never looks the same when the research comes to completion. In part the relationship between what is proposed and what is completed reflects the learning that the research process involves. In part also the world will have changed. In the present Web based publication environment, web pages come and go with increasing rapidity. It is good practice to keep hard copy of web-sourced data so as to ensure that if required you can provide referencing sources.

8. Quality Assurance

Research activities like many other human endeavours must first feel right to the person carrying them out. On the one hand, busy work or research that fails to meet personal standards disappoints and drives people away from what should be especially rewarding activity. On the other hand, most science and other research has been described as "carrying water and gathering sticks", it is hard and demanding work. The reward is in completion, in the sense of making a contribution, in knowing that other people could build on the work when it is reported. Acceptance for publication is a second step in evaluating research output. It is assumed that reports will be "blind reviewed" by peers. A process that ensures that the reviewer is not known to the person reading and evaluating the paper. Researchers can have more confidence in
acceptance for publication under blind review. Rejection of papers is a common experience for all writers. Almost all papers written are publishable with more or less, and in some cases no, editing. Matching the research paper with the appropriate conference or journal publication ensures that acceptance rates rise.

9. Key Lessons

What helps things go well for researchers: suitable supervision, adequate resources, suitable time to prepare, think about and write up research. Meeting with a mentor or supervisor helps research come to completion by assisting the researcher with motivation, scheduling of activities and evaluating progress. A post graduate course in research methods gives perspective on what is involved and ensures that research goals are appropriate. Methods, tools and techniques must be suitable for the research questions or problems.

Get help with the form of writing up reports from a specialist editor or and English language scholar or a disciplinary expert. Lots of things can go wrong with research. By far the biggest problem is missing meetings with mentors or supervisors, and deviating from the research plan.

10. Common Responses to Problems

People are often tempted to miss meetings, blame themselves for lack of progress or engage in displacement activities, such as filing CDs, sharpening pencils, web surfing, planning a holiday, and gathering around the water cooler. It takes researchers a while to develop the self-discipline to adopt a Carpe Diem attitude to research. Developing a close network of support people with shared research interests helps solve day-to-day problems. Contributing to other people's research also helps to appreciate the various tasks that have to be completed. Reading and commenting other people's text helps them and develops the critical eye required for editing personal research contributions. Research Centres exist for most research disciplines at tertiary institutions around New Zealand. Volunteers are always welcome and useful training in research can be gained from such associations.

11. Other Resources

There are a multitude of web pages dealing with the research process and the craft of writing. Many good books also exist on the subject (Day, 1994) and (Alley, 1996) are useful guides to the research and writing processes in Science and are applicable to Information and Computing systems writing.

12. Conclusion

Pragmatically, research is difficult work requiring attention to detail, careful planning, and a long-term view. Carrying out research as a part of full time academic work requires balancing a number of demands. Academic employers make provision for research in employment contracts. Teaching responsibilities will fill all the hours of the day and night, if you let them. Extra fortitude is required to complete research under such circumstances. Some suggestions have been made as to how to advance research that, it is hoped, will encourage research and contribute to a better understanding of the research process.

References


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