Chapter 3:

Resource to Conduct Research

Digital Libraries

- A digital library, also called an online library, an internet library, a digital repository, a library without walls
- It is a digital collection is an online database of digital objects that can include:
  - ✓ text,
  - ✓ still images,
  - ✓ audio,
  - ✓ video,
  - ✓ digital documents, or other digital media formats or a library accessible through the internet

Digital Libraries

- Digital Library provides a platform for the collection, organisation, access, annotation and preservation of scholarly information in digital formats.
- Digital libraries are much more than easy access to literature and information,
- They are dwellings that expand our possibility to store books and read them under house arrest.

Digital Libraries

- In no particular order, the following are recommend:
  1. World Digital Library. A source for manuscripts, rare books, films, maps and more in multilingual format.
  2. Universal Digital Library. A collection of one million books.
  3. Project Gutenberg. More than 33,000 e-books to read and download.
  4. Bartleby. An immense collection of books for consultation, including fiction, essay and poetry.

Digital Libraries

5. ibiblio. E-books, magazines, academic essays, software, music and radio.
6. Google Books. More than 100,000 books for consultation, download or on-line purchase.
7. Internet Archive: The largest digital library for downloading e-books and audio-books for free.
8. Open Library: More than one million e-books of classic literature to download.

Digital Libraries(IEEE)

- The IEEE promotes the engineering and technology:
  - ✓ process of creating,
  - ✓ developing,
  - ✓ integrating,
  - ✓ sharing, &
  - ✓ applying knowledge about electro- and information-technologies & sciences for the benefit of humanity & the profession.

Digital Libraries(IEEE)

Foster Technological Innovation:

- IEEE conferences
  - Over 300 conferences per year held worldwide
  - 110,000 plus participants
- IEEE publications
  - Over 30% of world's information
  - Over 1.3 million subscriptions
  - Over 100 periodicals
  - 200 conference proceedings per year
  - 50 new IEEE books per year
- IEEE standards
  - 90 new & revised per year
  - 30,000 plus participants

Digital Libraries(IEEE)

IEEE Publications

- World's leading publisher in Electrical and Computer Science
- *Spectrum* Magazine - award winning monthly publication – available online
- The INSTITUTE - news supplement to Spectrum
- IEEE *Potentials* Magazine - quarterly magazine for student and recent graduate members
- IEEE/IEE Electronic Library (IEL) - 30% of world's current literature in electrical engineering and computer science.
- IEEE Xplore - provides full-text access to IEEE transactions, journals, magazines and conference proceedings published since 1988 and all current IEEE Standards (www.ieee.org/ieeexplore/)

  http://www.ieee.org/organizations/pubs/pubs.html

Digital Libraries(IEEE)

IEEE Conferences

- Over 350,000 Participants at more than 300 meetings & conferences worldwide:
  - ✓ Region Conferences
  - ✓ International Conferences
  - ✓ Symposiums
  - ✓ Workshops
  - ✓ Tutorials
- Search online conference database (http://www.ieee.org/conferencesearch/)

http://www.ieee.org/conferences/

Documentation Tools

- Academic writing can be a daunting and time-consuming process, but with the help of the right tools you can make writing your paper much easier.

Documentation Tools (Introduction to LaTeX)

- LaTeX is pronounced "lay-tech" or "lah-tech," not "la-teks."
- LaTeX is a document preparation system for high-quality typesetting.
- LaTeX is most often used to produce technical or scientific documents, but it can be used for almost any form of publishing.

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Documentation Tools (Why Use LaTeX?)

- Designed by academics and easily accommodates academic use.
- Professionally crafted predefined layouts make a document really look as if "printed."
- Mathematical symbols and equations are easily integrated.
- Even complex structures such as footnotes, references, table of contents, and bibliographies can be generated easily.
- Creates more beautiful documents.
- Portable, compatible, flexible, versatile, and cheap (or free)!

Documentation Tools (Installing LaTeX)

- Linux
  - Typically comes with LaTeX or has it easily available in the standard repositories
  - "TeX Live"
- Mac
  - http://www.tug.org/mactex/
- Windows
  - http://www.tug.org/protext/
  - This will install MiKTeX, Ghostscript, and TeXnicCenter.

Team Work

- Teams are often helpful in tackling complex and important problems.
- They often produce better work because they take on more ambitious projects, bring complementary knowledge and apply diverse research methods.
- Teams also have larger social networks than individuals do to collect input during research and disseminate results as they emerge.
- In addition, in the best situations, teamwork promotes not only timely but also high-quality work, as people in the team have a strong incentive to demonstrate excellence to their partners.

Team Work

- A further advantage of team research is the opportunity for all members to learn from each other.
- Diverse experiences and skills are clearly a benefit, but team members may also productively complement each other by balancing breadth versus depth, basic versus applied research directions and quantitative versus qualitative approaches.

Team Work

- Many team members report satisfaction and fun with team processes, but there is a dark side to teamwork.
- While mild respectful disagreements can be productive, forceful personality differences that lead to disruptive conflicts can undermine team performance.
- The opposite effect is groupthink, in which team members all too quietly accept initial ideas without sufficient spirited discussion of alternatives. Teams also face difficulties when one or more team members don't contribute as much as others expect.

Team Work

- Creating an effective and productive research team requires thought and planning. Based on my experience working on a variety of teams and extensive research literature, I believe that successful teams have the following characteristics:
  - Previously successful collaborations. A strong correlate of team success is a history of fruitful previous collaborations. Successful collaborations call for establishing common ground -- a shared vocabulary and compatible working styles -- and building trust.
  - In fact, when companies or existing teams ask me to work with them, I like to start with some small collaboration before committing to a longer-term one.

Team Work

- Balanced teams. Teams with mixtures of senior and junior members, women and men, or business and academic members are likely to produce higher-quality work than homogenous teams.
- Teams with members of the same discipline can be effective when they have complementary skills, but you should consider team members from nearby or even distant disciplines, who can bring fresh problems, research methods or analytic tools.

Team Work

- Clearly defined goals and roles. As your team forms, you should write a shared vision of the overall goals and clarify individual roles, especially when working in large distributed teams. When authoring a proposal, report or paper, people's specializations may emerge. For example, some people may be great at producing titles, abstracts and introductions, while others may do excellent reviews of previous work.
- Some team members may focus on evaluations, which others develop compelling and comprehensible data. Finally, there may be social roles in teams, such as cheerleaders, gatekeepers, spokespersons, budget managers or schedule keepers.

Team Work

- Explicit statements of who does what by when. You should also develop an initial schedule that allocates tasks to be accomplished with deadlines to be met. You can change it later, but having a clear specification of contributions from each team member is helpful -- whether the plan is short-term work leading to a conference submission or a multiple-year endeavor to deliver major breakthroughs, working systems or mature products.
- This strategy requires outlining specific, concrete steps and timelines for completing them. For example, team members must commit to having Annette make the first draft of the screen design or first pilot implementation by 9 p.m. Tuesday evening. Then Bharat will provide feedback by noon Wednesday. And so on.

Team Work

- Regular and open discussion. Teams are best when they hold regular and open discussions. Groups in which a number of different people speak during meetings tend to perform better than teams in which one or two people dominate the discussion.
- Modest controversy is often healthy in choosing among alternative directions as well as in promoting trust among team members.
- Another commonly stated principle is that you should always be open to seemingly wild ideas that may offer unorthodox solutions or initiate new lines of thinking.

Team Work

- Good communication. Team members may have to learn how to speak to each other in constructive and positive ways during informal one-on-one discussions and in face-to-face group meetings. Often, getting team members to agree on terminology is a big step forward in forming common ground.
- Communication also includes respectful dialogue, so replacing "your idea just won't work" with "I don't understand why you want to do it that way" changes the atmosphere in the room, raising the willingness of team members to contribute and inviting productive differences of opinion.

Team Work

- Collaboration readiness. This occurs when team members are eager to work in the team and their management is supportive of team participation.
- Loners who are reluctant to work in teams are unlikely to become productive team members, and managers who fail to encourage teamwork may undermine the team by providing inadequate resources or disparaging team successes. Some institutions promote a culture of collaboration by training for teamwork, making collaboration technologies readily available and celebrating successful teams.

Team Work

- Technological readiness for remote teamwork. The reality of contemporary teamwork is that inevitably some members will be traveling, while others are embedded in distant organizations, making regular face-to-face meetings difficult. You should rely on technology to facilitate collaboration at a distance and help to bring team members closer together regularly to describe progress, share problems, exchange ideas and forge agreements about future plans.
- Meetings by phone, Skype or video conference can help groups of three to 30 to coordinate their activities, learn from each other and build trust.

Team Work

- Trained experienced leadership. Great leaders set visionary goals, inspire younger team members, push for high quality and share the recognition and rewards.
- They also are attentive to and step in to resolve conflicts among team members, keep the project on schedule, deal well with setbacks, and even know when to remove someone from the team.
- In small teams, democratic management with no designated leader is possible, but as the size of your team grows, a strong leader will become an increasingly valuable asset.

Team Work

- Adequate administrative resources and services. As teams grow larger, the successful teams also have specialists to handle the administrative load of budgets, technology support, travel coordination, meeting planning and human-resource management (hiring, insurance, benefits, etc.).
- You should make sure resources for these areas are in the budget.

Team Work

- Effective brainstorming strategies. Thousands of studies of brainstorming, usually in design and engineering, have shown that there are good and bad practices.
- While it can sometimes be helpful to have lively group discussions to develop new ideas, fresher and more diverse ideas emerge more reliably if individuals begin brainstorming on their own.
- Your team members should then meet to present their ideas in a safe, nonjudgmental process that allows for clarification, questions and refinements. Facilitated brainstorming sessions, with trained leaders, often elicit bold innovative ideas, which the team can discuss and refine.

Data Set

- A dataset (also spelled 'data set') is a collection of raw statistics and information generated by a research study.
- Datasets produced by government agencies or non-profit organizations can usually be downloaded free of charge.
- However, datasets developed by for-profit companies may be available for a fee.

Data Set

- Most datasets can be located by identifying the agency or organization that focuses on a specific research area of interest.
- For example, if you are interested in learning about public opinion on social issues, Pew Research Center would be a good place to look.
- For data about population, the U.S. government's Population Estimates Program from American Factfinder would be a good source.

Data Set

- An "open data" philosophy is becoming more common among governments and business organizations around the world, with the belief that data should be freely accessible. Open data efforts have been led by both the government and non-government organizations such as the Open Knowledge Foundation.
- Learn more by exploring The Open Data Handbook. There is also a growing trend in what is being called "Big Data", where extremely large amounts of data are analyzed for new and interesting perspectives, and data visualization, which is helping to drive the availability and accessibility of datasets and statistics.

Data Set
(Specific Dataset Resources)

- Damodaran Online: Corporate Finance and Valuation
- Mergent Online
- IMF Fiscal Rules Dataset (1985-2013)
- Pew Research Center
- National Longitudinal Surveys
- ACM Digital Library
- CDC Data