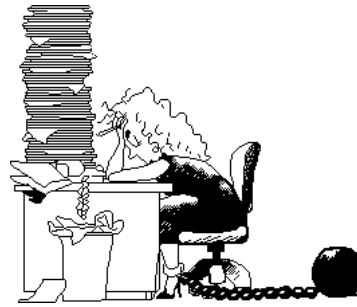# CPSC 699

Research Methodology
in
Computer Science

Saul Greenberg

A typical grad

<u>CPSC 699 Administrivia</u>

Instructor:

- Saul Greenberg
  - Research area:
    human computer interaction
    computer supported cooperative work

  - Office hours (Room MS 616):
    before and after class
    or by email any time: saul@cpsc.ucalgary.ca
    or by appointment: email or phone: 220-6087
    or drop in for urgent requests (but no guarantees!)

Text:

- Booklet of readings and handouts

<u>Objectives</u>

The aim is kick-start you as a Computer Science grad student.

You will:

1. Apply a structured process that will help you begin and develop your:
- selection of a thesis research area
- thesis proposal
- background literature review
- thesis writing
- actual research

<u>Objectives (continued)</u>

2. Acquire professional skills in computer science research by

- understanding the research process
- planning research via research proposals
- critically evaluating your work and other people's work
- writing research documents (papers and theses)
- finding relevant information through the library and Internet

Objectives (continued)

3. Learn about research done by our faculty, which will help you

- select a supervisor
- select graduate courses
- use them as sources of information
- know about the breadth of research areas

Course Structure: Orientation days

Goal

- familiarize you with the department, especially graduate research activities

Contents

- Introduction to 699
  - goals, structure, expectation, evaluation, your peer group
- Introduction to graduate studies (faculty and department)
- Grad courses offered this year
- Research introductions by faculty
  - meet the faculty and see the range of research
  - see a variety of presentation styles
  - see who is working in an area that interests you
- Department software and hardware
  - see the resources available and know the department policy
- Scholarships
- Library

Course Structure (remainder of term)

Goal:

- launch your thesis work

Regular Classes (All Fridays, 10:00 - 11:15)

- Topics relevant to you becoming a graduate researcher
    - The thesis: Research and critical evaluation
    - Using the Internet to do research
    - Preparation of research proposals
    - How to write a research paper
    - Methodology and argumentation
    - Concept maps...

- Student presentations
    - presentation of your own research proposals
    - discussion / critique of proposal by others

Occasional classes (Wednesday, 9:30-10:45)

- overflow presentations, practice, special seminars, comments on writing...

How you will be evaluated

Plan 1: Starting point (10%)

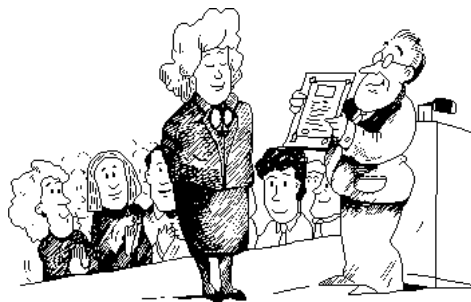**Plan 2: Short list of topics (10%)**

Plan 3: Research proposal (20%)

Literature survey (20%)

Research presentation (20%)

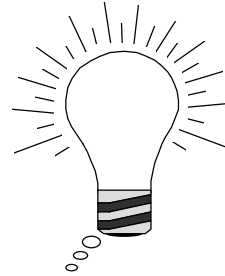**Participation (20%)**

Due dates:

- *see schedule in handout.*

Plan 1: Starting point (total 10%)

Goals:

- start you thinking about topics right away
- get you reading about the basic material in the areas
- begin the process of laying out possible thesis topics.

Deliverables:

1. A statement of your current progress toward:
   - choosing a thesis topic (including a list if you have one),
   - carrying out your research work, and
   - writing the thesis

2. A plan for how you propose to complete the research and thesis
   - includes milestones, activities and deadlines

3. A short list of the fundamental reading material for the research area

4. A short summary of the relevant department research
   - gleaned from presentations during orientation week

Plan Two: Short list of topics (10%)

Goals:

- describe your short-list of topics in enough detail so that you can decide which is most appropriate for your final choice.
- should reflect some background reading.

Deliverables:

1. A short summary of each topic
   - including the state of the art and what work you might do in it for a thesis

2. A revised plan for completing the research and thesis
   - based on the most likely topic

3. The relevant resources available for conducting your research
   - equipment, software, expertise, ...

Plan Three: Research proposal (20%)

Goals

- produce a real proposal that sets up your research program,
- after course completion, you should be able to complete the related reading and start the research

Deliverables (4000 word document)

- Short introduction
  - stating the proposed research topic and its general importance
- Concise survey
  - of the relevant work in the area and how it relates to your proposal
- Statement and brief analysis
  - of the problem/s to be investigated
- Description of the proposed work
  - including a statement of progress so far
- References
- Thesis plan
  - outlining milestones and schedule for completion
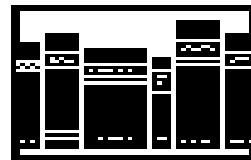
Literature Survey (20%)

Goals

- bring you up to speed on the literature study for your thesis work
- provide an initial draft of a thesis survey chapter.

Deliverables (4000 word document)

- Survey
  - of relevant literature in the area of your research
- Reference/bibliography section
  - using standard publication format
- Appendix briefly mentions the information facilities you checked and used
  - library, profs and supervisor, reference section of key papers, library search facilities, grad students, internet...

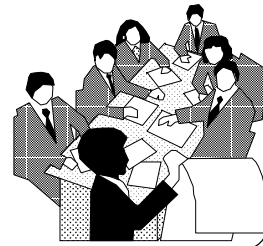**Advice:**

- Start now!
- Text excerpts can be included in Plan 3

Presentation of Research Ideas (20%)

Goals of presentation

- expose your ideas in public

- help you think about ideas by articulating them

- improve them from audience feedback

- acquire a feeling for what it is like to present your work to a group
    - as you do in the final thesis oral and in conference presentations

Deliverables

- half-hour presentation
    - 20 minutes plus 10 minutes discussion of your proposed research ideas

- copies of your overheads

Participation (20%)

Goals

- by attending and participating, you will
    - help each other out by giving constructive comments
    - build professional relationships with fellow students so you have colleagues you can discuss your work with
    - trigger ideas in your own area (and writing/presentation skills) from others' research work

Metrics

- you will be assigned as discussants for each presentation (after the orientation week), which will contribute to this grade.

- your critical comments, questions, and other forms of participation will also contribute to this grade.

Alternatives to Research Proposals

Project Proposal

- a project exercise to help your supervisor discover your skills
  - will not necessarily become your thesis research!

- deliverables similar in structure to research proposal except:
  - plan 2 desribes a well-defined project (by supervisor)
  - literature survey replaced by detailed research background of an aspect of your project
  - final concrete deliverable is a technical paper (perhaps with system) of the work done so far
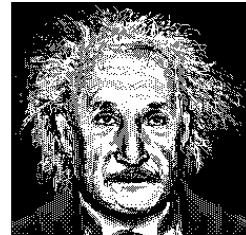
Area exploration

- an exercise that lets you gain essential background knowledge in your area
  - will allow you to choose a research area *after* completion

- appropriate if you lack fundamental knowledge in chosen research area

- deliverables similar to research proposal except:
  - plans 2 and 3 give successive background to what could be interesting (but general) research directions
  - literature review summarizes and synthesises the background knowledge you have acquired

Supervisor involvement

consult with your supervisor about:

- your research plan

- resources

- key papers, etc

have them comment your written and oral work

- drafts of written work should be given to supervisor one week before due date

heed their advice unless there is a strong reason not to

- the only thing a supervisor can offer you is advice!

your supervisor can contribute up to 50% of your grade

Opinion vs fact?

there is no "right" way of planning or doing research
- every person has different perspective and opinions

many presentations will reflect opinion tempered by experience

it is your responsibility to find the research style that fits:
- you
- your supervisor
- your examining committee
- your academic peers