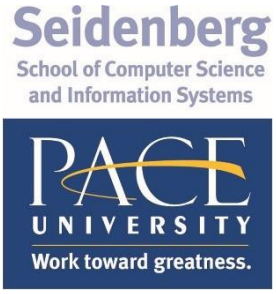
Dissertation Guide

Doctor of Professional Studies in Computing

Seidenberg School of Computer Science & Information Systems

Pace University



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1 Introduction

This dissertation guide aims at streamlining the dissertation research process of DPS students.

1.1 Importance of Dissertation

Dissertation research is a process to discover new knowledge in improving our understanding of complex phenomena or addressing major challenges in advancing our society. Dissertation is for documenting the research process and result and share them with the public so the result could be validated and adopted in problem solving. Dissertation is the most important component or requirement of any research doctorate program.

The dissertation is an original and rigorous research work carried out independently by the doctoral student to develop new knowledge. It represents an extrapolation from a base of solid experience or knowledge. The research work advances knowledge, improves professional practice or contributes to understanding in the field of study. Dissertation work must be presented in a logical and understandable fashion.

Originality means that the work has not been done previously in the same way. ***Independence*** means that the research is conceived, performed, and documented primarily by the doctoral student. To be **rigorous**, the research presents precise distinctions among facts, implications, suppositions, and solutions. Rigor is achieved by validating new knowledge through well-documented and repeatable experiments, using demonstrable facts when reporting procedures and results, by building on a foundation of facts when drawing conclusions, by specifying links to facts when inferring implications, by always bringing forward all relevant data, and by being both self-critical and logical in reporting.

The dissertation must be of sufficient strength to be able to distill from it a paper worthy of publication in a refereed journal or conference proceeding, or to use it as the basis of a monograph. Although publication is not a requirement for completing the doctoral degree, you are required to prepare a paper to submit for publication. There is also no better way to appreciate the standards expected in a journal paper, or dissertation, than to read papers and dissertations in your area of specialization.

While completing program course work is a routine effort, most students are new to the research process featured by creativity. That is why we arranged one research seminar course in each of the semesters of the first two years of the program to help you better understand how to do dissertation research. There are different opinions and methods of how to do research, and you need to find which problem and methods are most suitable for your case. Since we promote applied research in this program, you are encouraged to work on problems that are important in advancing the IT industry.

If you plan to graduate in time, then you should try to identify your research problem and advisor from the first week of your study in this program. There is no point in waiting further.

1.2 Common Types of Research

There are infinite number of types of research projects. The following are those more common in Seidenberg School doctorate research.

- Understanding relationship among complex concepts (which is the key factor; causality among concepts; quantitative research and qualitative research)
- Developing reusable knowledge that can be used in multiple applications (patterns in software engineering, business process management and education)
- Developing algorithms for correct and efficient problem-solving
- Developing or improving a software framework that solve a class of similar problems, instead of developing an application (Android, Drupal, …; most software today are based on software frameworks)
- Improving solution quality or reducing solution time for a specific important but hard problem (pattern recognition of a specific type of objects, combinatorial optimization, …)
- Reducing the complexity of using technologies
- Improving meta processes like agile software development, Lean Six Sigma, pattern languages, …

1.3 Best Practices in DPS Research

Again the following list is not exhaustive.

- Proactively identify research problems starting from the first semester
- Jumpstart from sample research papers and previous dissertations
    - Improve solution quality or solution efficiency
    - Remove some problem constraints to address the larger problem
    - Add some problem constraints and look for better quality solutions of the smaller problem
- Use-case driven. Go from specific to generic, small to large, project to research. Don't start with learning a new subject unless your advisor has prior work on it and clear path for you
- Keep writing idea papers and publishing conference papers
- Your priority is completing your dissertation sooner, not entertaining your passion on the problem

1.4 Recommended DPS Research Time Line

- Having identified a stable research problem and secured approval of a dissertation advisor for the problem by May of the 2nd year.
- Completing a research idea paper with clear problem statement, use cases, literature review, and solution methodology by August of the 2nd year.
- Assisted by Program Chair and advisor, setting up the dissertation committee in early fall semester of the 3rd year.

- Be ready to write dissertation with preliminary research project deliverables by December of the 3rd year.
- Circulating a good full draft of the dissertation among the dissertation committee members by the end of March of the 3rd year.
- Participating in Graduate Commencement Ceremony in May of the 3rd year.
- Passing the dissertation defense by May of the 3rd year, and hopefully no later than August of the 3rd year.

To be completed	**On or before**
Starting to look for research problem and advisor	First day in the program
Having identified a stable research problem and dissertation advisor, and secured approval of the problem by the advisor	May 1 at the end of Year 2
Completing a research idea paper with clear problem statement, use cases, literature review, and solution methodology	August of Year 2
Setting up the dissertation committee	September of Year 3
Be ready to write dissertation with preliminary research project deliverables	December of Year 3
Circulating a good full draft of the dissertation among the dissertation committee members	End of March of Year 3
Participating in Graduate Commencement Ceremony	May of Year 3
Passing the dissertation defense	May of Year 3, and hopefully no later than August of Year 3

2 Dissertation Management Process for DPS in Computing

This section introduces the major steps in dissertation research.

2.1 Identifying Research Problems and Writing Idea Papers

A candidate should think about his or her Dissertation as a significant topic that is worthy of exploration; this means that the research problem is important and the resolution will influence how people practice computing.

A research problem is one for which:

- A solution is important (i.e., the solution makes a significant contribution to the field)
- The solution is not known or needs further verification (i.e., the proposed study is the next logical step in the research on the topic)
- The solution can be found through research (i.e., the solution is a matter of evidence, not of opinion or values)
- The candidate has the resources of energy, time, and money to address the proposed study

The first goal is to find a possible dissertation area and to write a **Dissertation Idea Paper**. Ideas for topics may come from many sources: a core course, **readings**, your job, an elective course, a discussion with a faculty member, **readings**, a discussion with a colleague at your job, a discussion with a fellow student, and **readings**! We're trying to convince you that the more you read the literature, the easier topic selection will be. Each paper, book, report, or dissertation that you read uses prior work as a foundation and, since a single work can't do it all, usually points to future work that might be pursued.

As you proceed in your quest for a dissertation area, you will be exposed to many potential topics. A good approach is to keep a notebook in which you list possible topics. For each possible topic, provide a title, a short description of what the work might entail, and an indication of the source of the idea, relevant references, an annotated bibliography, and comments by faculty members or fellow students with whom you have discussed the idea. Course instructors may mention potential research topics during lectures, so be sure to include these on your list. Remember that your interests may change as you proceed, thus keeping track of even mildly interesting potential topics can be worthwhile. As a doctoral student, you are expected to use the library, the Internet, and the World Wide Web extensively.

You may become anxious because you do not have a dissertation topic, but this is not unusual; everyone goes through a search process. By the end of the second year you will find a topic. Remember that the faculty understands this situation and is there to advise you and help you get through it.

Many students experience one or more false starts that result in a search for new topics. This also is not unusual.

As you start to focus on a topic, you should start the search for a dissertation advisor. As a general rule, only full-time CSIS faculty members or doctorate adjunct faculty may serve as dissertation advisors. Exceptions must be approved by the program office. You should have selected an advisor by May 1 of the second year of study.

2.2 Identifying Research Methods

Research is the diligent and systematic inquiry into a subject undertaken to discover, establish, or revise facts or theories; or develop innovative solutions to important challenges. The research method employed depends on the nature of the problem, and the most popular ones include the *constructive approach*, the *quantitative approach* and the *qualitative approach*. Most computing researches are constructive in form of solving important industry challenges through developing new algorithms/protocols, processes or technologies. In some contexts the research method involves a special type of controlled experiment. However, in other contexts, different methods may be more appropriate. There is no generally accepted classification of types of doctoral-level research. You will be exposed to a range of research methods useful for the dissertation in the research seminar sequence during your first two years of study. At this time all published research method books focus on how to understand and interpret existing world phenomenon and none of them properly describes how to conduct constructive computing research, technology

problem solving or innovation. Therefor the best way to learn research is through reading research papers and conducting research under the supervision of your adviser.

2.3 Importance of Literature Review

Every candidate must possess a strong command of the literature on a topic before s/he can pose a Dissertation topic. Therefore, the first step in posing a question worth answering is thoroughly and systematically reviewing the literature on the topic. All comprehensive reviews of literature have common features including:

- Focus on a relatively well-delineated topic
- Exhaustive of the important research on that topic
- Clear separation of the meaningful from the meaningless
- Coherent and logical analysis/summary of what is known about the topic and what requires further exploration and clarification

A complete review of the important literature requires electronic searches through databases as well as hand searches through journals, books, and other scholarly materials; it sometimes also requires contacting researchers who are working on similar topics. Researchers must not work in isolation or assume that information is the most accurate or recent simply because it has been published. A good review describes the search methods used to find relevant literature.

A good review separates sound from unsound research; it may ignore or mention studies of little or no merit, but it devotes significant attention to those with the best designs and the most defensible conclusions. A strong review also explains legitimate differences in the findings and/or opinions of researchers. Studies that have undergone rigorous peer review are typically, but not always, more trustworthy than are those that have not.

Good reviews may be organized in a variety of ways. Some are chronological, following the development of an idea over time. Others are topical, bringing together disparate ideas in meaningful ways. All lead the reader through a thicket of information and arrive at conclusions that are logical and supported by reliable evidence. A good review is coherent, evaluative, and forward-looking.

2.4 Dissertation Idea Paper and Dissertation Advisor

As early as possible, you should discuss with faculty who are interested in your ideas and write down your research problem and solution methodology clearly and succinctly in form of a dissertation idea paper. The purpose of the dissertation idea paper is to obtain constructive feedback and supervision from the general faculty, and identify your dissertation advisor.

The dissertation idea paper should be a short document of no more than 30 single-spaced pages. The dissertation idea paper should include the following sections:

- A concise dissertation title focusing on the concrete problem description and your expected contribution to its solution. (1-2 lines)

- Introduction to the problem background, why the problem is important, what are the current solutions and their limitations, and why you could do better. You use use-cases (examples) to support your points. (10 pages)
- Problem statement that clearly defines the research problem in one paragraph, and outline your solution methodologies and expected contributions. (1-2 pages)
- Literature review of the relevant solutions. (2-5 pages)
- Work plan. (1-2 pages)
- Reference list. (1-5 pages)

If it is determined that your research problem and solution methodology are suitable for a doctoral dissertation, then you are on your way for dissertation research. Things, however, may not be that simple. If the idea paper is not clear, you might be asked to revise the idea paper and re-submit it for further review. Or if your work is deemed not suitable for a doctoral dissertation, you may wish to try another faculty member or another topic.

After a CSIS faculty approves your idea paper and is willing to be your dissertation advisor, you need to submit your idea paper with the Idea Paper Approval Form (Appendix C), signed by your Dissertation Advisor, to the program coordinator.

2.5 Dissertation Committee

Your advisor or the program office will tell you when you should initiate the formation of a dissertation committee. This usually occurs soon after the advisor approves the idea paper. The committee should be formed by September 1 of the third year of study. The advisor will recommend faculty members for you to contact to explore the possibility of their serving on your committee. Potential committee members should be given copies of your work-to-date for their review. Dissertation committee composition needs be approved by both the committee chair and the program chair.

2.5.1 Dissertation Committee Formation

Dissertation Committees usually have three members, one of whom is the advisor who will chair the committee. The dissertation advisor must be a CSIS faculty. After the committee has been formed, the terms dissertation advisor and dissertation chair may be used interchangeably. CSIS doctorate adjunct faculty members may serve on committees. Up to one of the three dissertation committee members could be an External Advisor who must have a doctorate degree and relevant research experience illustrated by relevant research publications. Each external adviser needs to submit a copy of current CV to the program office for prior approval.

Once you have the three members of your committee you must complete a ***Dissertation Committee Approval Form*** (see Appendix C), signed by each of the committee members, and forward the completed form to the program office for program chair approval.

2.5.2 Operation of the Committee

After the committee has been formed, it shall operate under the leadership of the dissertation **advisor/chair**, who **has the primary responsibility** for advising and guiding the student. You should avoid taking or assuming direction from a committee member that might result in a change in approach or direction of the research without first coordinating with the chair. The signature of each committee member will be required to indicate approval of the Final Dissertation.

2.5.3 Change of Advisor or Committee Member

Sometimes a change in the composition of the committee is required. A new Dissertation Committee Approval Form (see Appendix C) must be resubmitted with signatures of the revised committee. Each new committee member must be approved by the dissertation advisor and program chair. If the dissertation advisor is changed, the whole dissertation committee formation process needs be repeated. The program office will notify the previous advisor or committee member of committee composition changes.

2.6 Agile Dissertation Research Process

Different people have different styles of conducting research. But the following agile dissertation process is strongly encouraged. Start with a dissertation outline with chapters and major section, and annotate each with descriptions of what you plan to write in it. You don't need to work on these units sequentially. You can incrementally expand on select chapters or sections into finer units with richer content descriptions. Eventually your writing will converge into a well-organized dissertation. This process will keep you from deviating easily from your dissertation design, and help you work with your new ideas and passion in any order, and not get stuck at a specific section thus losing confidence.

While we always start with chapter 1 since it is basically the refinement of your idea paper, chapter 1 is the hardest to complete. You cannot finalize chapter 1 until you complete your dissertation.

Microsoft Word is strongly recommended for writing dissertation idea papers and dissertation. The main reason is that Word supports traced writing revision so the advisors can easily revise the student writing and add comments that students could clearly review with the option of accepting or rejecting them. Efficient written communication is of paramount important for speedy completion of your dissertation. PDF documents are not suitable for seeking advisor detailed feedbacks.

You are requested to use your Blackboard Dissertation forum (in the Discussion Board of your class' Dissertation course shell listed in the community section of your Blackboard) to post your new ideas and writings so all faculty and fellow students can share and comment on them. This is the official supervision channel between you and your adviser.

2.7 Dissertation Defense

After you have completed your research and dissertation draft, consult your advisor whether you are ready for your dissertation defense. With the approval of your advisor, you need to distribute a clean copy of your dissertation Word draft to each of your committee members, and give them one month to read and process. You should consider to use cloud document storage like Dropbox to share links of your large documents so your large files would not clog committee member email inboxes, or your emails would not get blocked by anti-virus software. Then you need to fill in a Dissertation Pre-Defense Approval Form with the program office with approval signature from each of your dissertation committee members. With the properly approved Dissertation Pre-Defense Approval Form, the program office will consult the dissertation committee to schedule your dissertation defense. The defense date and time will be determined by the program office after consulting with all relevant parties. A public announcement of your dissertation defense with your dissertation title and abstract will be distributed to all faculty and graduate students of Seidenberg School. Attendees need to reserve their seats one week before the defense.

The dissertation defense takes about 60-90 minutes. First the student needs to present the dissertation research work in about 30 minutes. Then the dissertation committee asks questions. The public questions follow. The committee will then have a closed session to evaluate the quality of your research and your dissertation presentation. The committee will reach one of two possible decisions: (a) the student passes the defense with additional final revisions to be executed under supervision of the dissertation adviser; and (b) the student fails the defense and needs to make major revision of the dissertation before rescheduling the dissertation defense. There needs be at least two months between successive dissertation defenses by the same student.

2.8 Research Involving Human Subjects

If your research involves human subjects and you plan to publish the research results, which is true to all DPS research since dissertation is considered as a form of publication, your research may need to seek prior approval by Pace University Institutional Review Board (IRB) (http://www.pace.edu/provost/information-faculty-0/pace-university-institutional-review-board-irb-0/irb-application-guidelines-0). This is very important for protecting subject's privacy. Please consult your advisor as to whether you need or at which level to apply for Pace University IRB prior approval.

2.9 Publication of Research Results

Publication of dissertation results is not required but is strongly encouraged. **You are required** to **prepare** a paper for publication. Your advisor will be pleased to recommend several appropriate professional or scholarly journals for submission of your work. Publication in a referred journal is the best way to validate the value of your research. Students sometimes co-author publications with their advisors and/or committee members, or with fellow students. This may happen when substantial contributions are made by these persons or when the dissertation is

part of a larger project. In the latter case, other individuals who have collaborated on the project may also be co-authors.

3 Dissertation Organization

There is no unique preferred dissertation organization. Dissertation organization also depends on research problem and research method. The following is a sample dissertation organization for your reference.

1. Introduction
    a. Informal introduction of the research problem with uses cases (why it is important, limitations of current solutions, your idea for improving the solution quality)
    b. Problem Statement (half page summary of research problem with its scope and objectives)
    c. Solution methodology
    d. Expected Contributions
2. Literature Survey (minimum summary of all existing work supporting your research)
3. Problem Solution Design
4. Solution Continues or Implementation Highlights (may include process to adapt your solution for similar problems – key for reusable knowledge)
5. Experimental Validation
6. Conclusion
    a. Contributions
    b. Future Work
7. References

3.1 Defining the Research Problem

Chapter 1 typically introduce informally the general research problem, its current solutions, why the current solutions are not sufficient, why you have opportunity to get better solutions. You should assume as little background knowledge from the readers as possible, and use rich use cases to make your points. Then a half page problem statement summarizes what is your research problem with major assumptions and objectives. Your main research methodologies and expected research contributions then follow. The chapter may conclude with a dissertation roadmap to give readers heads-up. This chapter should contains around 15 pages.

3.2 Survey of Relevant Research

While chapter 2 may have various titles, it typically includes a concise literature survey relevant to your research, and prepares the readers to understand your work. Any knowledge needed for understanding your research but that is not your contribution should be described in this chapter

so readers would not be confused which is your contribution. This chapter should contains around 15 pages.

3.3 Solution Methodology and Design

In chapter 3 you typically details your problem statement in chapter 1, describe your solution methodology and design, and illustrate your methodology and design with use cases.

3.4 Solution Implementation and Application in Similar Problems

Chapter 4 may describe your solution implementation highlights, and explain how your solution could be adapted to solve similar but different problems. This will help prove that what you are working on is not simply a project but research contributing to reusable knowledge.

3.5 Solution Validation

Chapter 5 typically validates your solution's correctness, quality and efficiency. You should describe your experiment design and your experiment data to ensure that readers could reproduce your experiments. You analyze and present your result data, highlight the solution patterns and explain the outliners.

3.6 Contributions and Future Work

The last chapter typically summarizes your research contributions in the dissertation and outline potential future work.

4 Dissertation Formatting

This section contains requirements for margins, line spacing, page numbering, type style, subheadings, tables and figures included in the body of the text, plus format requirements for some of the front matter and back matter sections.

DPS Program Chair, Prof. Lixin Tao, has created a Word template for DPS dissertation at http://csis.pace.edu/lixin/dps/dpsDissertationTemplate.dot for you to use. You can simply insert text into it to get well formatted dissertation. If you copy contents from another Word document, please make sure that don't copy format over. Otherwise the provided DPS dissertation template could be easily compromised into beyond repair.

4.1 Margins

The left-hand margin must be 1.5 inches thus wide enough for binding. Margins at the right, top, and bottom of the page should be 1 inch. (See exception for chapter title pages below.) The dissertation text should be both left and right justified.

4.2 Line Spacing

Double-spacing is required for most of the text in the dissertation. Pages for the abstract, acknowledgments, the table of contents and most of the appendices, however, must be single-spaced in the final dissertation manuscript. Single-spacing also can be used for table titles and headings, figure captions, references in a reference list (but double-spacing is required between references in the list), footnotes, and long quotations. Long quotations may be indented five spaces.

4.3 Paragraph Spacing

No start indentation for each paragraph. Single space between paragraphs, double space between sections. Avoid open white spaces. Material within a chapter should be kept together. Chapters begin on new pages.

4.4 Page Numbering

Page numbers for preliminary pages should be lowercase roman numerals, centered at the bottom of the page. All other pages should have page numbers in Arabic numerals in the upper right-hand corner. The number should appear at least one inch from the right-hand edge of the page, in the space between the top edge of the paper and the first line of text.

4.5 Type Style

Times New Roman at 12 point should be the default font used in a dissertation. Courier New, could be in 10 point, should be used for code/XML/HTML listings. Make sure don’t use curly single/double quotes in code/XML/HTML listings. Please only use curly quotes in normal text.

Text for the cover page may be larger but should not exceed 14-point size. Text for the chapter title text should be 14-point size. Be consistent in your use of typefaces throughout the document. Do not use a compressed typeface or any settings on your word processor that would decrease the spacing between letters or words.

4.6 Title Page

Use the format of the Sample Dissertation Title Page provided at the end of this guide.

4.7 Chapter Title Heading, Subheadings, and Sub-Subheadings.

It is preferred that dissertations use no more than three levels of headings in the body text. All headings should have only the first letter of each word capitalized except that non-major words shorter than four letters have no capital letters. Heading levels are as follows:

4.7.1 Level 1: Chapter Title Heading

This heading starts 2 inches from the top of the page, is centered on the page, and is set in 14-point type. The first line contains the chapter number, e.g., Chapter 4. The second line is blank. The third line displays the chapter title, centered on the page, and set in 14-point type. The above line breaks should be generated by Shift-Enter so the chapter number and name are treated as a single entry in the table of contents.

4.7.2 Level 2: Subheading

Start the subheading at the left margin of the page, four spaces down from the title, set in bold 12-point type. Double–space to the body of the subheading.

4.7.3 Level 3: Sub–Subheading

Start the sub–subheading at the left margin of the page, double spaced from the subheading, set in 12-point italics. Single–space to the body of the sub–subheading.

4.7.4 Tables and Figures in the Text Body

Charts, graphs, diagrams, figures, and summary tables that significantly enhance reading of the dissertation should be placed in the text body. Only include material in the text body that is needed by the reader to understand the point(s) you are trying to make. Other material should be placed in appendixes. Tables that summarize large amounts of data are best placed at the end of the dissertation. If you have included numbers/data in your text related to some point, then the full table containing such numbers/data belong in an appendix. When using tables and figures in the body of the paper, remember that the left/right center of the body is not at the center of the paper. It is 0.25 inch to the right of center due to the 1.5 inches left binding margin. All tables and figures that are less than body margin must be centered properly.

4.7.5 Cross Listing

References to sections, subsections, sub-subsections, tables, figures and page numbers must be implemented through the Word cross reference feature. None of them should be hard coded.

4.7.6 Appendixes

Place in appendixes the key raw data, analytical tables, evaluation instruments, and other material important in the determination, evaluation, analysis, and description of your research that is not contained in the text body. Do not exclude material that would be necessary for

another researcher to replicate your work and that is not available elsewhere. Appendixes should in general contain no more than 25 pages.

4.7.7 References

The reference list must contain an entry for every work cited in the paper. It must follow the style shown in this Dissertation Guide. The references should be in alphabetical order by the last name of the first author and numbered sequentially in square brackets. They should include author, title, publisher/journal/proceedings, page number(s), and publication date. Citations in the body of the paper should have the number of the paper in square brackets ([]), and placed before punctuations. Web references are stable so you must indicate the last date that you succeeded in accessing it. You are encouraged to save a copy of such web references in case they disappear later.

For example:

> The task of working in the unknown areas is difficult [11]. According to Stevens [12, 13], this is compounded by .....
>
> References
>
> [11] J. Smith and T. Jones, "Analyzing results in a vacuum", Proceedings Third IEEE Symposium on Thinking, pp. 34-45, San Francisco, CA, IEEE Press 1998
>
> [12] K. Stevens, "To think or not to think", Comm. ACM, vol. 35, no. 6, pp. 513-516, 1997
>
> [13] Oracle, http://www.oracle.com/bpm/example.pdf, 2014; available by 12/25/2015

5 Dissertation Final Submission

5.1 Dissertation Pre-Defense Approval Form

To schedule your dissertation defense, you need to distribute your stable dissertation draft to your committee members at least one month before your planned defense date. Once your advisor and committee members are in agreement that you are ready to defend your dissertation, you must submit a Dissertation Pre-Defense Approval Form (Appendix C) to the program coordinator, signed by each of the committee members acknowledging that they have reviewed your dissertation draft and that your research is ready for defending. The oral dissertation defense is scheduled by the program chair and coordinator.

5.2 Final Dissertation Manuscript

Committee members will discuss and vote on the pass/fail status of (1) the oral defense and (2) the written document. The decision to pass a candidate in either category may include no more than one negative committee member vote. The completed Dissertation Defense Evaluation Form (Appendix C) should be signed and submitted to the program coordinator with the appropriate box checked.

As your committee members read your dissertation, they may send you lists of corrections they require, or mark revision requests on your dissertation draft, or write revision requests on the Dissertation Defense Evaluation Form. You should make the corrections and keep track of them so that you can show each committee member that their correction requests have been properly implemented. After your defense, when you believe all of the corrections are complete, you will arrange to meet briefly with each committee member individually to show them that the corrections they requested have been made in your final version, and to have them sign the cover page (Appendix B) for your final dissertation cover page, the Dissertation Defense Evaluation Form (Appendix C), and OSA's Final Dissertation Approval Form (Appendix C), and submit them to program coordinator.

You need to submit the following documents to your advisor and the program coordinator as part of your final dissertation submission:

1. Dissertation Word file
2. Dissertation PDF file
3. Defense slide file
4. All source and binary code for your and reference algorithms which are part of your solution or used in your experimental evaluation
5. Complete raw data sets for survey based research and example data sets used in your examples or use cases
6. Download and installation guide for any software (yours or external ones) used in your dissertation
7. As well as any other supporting documents that enable readers to repeat your experimental assessment.

5.3 PDF Submission to ProQuest Dissertation Publishing

You need to submit your final dissertation PDF file to ProQuest Dissertation Publishing at http://www.etdadmin.com for distribution to the public.

When preparing your PDF, be sure to do the following (you in general don't need to do anything):

- Embed all fonts (not needed if you only use Word provided fonts)
- Make sure there is no password protection on the PDF (just don't set up PDF password)
- Ensure that security settings allow printing (just don't disable printing)

- Format as individual single pages (no PDF page contains multiple pages of your dissertation)

Supplementary materials are not recommended to be submitted to ProQuest Dissertation Publishing.

6 Appendix A Pace Library Access and Research

6.1 Databases

In order to gain library access to databases, please begin at the Pace Library homepage: http://pace.edu/library and click on databases. You will be asked to identify yourself with your Pace email credential.

At the database menu, choose "subject: Computer Science" for a pull-down list of all library databases in the discipline of Computer Science. Many of our databases have full-text articles. If you are in a database and you do not see the full-text of an article, please click on the link SEARCH FOR ITEM. If you end up at the inter-library loan page, follow the following steps.

6.2 Google Scholar

Check Google Scholar to see if you can find the article for free. Use web browser to visit https://scholar.google.com and enter the article title and journal title into the search box. Look for PDFs of the article. If you hit a paywall, do not pay for the article, and request an inter-library loan.

6.3 Inter-Library Loan

You can use Inter-Library Loan (ILLiad) Request to get non-Pace Library articles, books and dissertations. Register and create an account at https://pace.illiad.oclc.org/illiad/logon.html. You must have a barcode number to set up an account. If you do not know your barcode number, please send Michelle Lang an email at mlang@pace.edu, using your PACE EMAIL ACCOUNT and Michelle will send you your barcode. Your home library is *Mortola Library* and your home campus is *Pleasantville*.

6.4 DPS in Computing Dissertations

Should you like access to the DPS in Computing completed dissertations, please visit Library Catalog at http://libguides.pace.edu/c.php?g=371330&p=2510038, and choose Digital Collections and then DPS Dissertations. The password is: digitalthesis

6.5 Computer Science Doctoral Library Research

To view your Computer Science Doctoral Library Research Guide, please visit http://libguides.pace.edu/DPSComputing.

6.6 Further Help

Should you have any further questions about Pace Library access or research or if you need a one- on-one research consultation, please contact Michelle Lang, Assistant University Librarian for Graduate Services at (212) 346-1778 or mlang@pace.edu.

7 Appendix B Dissertation Sample Pages

DPS Program Chair, Prof. Lixin Tao, has created a Word template for DPS dissertation at http://csis.pace.edu/lixin/dps/dpsDissertationTemplate.dot for you to use. You can simply insert text into it to get well formatted dissertation. If you copy contents from another Word document, please make sure that don't copy format over. Otherwise the provided DPS dissertation template could be easily compromised into beyond repair.

7.1 Sample Dissertation Title Page

Solving a Class of Time-Dependent Combinatorial Optimization Problems with Abstraction, Transformation and Simulated Annealing

by
Rigoberto Diaz

Submitted in partial
fulfillment
of the requirements for the degree
of Doctor of Professional Studies
in

Computing

at

Seidenberg School of Computer Science and Information

Systems Pace University

June 2003

NOTE: This is Page i but the number should not be printed

7.2 Sample Dissertation Signature (Approval) Page

We hereby certify that this dissertation, submitted by David Ulmer, satisfies the dissertation requirements for the degree of *Doctor of Professional Studies in Computing* and has been approved.

_____-_____

Lixin Tao

Chairperson of Dissertation Committee Date

_____-_____

Michael Gargano

Dissertation Committee Member Date

_____-_____

Fred Grossman

Dissertation Committee Member Date

School of Computer Science and Information Systems
Pace University 2003

NOTE: This is Page ii but the number should not be printed.

7.3 Sample First Page of Abstract

Abstract

Solving a Class of Time-Dependent Combinatorial Optimization Problems with Abstraction, Transformation and Simulated Annealing

by
Rigoberto Diaz

Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Professional Studies
in Computing

November 2003

While the operations research community has been working on combinatorial optimization problems for over half a century, most of the problems considered so far have constant event costs. This dissertation is dedicated to efficient solutions to a class of real-world combinatorial optimization problems whose event costs are time-dependent.

A class of time-dependent problems is first identified and abstracted into a mathematical model. Based on some critical observation on the model, a problem transformation algorithm is proposed to significantly shrink the solution space while maintaining equivalency to the original problem. This problem transformation can benefit any solution strategies for this class of problems.

Since the class of problems is NP-hard, a comprehensive literature survey is conducted for the prevailing meta-heuristics for solving NP-hard problems, including local optimization, genetic algorithms, simulated annealing, and tabu search. Simulated annealing is adopted as the base of this research's solution strategy due to its proven convergence to global optimum when its temperature is reduced slowly enough. Comprehensive experiments are conducted to study the sensitivity of the simulated annealing algorithm to the values and strategy of its multiple parameters including initial temperature, cooling schedule, stopping criteria for the same temperature, and stopping criteria for the algorithm.

More than 70 problem instances are generated to evaluate the relative performance of the proposed simulated annealing algorithm against repeated random solutions and one of the published genetic algorithms for the same problem. The size of the problem instances ranges from 4 to 200. Considered performance categories include both solution quality and running time. Experiments show that the proposed simulated annealing algorithm outperforms the genetic algorithm by a factor of 5% to 116% while reducing the latter's running time by a factor of 2 to 145.

The abstract must be single-spaced, less than 350 words and should not exceed two pages in length. No leading indentation for each paragraph.

NOTE: This is Page iii but the number should not be printed.

7.4 Sample of Acknowledgments Page

Acknowledgments

This Word dissertation template was created by Dr. Lixin Tao for all of our DPS students based on the spirit of One for All and All for One.

NOTE: Acknowledgement body should be formatted with tag "Normal Single-Spaced." Count as the next Roman numeral, but do not print the number.

7.5 Sample First Page of Table of Contents

Table of Contents

7.6 Sample of List of Tables

List of Tables

7.7 Sample of List of Figures

List of Figures

7.8 Creating a Chapter

Start a chapter at the beginning of a new page. You can create a new page by clicking on "Insert|Break …" and choose "Page break."

Chapter title should be formatted with tag "Heading 1." To put the chapter number and chapter title on separate lines separated by a blank line, put the cursor just before the chapter title, and type key Enter twice while key Shift is hold down.

Normal chapter body should be formatted with tag "Normal."

7.9 Creating Chapter Components

7.9.1 Creating a Section

Create a section heading by applying formatting tag "Heading 2." Capitalize the first letter of each significant word in the section title.

7.9.2 Creating a Sub-Section

Create a sub-section heading by applying formatting tag "Heading 3." Capitalize the first letter of each significant word in the sub-section title.

7.9.3 Creating a sub-sub-section

Create a sub-sub-section heading by applying formatting tag "Heading 4." Capitalize the first letter of the first word in the sub-sub-section title.

7.10 Inserting a Figure

Figure 1 is an example of a figure in the dissertation. The caption of a figure should be centered below the figure. Create a figuew caption by using "References|Insert Caption|[Label = Figure]." Make reference to the figure using "Insert|Reference|Cross-reference".

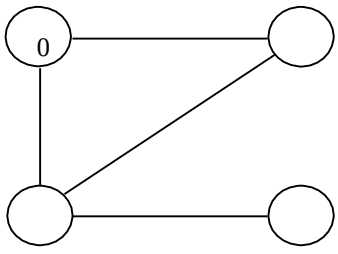

Figure 1 A Sample Figure

7.11 Inserting a Table

Table 1 is an example of a table. The caption of a table should be centered above the table. Create a table caption by using "References|Insert Caption|[Label = Table]." Make reference to the table using "Insert|Reference|Cross-reference …|['Reference type' = Table, 'Insert reference to' = 'Only label and number']," as the hyperlink "Table 1" at the beginning of this paragraph was created.

Table 1 A Sample Table

1	2	3	4
5	6	7	8

7.12 Making References to Section/Subsection or Items in the Reference List

To make reference to a section/subsection number or an item number in the reference list, use "Insert|Reference|Cross-reference…|['Reference item' = 'Numbered item' 'Insert reference to' = 'Paragraph number']." To make reference to a section/subsection page number, use "Insert|Reference|Cross-reference…|['Reference item' = 'Numbered item' 'Insert reference to' = 'Page number']."

8 Appendix C Dissertation Process Management Forms

8.1 Idea Paper Approval Form

Idea Paper Approval Form

Student: Please complete and return form to the Program Coordinator with proper advisor signatures. Please include copy of the approved idea paper.

Student Name_____Student ID# U_____

Class: _____

Date: _____

Dissertation topic/title_____

_____

_____

Idea paper attached.

I have discussed the topic with above student and have agreed to be student's dissertation advisor.

Faculty Member Signature_____Date_____

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Date Processed_____By_____

8.2 Committee Member Approval Form

Committee Member Approval Form

Student: Please complete and return form to the Program Coordinator with proper signatures.

Student Name_____Student ID# U_____

Class: _____

Date: _____

Dissertation topic/title_____

_____

I have been requested by the candidate and hereby agree to serve on the dissertation committee and will be present at the defense.

Committee Advisor Signature_____Date_____

Committee Member Signature_____Date_____

Committee Member Signature_____Date_____

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Dissertation Pre-Defense Approval Form

Dissertation Pre-Defense Approval Form

Student: Please complete and return form to the Program Coordinator with proper signatures.

Student Name_____ Student ID# U_____

Class: _____

Suggested Date and Time: _____

Title of dissertation_____

_____

Short Abstract Attached.

Committee Approval

We have studied this proposal and certify that the topic is appropriate for a doctoral dissertation and that the research design is developed sufficiently for defending.

1. Committee Advisor/Chair Signature_____Date_____
2. Committee Member Signature_____Date_____
3. Committee Member Signature_____Date_____

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Date Processed_____By_____

8.3 Dissertation Defense Evaluation Form

Dissertation Defense Evaluation Form

Please complete and return form to the Program Coordinator

Student Name_____Student ID# U_____

Class: _____

Date: _____

☐ **We hereby approve the candidate's Dissertation. Requested editing and changes are specified below, marked on dissertation papers or attached and they must be implemented under adviser supervision before final approval for publishing.**

☐ **Candidate has not completed his defense. Please see attached for suggested corrections.**

4. Committee Advisor/Chair Signature_____Date_____

5. Committee Member Signature_____Date_____

6. Committee Member Signature_____Date_____

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Date Processed_____By_____

8.4 OSA Final Dissertation Approval Form

OFFICE OF STUDENT ASSISTANCE

FINAL DISSERTATION APPROVAL FORM

PACE UNIVERSITY
Work toward greatness.

U_____
STUDENT ID NUMBER | LAST NAME | FIRST NAME | MIDDLE

SCHOOL: _____

DEPARTMENT: _____

DISSERTATION TITLE: _____

_____

_____

WE HEREBY APPROVE THE CANDIDATE'S FINAL DISSERTATION IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE DEGREE OF Ph.D. IN MENTAL HEALTH COUNSELING.

ADVISOR/CHAIRPERSON _____
NAME | SIGNATURE | DATE

COMMITTEE MEMBER _____
NAME | SIGNATURE | DATE

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