

Supervising postgraduates brings the research and teaching aspects of an academic career together. To do it well, *Postgraduate Supervision* is demanding and challenging, requiring careful attention to details, policies, students' needs and interests, as well as academic integrity and rigour. However, it can be exciting, rewarding and a wonderful learning experience for both the supervisors and their students.

Improving the Medical Graduate Programme and Supervision of Postgraduate Students

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The number of graduate students has increased exponentially with the expansion of the postgraduate programme in NUS over the last decade. In addition, I believe that the mission of the Faculty of Medicine's PhD programme—to educate and train competent, reliable and self-directed research scientists who have a strong sense of scientific integrity—has played an important role in improving the quality of our PhD graduates over the years. Unlike the training of technicians, a PhD graduate's research experience should help the individual understand that research involves:

- Recognition, formulation and solving of a problem,
- Evaluation and presentation of the results in a clear manner (both written and oral),
- The acceptance of the value of scientific research in contributing to society, and
- The ability to use professional standards in all professional activities such as teaching, practical applications, project management or administration, relations with industrial or other sponsors and research.

In order to achieve our mission, we have implemented various changes to the PhD programme based on the

standards recommended by the International Union of Biochemistry and Molecular Biology¹ (IUBMB). In addition, we have restructured the programme according to the following features that a PhD graduate should have:

- A general knowledge of all the branches of science (physics, chemistry, biology and cell biology, biochemistry and molecular biology) and a detailed knowledge of his area of research,
- Familiarity with the research literature of the particular bioscience area and the ability to keep abreast of major developments to acquire a working background in any area,
- Ability to recognise potential problems and questions for research as well as the necessary technical laboratory skills to solve those problems and questions,
- Good oral, written and visual communication skills, and
- Ability to design experimental protocols and conduct productive self-directed research.

Thus we introduced coursework on key topics (e.g. scientific writing, presentation of talks, bio- and professional ethics, information storage and retrieval, recording of experimental protocols and results, intellectual property rights, statistics, grant-writing and

1. As our programme centres on biomedical research, the standards were taken from a booklet, *Standards for the PhD Degree in the Molecular Biosciences*, by the IUBMB.

English language), as well as some specialised graduate courses to equip students with the necessary general information base and some transferable skills.

Departments were encouraged to organise journal clubs where students could present and share their research results to prepare them for the PhD qualifying examination (including both written submission and an oral examination) which we started that required the candidate to demonstrate the following:

- Detailed knowledge of his area of research,
- Familiarity with the background on which he had formulated questions that he was proposing to answer through his research towards the PhD degree, and
- Technical skills (by presenting his results obtained prior to the examination).

Finally, we also introduced the formation of a thesis advisory committee after the candidate had passed the qualifying examination.

While we have improved the academic programme, the roles and responsibilities of PhD supervisors remain undefined. I welcome your feedback (bchkhe@nus.edu.sg) to improve the following proposed guidelines on the PhD supervisors' role:

1. Supervisors should have ongoing research and contributions made to peer-reviewed literature so that they can provide appropriate guidance and supervision to students.
2. Supervisors should honour the commitment to devote the time and energy required to supervise graduate students until the completion of the programme (i.e. a supervisor should ensure that he has enough time for all his students).
3. With reference to (2), supervisors should therefore be available for regular consultations with their students to provide constructive and timely feedback. If a supervisor intends to be away for a prolonged period of time, alternative supervisory arrangements should be made.

4. Supervisors should provide regular evaluations and assessments of their students' progress and academic performance to the Faculty Graduate Program Committee.
5. Supervisors should ensure that adequate and appropriate research resources are available to their students so that they can finish their research projects on schedule.
6. Supervisors should provide guidance, instruction as well as encouragement regarding the research activities and help disseminate their students' research results further through publications or conferences. Supervisors should also ensure that manuscripts are suitable for publication before submission to a suitable journal.
7. Supervisors should adjust their style of directing student research according to their students' maturity level (e.g. give more guidance to a beginner and allow the student to evolve into a self-reliant and professional investigator during the thesis work by decreasing detailed direction as the project proceeds).
8. Supervisors should see the candidates as partners in a mutual effort but not as equals. Thus any difficulties in supervisor-student relationships should be resolved as soon as possible by reference to a third party (either the Head of Department or the Faculty Graduate Programme Committee).
9. Supervisors should be familiar with the requirements of the Faculty's graduate programme in order to advise their students appropriately.
10. Supervisors should encourage their students to obtain necessary skills and information from appropriate sources (including fellow colleagues). A supervisor's personal animosities or intellectual differences with his co-workers should not impede his students' access to his colleagues.
11. Supervisors should also advise students about career opportunities that include their possible participation in particular research projects. ■

Graduate Research and Supervision in the School of Design and Environment

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Introduction

This article briefly describes the measures adopted for graduate research and supervision in the School of Design and Environment (SDE) since June 2000. Among others, the measures serve to achieve the following objectives:

- Ensure that the best interests of research students are met,
- Ensure that the core competencies of the departments are built up over time, and
- Ensure that faculty members are given the opportunities to develop their capabilities in graduate research supervision.

Research Topics

Research topics in SDE range widely from humanities and social sciences to science and engineering. Although applicants may propose their areas of research, measures are taken to ensure that the areas put forward match those of their potential supervisors' so that our research students will in turn contribute towards the strengthening of the strategic focus and core competencies of the departments. All applicants are expected to be full-time candidates.

Broadening Exposure

SDE research students are also given maximum exposure to cutting-edge research in their areas of research, both locally and overseas. For example, research students in the joint PhD programme between the NUS Department of Building and the Technical University of Denmark are exposed to different climatic conditions in indoor environment and energy research.

Joint Supervision

Senior faculty members supervise PhD students and mentor junior faculty members (assistant professors

who serve as members of the thesis committee). The arrangement safeguards the interests of the research students and provides opportunities for the assistant professors to learn about graduate research supervision from senior faculty members at the same time.

Like many other faculties and schools, SDE also faces intense international competition for good students from top overseas universities such as those in China. The school recognises that top Chinese students will come to NUS if their professors strongly encourage them to do so. Thus, SDE hopes to overcome the competition by implementing joint supervision between NUS professors and their Chinese counterparts who have recommended their own Chinese students to come to NUS. The Chinese professors effectively become a stakeholder in this arrangement. Besides, the possibility of joint publications in English journals (with their NUS PhD students and professors), which they would otherwise not publish, could be additional motivation.

Conference Presentation

SDE encourages and provides financial support for research students to present joint papers with their supervisors at established international conferences. Supervisors are advised to attend the conferences where their research students are making presentations to support them.

Research Seminars

Such seminars are regular features of the Departments of Architecture, Building and Real Estate where research students are expected to present their research design, methodologies and findings as well as share their experiences. Presentations are scheduled during the initial stages of research, after the PhD qualifying examination, as well as after the successful oral defence of the thesis. Such seminars are also good rehearsal platforms for the students before they make their formal presentations at international conferences.

Industry Sponsorship

Being a professional school, many of the topics undertaken by research students in SDE are inevitably related to practice-related problems confronting the industry. The school recognises that a greater synergy can be garnered through a closer alliance with the industry. From regular dialogues with major property developers and manufacturers of building products, the school has identified practice-related problems that the industry would like to solve. In such cases, SDE encourages the industry to provide funding for research scholarships and research projects that would specifically address the identified problems. Such strategic alliances help the school to source for more external funds to support more research students and help the industrial sponsors resolve their company-based research problems at the same time.

The Future

With entrepreneurial economic activities becoming increasingly more important in the new knowledge economy, strategic alliances with industries and companies will continue to gain increasing significance. It may be timely to explore how the traditional PhD route can be restructured to achieve the same scholarship rigour and yet, make more significant contributions to companies and industries concurrently.

It is believed that the philosophy and principles behind the Engineering Doctorate (EngD) introduced recently in the UK can be examined further in the restructuring of our PhD route. In essence, the objectives of the EngD are:

- Development of innovative thinking, while tackling real industrial problems, and
- Continual broadening, by gaining and applying new knowledge from a modular taught programme.

Depending on the nature of the research project, EngD candidates are expected to spend between 70–80% of their time at the premises of their collaborating companies. Training courses are tailored individually to their needs in order to develop a wider range of competencies in engineering business management as well as specialist technical subjects. Candidates are required to satisfy the requirements of the taught modules. Such candidates are expected to demonstrate innovation in the application of knowledge to the engineering business and make a significant contribution to the performance of the collaborating companies who sponsor them. The EngD is assessed by means of a mini-thesis as well as a portfolio that covers the key requirements for a Management Development module. In addition, the portfolio is built up over the period of the candidature under joint supervision by an academic supervisor as well as an industrial supervisor. It is therefore essential that candidates (or company employees as the case may be) ensure that their daily day work and EngD project work have as much similarities as possible. ■

Ideas highlighted in this article were collated from members of the School Management Committee over the past two years. The pointers in the last section were sourced from the Centre for Innovative Construction Engineering.

Building a Graduate Studies Learning Community

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Last semester (Semester I, Academic Year 2002–2003) Leong Wai Teng and I initiated the course, SC5104 *Foundations for Social Research*. It was the first course designed specifically for graduate research students offered by the Department of Sociology. The need to develop a course specifically for our research students was strongly felt within the context of the present efforts at restructuring graduate education within NUS. Our previous graduate courses were

designed for mostly part-time, employed students upgrading their skills in a course-work programme in applied sociology. We envisioned a catalytic course for students at the beginning of substantial research projects. Our intention was also to build interaction within a community of scholars, something we felt was under-developed among our students because of the absence of cohort-defining common experiences.

The Challenge

Although our graduate research students have often produced quality theses that are publishable, we feel that many students do not reach the expected potential given their prior preparation and their high level of effort. Such a situation can be attributed to the following factors:

- Common to many social science and humanities departments in the world, students rarely work on problems defined by their supervisors' research programmes and only infrequently use their advisors' methodological tools or data.
- One of the mainstays of research apprenticeship in some fields—co-authorship—has so far been infrequent in our department; supervisors encourage single authorship and expect students to work independently.
- The high degree of student discretion in defining topic, research question, methodology and theory arguably places undue weight on the individual student and on the supervisor-student relationship.

In the best U.S. graduate programmes (and indeed in our own honours year), the student and the supervisor-student relationship are buttressed by several courses, a thesis workshop, informal interactions with other faculty members and supportive peer relationships. Unfortunately, at the moment, with our graduate programme undergoing considerable transition, we do not have an extensive supportive structure in place and many of these sources of sustenance fall away. The transition from an exam-oriented undergraduate culture to a culture of self-reliant scholarship also proves difficult for students. As one first-year graduate student put it a year ago, "You have everything to do and nothing to do at the same time."

Such comments pointed toward the need for a stronger framework for individual progress and an improved structure of social support. Therefore, our challenge in the Department of Sociology, has been to attempt to work within the professional expectations of scholarly independence of our disciplines (anthropology and sociology), while at the same time constructing an environment that can encourage the production of excellent theses by the graduate students in our programme.

We had also found that the graduate seminar, long institutionalised in our department as a forum for students to get feedback on their research and to aid

them in keeping to a timely schedule, was losing its effectiveness. When our graduate research programme admitted only one or two students per year, the graduate seminar and other more informal arrangements sufficed as supplements to the supervisor-student relationship. Inevitably, as our programme expanded, these arrangements became strained. The seminars had to convene with increasing frequency with three or more students presenting at each meeting. Students found the meetings very stressful, and not as useful as they had been when more time was devoted to each student. Staff also found that the frequency of the meetings placed a growing burden on their time, and found it increasingly difficult to attend.

These reactions highlighted the need for a different mechanism by which to address the need of graduate students to receive suggestions and critique at various stages of their work. Therefore in the spirit of transforming of our graduate programme by research, and with the strong sense that a course on research design would fulfil an immediate need, we set out to create a course that would aid our graduate students in their research efforts.

Our Response

The course, *Foundations for Social Research*, was meant to address the situation just described and to provide a bridge to the more ambitious, comprehensive programme we are designing within the framework of the university-wide restructuring of graduate studies. Besides encouraging early progress on the thesis and facilitating faculty feedback early in the research, the course was also intended to encourage peer support and better integrate the graduate students into the intellectual life of the department. With an initial cohort of 14 students (the incoming batch of research students with the addition of some visitors and more advanced students), this new course worked toward those goals in several ways.

Other than the weekly classes, students also attended the regularly scheduled Departmental Seminar. The Sociology Head had suggested that the Departmental seminar be revamped so that it would meet every week, encompassing three different types of presentations: those by faculty members, those by visitors to the department, and those by graduate students nearing completion of their research. These different groups would be allocated approximately one-third of the weekly slots each. Students would then discuss and critique the presentations made at the seminar during the subsequent classes. Several seminar

speakers attended the ensuing classes to address students' questions and share their research problems as well as experiences.

In addition to the extended individualised readings required of each student, we assigned a number of common readings that we discussed during the course of the term. These common readings either addressed generic issues in performing research or were exemplary pieces of research. We took a 'rhetorical' approach to thesis writing and assigned selections from Booth, Colomb, & Williams' *The Craft of Research*. We thought their text, which is designed for a broad audience, would be general enough to include the topics and approaches of all potential students while identifying the questions that all research papers need to address and outlining the process of writing. In addition, we had students read Lave & March for their emphasis on critical tests and Latour's *Science in Action* in order to place individual projects in the context of a collective effort of truth making. In addition to these methodological works, we assigned several prominently published articles that were developed from masters theses or PhD dissertations. This was done to allow the students to assess for themselves, what the authors were trying to accomplish and examine how they were able to be successful in doing what they did with the limited resources available to a graduate student.

An important part of the course was also the regular discussion of the students' own research, when we asked them to explain and defend their work. Both students and instructors were free in asking questions, offering comments, contributing critique and advancing suggestions. In general, we did not give students advance warning of our intention to discuss their work. In fact, in the beginning of the semester, we often did not know whom we would call on because many of the queries developed out of the discussions of the readings. Later in the semester, we became more systematic in the interest of approximately fair coverage. In order to allow students to present their research at an early stage to fellow students, we set up a sub-site within the course website that included student pictures and research statements.

Students were asked to prepare three short papers of 10–15 pages in length. These papers gave students the opportunity to outline and justify their (a) research question, (b) methodology and (c) the claim they hoped they could make on the basis of the research they were beginning to perform. Towards the end of the semester, we asked each student to deliver a presentation similar

to one that might be heard at a professional meeting. As part of their work in the course, we asked the students to evaluate the presentations of their fellow students.

Reactions

We found SC5104 to be a very intensive course to teach. Informal discussions almost always lasted more than an hour after class ended and students often remained in discussion after the instructors left. Having two instructors turned out to be valuable in giving students feedback from multiple points of view. Each instructor reviewed all three papers (and sometimes additional revised versions). Reading and critiquing student writing demanded more time than we had anticipated. Students came for what often turned out to be extensive consultations. As we encouraged students to consult frequently with their advisors; particularly those advisors with multiple students also found themselves periodically inundated with consultation requests.

We were very pleased at the group dynamics in our class. Lively classroom discussions were matched by lively break time conversations. We were also struck by how much students working in seemingly disparate areas had to share with each other. It was clear in this respect that this class played an important role of helping to build a community of scholars among the Department's graduate students. Our main regret about the class is that we did not have more PhD students in this first class because the course was only made compulsory to students starting in the Academic year. The presence of more students with prior independent research experience would have improved the quality of the interaction.

We did not anticipate that assessing student performance would be so difficult. We explicitly did not want to take the place of the advisor or (very prematurely) the examiners of the thesis, in terms of the kinds of comments we made. In fact some roughly equivalent courses at other universities are not graded at all. Our department decided against that option because it wanted to send a strong signal to students that their research progress was being taken seriously. In the end, we graded students on how well they fulfilled class expectations with respect to the degree of progress they had made, either in their conceptualisation of their research design, their choice of methodologies and implementation or the collecting of data.

Unavoidably, the class was a difficult experience for students. Those who had been on U.S.-style campus employment visits would be able to identify with the intensity of needing to defend all aspects of one's work from many different angles. We were essentially asking beginning students to go through the same experience. Students needed to learn how to deal with such questioning. An initial reaction was sometimes an offer to change topics. Our response was that we did not necessarily want them to change topics but, if necessary, to develop adequate responses to the points raised. It is a simple point, but it was helpful to emphasise that a good journal article may go through half a dozen or more very thorough revisions before it appears in print. Also, it was necessary to emphasise that doing research is an entrepreneurial venture—that can mean many false starts. Incoming students did not realise that the inspiration-perspiration mix leans heavily towards the latter.

We have learned from our initial experience. As we revise and fine-tune the course for the coming year, we are concerned about the level of commitment of the University to sustaining the restructuring. On the one hand, there is a timely call for the redesigning of graduate education; but on the other hand, there is increasing pressure to increase class sizes and threats to cancel classes which do not reach a certain

enrolment. The mandated faculty-student ratios are becoming less favourable to mounting graduate level courses where cohort sizes tend to be small, and certainly will be small for the time that it takes to mount and sustain an excellent programme over a sufficient period of time to gain the recognition needed to attract large numbers of good students to our University. In designing this course and planning additional course work that will guide students in preparation for their theses, we have become aware of how very important this course and others are in motivating and equipping students to embark on a programme of excellent research and constructing top quality theses. Will NUS be willing to support the expanding number of courses that is mandating for research students, even with the initial small numbers? We certainly hope so, because, we have come to see how important these courses are to nurturing and guiding our new generations of graduate students to world-class excellence.

References

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Bibliographic Instruction: Search Strategy for Graduate Students

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Introduction

Bibliographic instruction is the process of teaching a more sophisticated and advanced level of literature search by integrating all levels of library orientation and instruction. The process whereby graduate students search for information from a whole range of bibliographic tools such as card catalogues, references,

abstracts, indexes, bibliographies, search engines and electronic databases is 'bibliographic inquiry'.

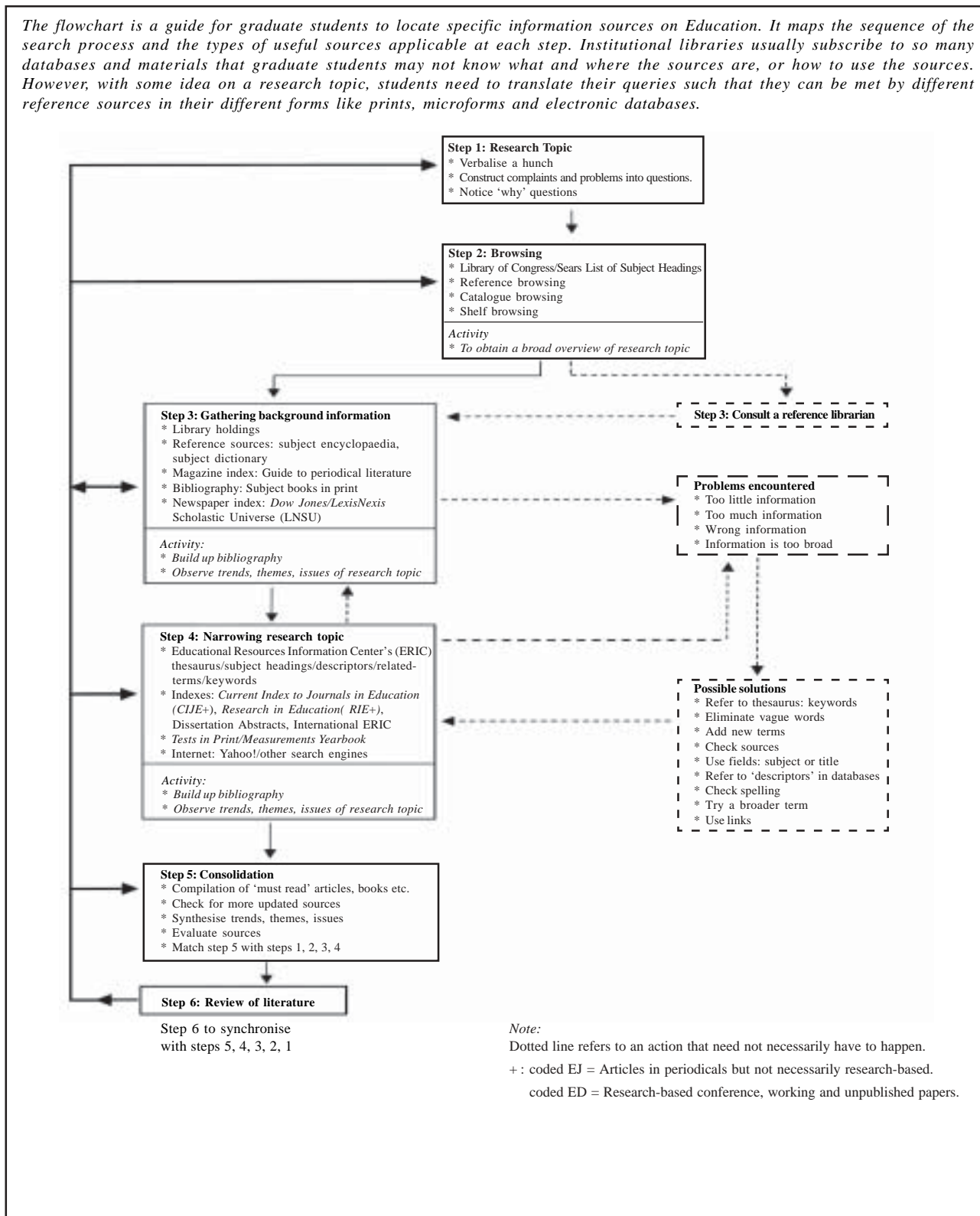
This paper deals with one crucial but frequently overlooked aspect of bibliographic instruction for graduate students in education—the 'how' and 'what' of information access commonly termed *search*

strategy. In this paper, the context in which 'search strategy' is discussed is the field of Education.

Search strategy is an organised and systematic plan of gathering information to locate relevant sources that can be used immediately for research or dissertation

preparation (see Figure 1 for the search strategy flowchart). While searches are usually focused on a specific subject, search activities include the following range of actions: looking up a research topic, consulting all types of sources, accessing information through the Internet, using indexes or abstracts with their

Figure 1: Search Strategy Flowchart for Research in Education (Yeap)



accompanying thesauruses to choose the best words for effective subject access, evaluating the retrieved sources, compiling and formatting bibliography, footnotes, quotations, figures and tables.

It is a ritual for graduate students at all levels of experience to search for relevant information during their dissertation writing. The ability to find information is as important as the information itself. However, search strategy is usually excluded from formal instruction because it is assumed that graduate students already have the prerequisite skills. Thus, when graduate students do not know how to search, is it their fault or the responsibility of those who did not provide the education and training in research? As far as search strategy skills are concerned, there is just too much to know for all to be taught; individuals may want the skills but not necessarily want to be taught. Students who have yet to acquire essential search competencies have a major shortcoming in their education. The knowledge-based economy requires students to learn how to explore the body of knowledge in their academic preparations for any job. Search strategy skills, applicable to all information access situations, also help individuals in life-long learning—an important characteristic of the knowledge-based economy.

A 'Must Have' Reference List for Research in Education

The concept of a reference source being only a book isolated as a special collection in the library is no longer relevant. A reference source is any source that can provide the necessary information regardless of form or location.

However, users' biggest nightmare is the unavailability of the resources within their own libraries. The libraries at the Nanyang Technological University and National Institute of Education have adequate resources for users interested in the field of education. The following is a very minimum but useful list of specific reference sources for research in Education.

1. To find background information for research

A user may have specific sources in mind but is unsure of their existence or location. A bibliography is an indispensable map that directs the user to sources of information. Below is a list of some basic but excellent bibliographies for researchers in Education.

a. Finding information on reference books

A guide to reference materials provides general and specific reference sources for research. The sources will be useful even to those unfamiliar with the subject. The sources place the context of the subject in the mainstream of knowledge. The following are two basic and excellent guides to references:

- Kieft, Robert. (2000). *Guide to Reference Sources (GRB12)*. 12th edition. Chicago: American Library Association.
- Day, A. & Walsh, M. (eds.). (2000). *Walford's Guide to Reference Material*. 8th edition. London: Library Association Publishing.

b. Finding information on books

This can be found from trade bibliographies that list books that are in print by authors, titles and subjects. The information can be useful to graduate students who would like to look up titles available in their research area.

- (1948 to present). *Books in Print*. New Jersey: Bowker. It is also available online at <http://www.globalbooksinprint.com/>.
- (1957 to present). *Subject Guide to Books in Print*, New York: Bowker.

c. Finding information on serial/magazines/journals

- (1953 to present). *New Serial Titles*. Washington: Library of Congress.

Besides listing periodicals available in the United States and Canadian libraries, this publication provides title and subject approaches as well. Users also can refer to this publication to find the libraries where serials (magazines or journals) are available for inter-library loan.

- (1932 to present). *Ulrich's Periodicals Directory*. New Jersey: Bowker.

This Directory lists a whole range of journals. Users can access the journals by subject. It is useful for users who would like to look up journals available in their research area. The online version at <http://www.ulrichsweb.com/> is updated weekly.

d. Finding extensive information on all branches of knowledge

Encyclopaedias are literary works of retrospective research containing extensive information on all branches of knowledge. Subject encyclopaedias are specialised, narrower in scope and more in-depth.

- (1992). *Encyclopaedia of Educational Research*. 6th edition. Alkin, M. (Ed.). New York: American Educational Research Association.
- (1994). *The International Encyclopaedia of Education*. 2nd edition. Husen, T. & Postlethwaite, T. (Eds.). Oxford: Pergamon.
- (2001). *Handbook of Research on Teaching*. Richardson, V. (Ed.). Washington: American Educational Research Association (AERA).
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A listing of useful specialised encyclopaedias for education can be found on www.google.com or www.yahoo.com.

2. Finding information on the review of the literature

Literature reviews present critical essays synthesising research in a particular area. All graduate students have to go through the review of literature. The following periodicals are annual publications by the American Educational Research Association (AERA) that contain critical review of research on a variety of educational topics:

- a. *Review of Educational Research*.
- b. *Review of Research in Education*.

3. Finding information on general and current affairs

- a. (1999). *The Readers' Guide to Periodical Literature* is a database containing comprehensive indexing of the general-interest periodicals and magazines.
- b. *Dow Jones* is a full text database that covers selected worldwide newspapers and major regional papers.

- c. *LexisNexis Scholastic Universe (LNSU)* is a full text database that provides access to vital source materials like international newspapers, magazines, newsletters and multi-disciplinary journals.

4. Finding information on tests

- a. (1999). *Tests in Print V* consists of descriptive listings and references to commercially published tests that are in print and available for purchase.
- b. (1985 to present). *Mental Measurements Yearbook* is a valuable resource to locate and evaluate commercially published tests.
- c. <http://ericae.net> is an Educational Resources Information Center (ERIC) database that includes test review information in the web site 'assessment and evaluation'.

5. Finding information on dissertation and thesis

- a. *ProQuest Digital Dissertation* (<http://wwwlib.umi.com/dissertations>) contains information about doctoral dissertations and masters' theses in American and Canadian universities. A 24-page review is available for titles published since 1997.
- b. *British Education Index (BEI)* lists articles of educational interest in periodicals published in the British Isles. It also includes the microfiche *British Education Thesis Index (BETI)* which records all thesis related to education but deposited in the United Kingdom and Irish universities and polytechnics.

6. Finding information on research articles

Indexes and abstracts are the heart of any information retrieval system. They are useful in locating specific pieces or bits of information in a larger unit like articles in journals and periodicals. Abstracts are an extension of indexes. They locate, record the contents of periodicals and include a summary of the materials indexed. Indexes and abstracts are updated very frequently.

- a. *Education Index* provides access to educational websites.
- b. *Current Index to Journals in Education (CIJE)**, ERIC is an online journal article bibliographic database.

* Both the *CIJE* and *RIE* have an accompanying reference, the *Thesaurus of ERIC Descriptors*, 14th edition (2001), that contains permitted terms/vocabulary/descriptors for use in the subject search of articles/studies in the ERIC system.

- c. *Research in Education (RIE*)*, ERIC is a bibliographic database of conference, working, research an unpublished papers.
- d. *ERIC Digest Database* is an online database of short reports that synthesise research and ideas about emerging issues in education.
- e. *International ERIC* contains the Australian Education Index and the British Education Index.

- f. *ProQuest Education Complete* (<http://proquest.umi.com/pqdweb>) provides titles on primary, secondary and university education with some full text and full image coverage.

You can be constantly frustrated when you conduct a search because the libraries may not have the titles and websites that you need. You may need to approach other libraries for assistance. ■

The Graduate Tutor Training Workshop in the Department of Mathematics

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Each semester, the Department of Mathematics hires about ten local and foreign graduate students as tutors. In order to help its graduate tutors provide quality teaching, the department has conducted a graduate tutor training workshop since 1999, in addition to the training programme organised by the university. Conducted by the authors, the training workshop enables the department to focus on issues related specifically to the teaching of mathematics and the needs of our undergraduate students. Besides, the training workshop allows us to monitor the teaching performance of our graduate tutors.

The first training session, comprising one hour, is usually conducted at the beginning of the academic year and highlights the importance of active learning and non-verbal communication skills (e.g. maintaining eye contact with the students while talking). The workshop also stresses the importance of making the tutorial sessions conducive for active learning as the students rarely have opportunities to voice their doubts during lectures. In addition, the graduate tutors also view video clips of tutorials conducted by previous graduate tutors to pick up pointers on how to run tutorials.

In the two weeks following the first training session, the trainers will make video recordings (each segment lasting from five to ten minutes) of a typical

tutorial session conducted by each of the graduate tutors. We try to capture the following:

- The level of class participation,
- The clarity of the tutor's explanation,
- Bad habits that the tutors may not be aware of, and
- Whether the tutor can initiate discussion among the students

During the second training session, the trainers and graduate tutors watch the tapes together. It is common for tutors to initially feel awkward about watching themselves on video, but we remind them that everyone feels the same way and that watching the video is a necessary step in learning to improve their teaching. After viewing each segment, the trainers and the tutors will discuss what we have seen on the tape and focus on whether the students asked any questions during the tutorials. It is interesting to observe from the video recordings how some of the top tutors are able to get a good discussion going with the students. In fact, in some tutorial sessions, the students are doing almost as much talking as the tutors! However, other tutors are just talking to themselves throughout the whole segment. Getting the first question from the students often seems to be the most difficult part. As soon

as one student has spoken up and receives a helpful answer, the questions start flowing! After watching the tape, we also discuss the general performance of the individual tutors if time permits. Following the session, technicians from the department convert the video clips into files that are sent to the tutors for future reference.

The exercise helps the department identify its top tutors to nominate for the faculty's Outstanding Teaching Assistant Awards. In the past, clinching the award has boosted the teaching careers of tutors who were teaching scholars in the department. As the intake of graduate tutors continues to increase, the department believes that the training workshop plays an important role in improving the quality of teaching in our department.

To conclude, here's a summary of the essential aspects of the teaching assistants' training workshop:

- Start early. It is better if the first session is conducted before the start of the semester as changing the teaching style of a tutor can be difficult once the tutor has started teaching in a certain way.
- Make the tutors feel at ease with watching themselves and others fumble. Remind them that everyone is going through a learning process to improve themselves.
- Design a way to follow up and assess the tutors' progress. As graduate tutors are usually appointed for two semesters, we can monitor and see if a tutor has improved in the second semester after attending the workshop in the first. ■

The next *CDTL Brief*
in July will be
on the theme of
**Heterogenous
Students**



The Centre for Development of Teaching and Learning (CDTL) engages in a wide range of activities to promote good teaching and learning at the National University of Singapore, including professional development, teaching and learning support, research on educational issues, and instructional design and development.

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