Technology Research Preparation

Lecture 1:

Introduction

Reading Critically

‘Read not to contradict and confute; nor to believe and take for granted; nor to find talk and discourse; but to weigh and consider’

Francis Bacon, *Of Studies*

Agenda

- **All about TRP**
- **What is research?**
- **Why read?**
- **Reading critically**
- **Evaluating our sources**
- **The importance of note-taking**

Aims of TRP

- To develop the research skills you need for a career in:
  - Industry or
  - University of Research Institutes
- To develop your ability to become a powerful writer:
  - To investigate a topic, argue your point of view on the topic efficiently and persuasively to convince the reader that your point of view is the right one
- To understand your ethical responsibilities in undertaking research

How TRP Lectures are Structured

21 Mar – 18 Apr

Lecture Theatre 11.00.401
Lecturer: Lu

Professional Stream
(masters by coursework)

- Master of Information
- Technology
- Master of Internetworking

+

Research Stream

- PhD
- Master by Research
- Honours

2 May – 16 May

Professional Stream
Lecture Theatre 11.00.401
Lecturer: Lu

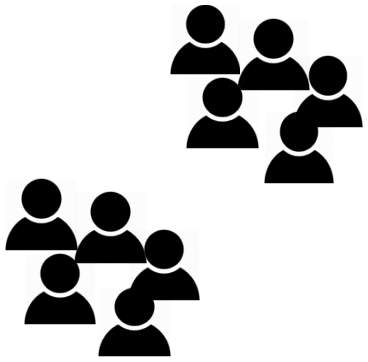
2 May – 6 Jun

Research Stream

Lecture Theatre 11.03.301
Lecturer: Professor Barry Jay

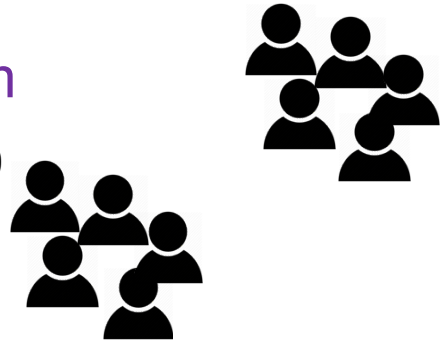
How TRP Tutorials are Structured

21 Mar – 6 Jun



Professional Stream

12:00-13:30 or 19:30-21:00
Tutorial Rooms



Professional Stream

12:00-13:30
Tutorial Rooms

How TRP is Assessed

- To pass this subject:
  - You must attempt all 4 assessment items
  - You must gain 50% or more overall

How TRP is Assessed (contin.)

- Assessment 1: Building Research Skills (10%)
  - Based on the quality of your written work, discussions and informal presentations in tutorials about research
- Assessment 2: Literature-Based Report (30%)
  - Search for 10 or more high quality articles on a given topic, evaluate the suitability of the articles for your research, and write a report about the topic from the articles

How TRP is Assessed (contin.)

- Assessment 3: Research Presentation (15%)
  - Present your findings from Ass. 4 to your fellow students in class:
    - Professional Stream: last 3 tutorials
    - Research Stream: last 3 tutorials + last 3 lectures

How TRP is Assessed (contin.)

- Assessment 4 (45%)
  - Professional Stream: Project Proposal
    - Write a proposal for a project in which you identify aims and objectives, provide some background to the topic, argue that the project is significant, and propose the methods that you would employ to undertake the project
  - Research Stream: Literature Review
    - Write a complete Literature Review on your topic based on 20 or more articles

How TRP is Assessed: Individual or Team?

- Research Stream (Assessments 1-4)
  - Individual
- Professional Stream
  - Assessment 1
    - Individual
  - Assessments 2-4
    - Teams of 3
    - Peer Assessment
      - individual marks

- Working by yourself or with the person sitting next to you:
  - Turn on your phone, laptop or iPad
  - Click on the Internet icon
  - Enter and **bookmark: https://respond.cc**
  - Enter the Session Key for the following question:

Q1
What are the Synonyms of “Research”

https://respond.cc

Session Key: **411595**

Example

Finding, Investigation

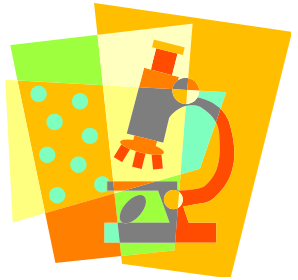
Q2
What words are frequently used in Research

https://respond.cc

Session Key: **531716**

Example:
Novel, New, Propose, Testing, Hypotheses

A Definition of Research



‘A **search or investigation** undertaken to **discover facts** and **reach new conclusions** by the **critical study** of a subject or by a course of **scientific enquiry**’

Shorter Oxford English Dictionary

Some Synonyms:

Investigation, inquiry, study, exploration, experimentation, testing, analysis, fact-finding, examination

Oxford Thesaurus of English

What is most essential in Research?

Research is:

Creation of new knowledge

* * Originality is essential * *

Q3
Which of these best fits your view of research?

https://respond.cc

Session Key: **519767**

a. An in-depth investigation of a topic to gather more information about it
b. Testing new software to ensure it fulfils its objectives
c. Inventing an algorithm for mining sales data
d. Adapting an off-the-shelf technology to create a better solution for your company's requirements

Q4
Is a literature review research?

https://respond.cc

Session Key: **576345**

a. Yes
b. No

Q5
Is repeating somebody else's research research?

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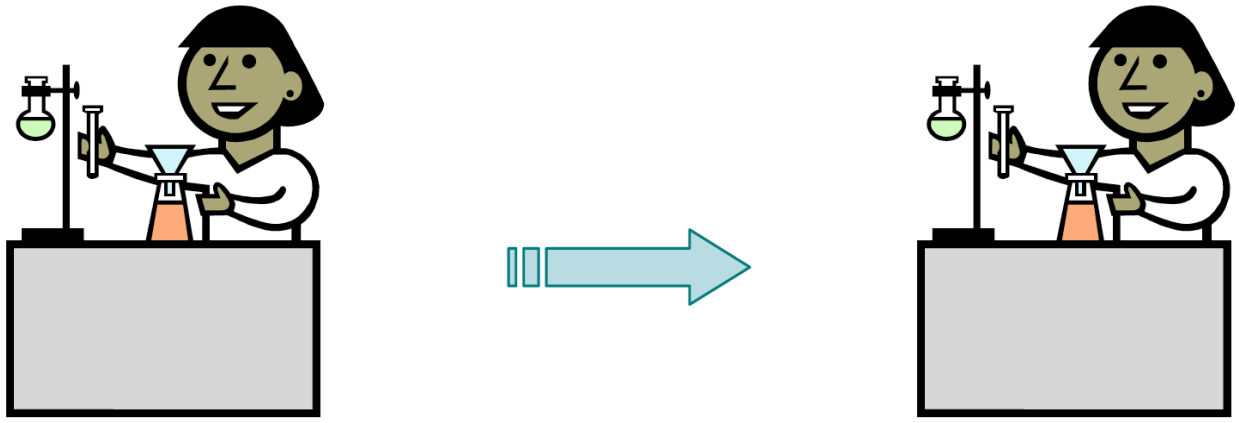
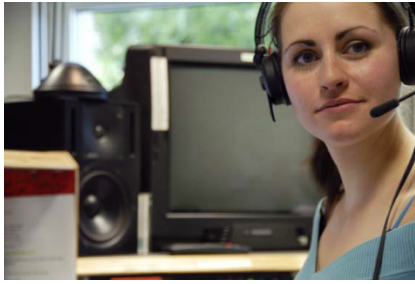
Session Key: **740689**

a. Yes

b. No



Examples of Industry Research



- **R&D: research and development of a new product or service:**
  - E.g., Developing new software or a new mobile app; inventing a new method of software testing
- **Investigating new technologies for possible application to one's own business:**
  - E.g., The investigation of cloud-based VoIP and its suitability to your company's telephony needs
- **Evaluating technologies that have been implemented in your organization:**
  - E.g., The analysis of an organization's use of social media: is it having a negative impact on productivity? Is it increasing sales?

Research happens everywhere in IT

What distinguishes these 3 graduates?

Barry Jay's Perspective:

- Bachelor of Science in IT
  - ⇨ Understands the textbook
- PhD
  - ⇨ Writes the textbook
- Masters of IT or Internetworking
  - ⇨ Explains the textbook

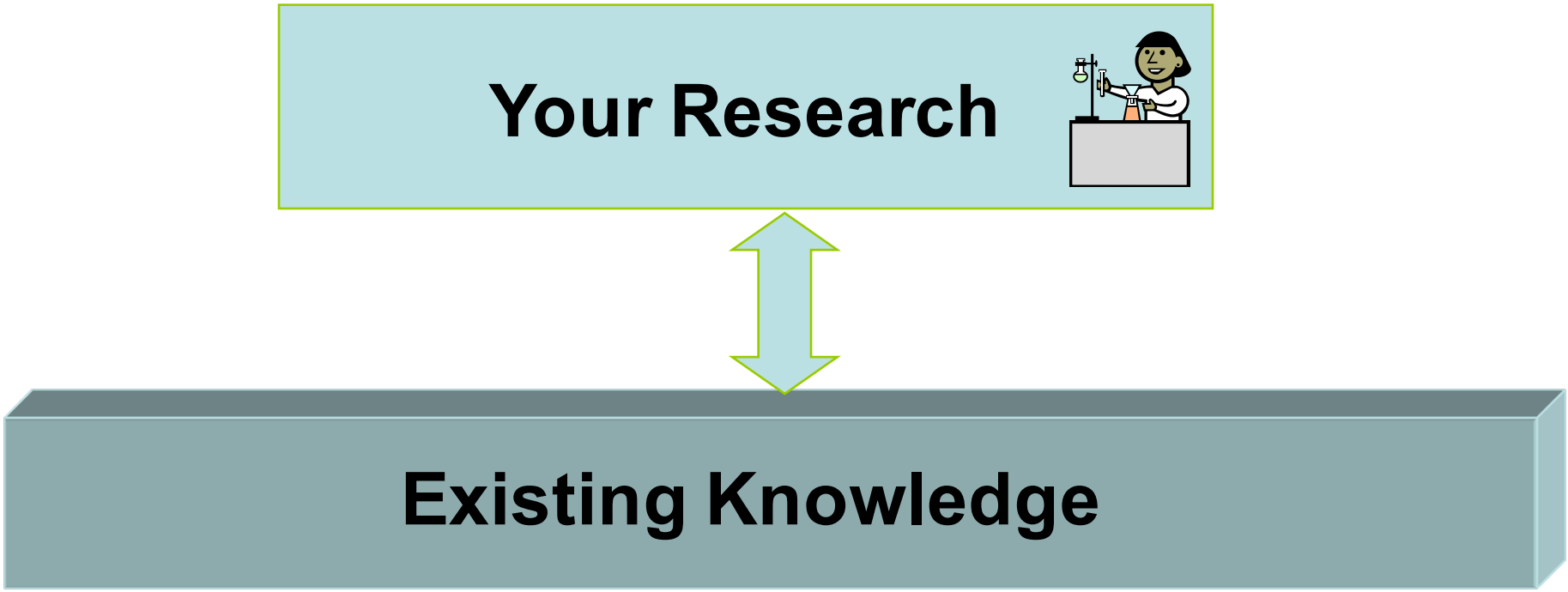
    To your boss, CEO or client

Reading the Literature

- Doing research requires a thorough understanding of the body of existing knowledge
- Otherwise:
  - *Academic*: How to do you know that your research is **new**?
  - *Industry*: How do you know that you are not reinventing the wheel?

Reading the Literature

- Establishes a baseline



Reading the Literature

Additionally:

- Allows you the opportunity to find out what **research methods** other researchers in your field have used
  - Helps you decide what research method(s) *you* will use
- Gives you a lead to new articles to read – from the Reference List

What is Critical Reading?

Non-Critical Reading	Critical Reading
Facts/ Information/ Enjoyment	Interpreting/ Analyzing/ Weighing up
What the text says	What the text says **+** How the text presents the 'facts'
Text as facts	Text as the product of an individual, potentially flawed or biased – a **point of view**

Why Read Critically?

- Allows you to make decisions and evaluate what you are reading
  - Do you believe what you are reading?
  - Would I spend 3 years of my PhD based on what this article says?
  - Would I make a business decision or invest money based on this information?

An Approach to Critical Reading

1. Evaluation of your sources:
   - Selection of what you intend to read
2. Preparing to read
   - Get a general idea of what the article is about
3. Critically reading
   - Locating relevant information
   - Analyzing: is the information correct?
   - Note the methods used to collect data
4. Take notes about the information you have read and your thoughts and responses to it

1. Evaluation of Sources

Select articles based on:

1. ***Relevance to your topic***:
   - Read Title, Abstract and keywords
2. ***Reliability/authority***:
   a. **Authors:** Are the authors named? What is their role? Where do they work? What are their credentials?
   b. **Publication Type:** Is the publication a peer-reviewed journal article or conference paper? Is it a book or book chapter?
   c. **Publisher:** Is the publisher reputable?
3. ***Timeliness***:
   - When was it published? Is it up to date?

1. Evaluation of Sources (contin.)

4. References

- Quantity:
  - Is it referenced?
  - How many references?
- Quality of references:
  - Experts in the field? Could I contact them to follow up the research if I wanted to?
  - Are the sources from reputable publications and publishers?

2. Preparing to Read

Getting a general idea of what you are about to read

- Read the Title and Abstract
- Skim:
  - Introduction
  - Section headings
  - Conclusion

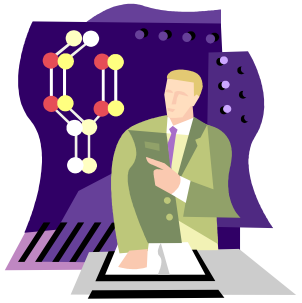
3. Critical Reading

If Stages 1 & 2 lead you to believe that the text is relevant and worthwhile, then read it, or the relevant parts of it, in detail:

- Reading for Content
  - The information that the article contains relevant to your topic
  - Research Methods – can I use these?
  - Reference List – should I read some of these?

- Reading Critically
  - Evaluating the quality and accuracy of the information
  - Seek answers to the questions you have about the topic

3. Critical Reading: Logic



- Is the article well organized and written logically?
- Are the authors unbiased? Do they justify their point of view?
- Is the information anecdotal or supported by evidence or references?
- What are the claimed contributions of the paper? Do the authors meet these claims?
- Does the writer use valid reasoning?
- Are any assumptions made by the authors reasonable?

3. Critical Reading Method & Analysis

- Is the methodology suitable for providing answers to research aims?
- Is the research well designed? Is the methodology valid (e.g., sample size, method of sampling, use of controls, etc.)
- Are the limitations of the research made clear?
- Is the method of analyzing the research data valid?

3. Critical Reading
Discussion & Conclusion

- Does the discussion and conclusion **follow logically from the results**?
- Or are the **conclusions unsupported**?
- How does the author deal with **unwelcome findings**?
- Has the author acknowledged any limitations to their research?
- Has the author **linked** their findings with the **existing literature**?

4. Note-Taking

- Highlight useful information as you read
- Take notes:
  - Useful information relevant to your topic
  - Evidence the author presents to support their point of view
  - Research methods that you might find useful
  - Quotable quotes
  - Your queries and critical comments:
    - Flaws in the Research Methods
    - Bias
    - Unfounded assumptions
    - Are there things left unsaid that should be said?

Q6

What important elements are missing from this example?

Sample Notes from the text 'Underwater Cameras'

Underwater Cameras

1. Regular Cameras
   special housing necessary

2. Amphibious

   a) snapshot models
   b) Nikonos (35 mm)

   Lenses
   i) air & water 35 mm
   90 mm
   ii) only under water 28 mm
   15 mm

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Session Key: **236732**

a. Page numbers
b. Information
c. Critical comments
d. Details
e. Good setting out

Cornell Method of Note Taking

***one source only per page**

Reference: Record in Harvard Referencing Style

Page No.	Notes	Comments
	Your paraphrased notes summarizing relevant information + Direct quotations of particularly well written points	Logical and well-reasoned? Substantiated claims? Well-designed method? Unbiased? Significance? Limitations?

Annotated Bibliography

- List of books, articles, and documents
- Each annotation consists of:
  - Harvard reference to the text
  - Date when annotation made
  - Brief summary of information relevant to your topic, including research methods used
  - Critical evaluation of the article

Annotated Bibliography Example

Zaremba, S. B. & Dunn, D. S. 2004, Assessing class participation through self-evaluation: method and measure, *Teaching of Psychology*, Vol. 31, No. 3, pp. 191-193.

- **Despite evidence to the contrary**, many instructors still feel that marking of class participation is a vague and subjective process. **This article details a method** of continual review of class participation by both instructors and students. **At first, the method may seem to** involve a great deal of extra work on the part of the instructor. **However, it is claimed that** the method soon becomes routine and the workload greatly decreases.
- The method begins with a short (3 questions) self-assessment form filled in by every student at end of every class, including an optional space for any student comments. The instructor reviews these after class allowing gaps between instructor and student assessment to be identified. Where there was a discrepancy between student and teacher marks, the teacher writes out reasons and returns those to the student at the next class. **The article does not give examples** of the process in operation, but reports favourable reactions from students in two classes. Ultimately, **the lack of wider testing meant that** academics would need to try the method for themselves to determine its value in practice. **At the very least, the method provides an interesting approach** to continual assessment of class participation.

Finding High Quality Info: Academic Literature

- **Journal databases**
  - Journal articles
  - Conference papers
  - High quality professional 'magazines'
    - E.g., *Communications of the ACM*
- Recent numbers of journals on their website
- Conference websites
- Library Catalogue: Books, eBooks
- Google Scholar
- Reference lists of articles you have read
- Research students: Ask your supervisor

Finding High Quality Info: Industry & Gov't

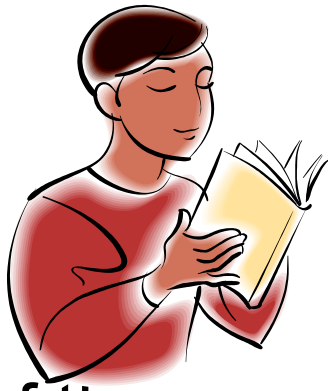
- **Government websites**
  - Australian Bureau of Statistics: ww.abs.gov.au
  - Federal Parliament: www.aph.gov.au
  - Department of Broadband, Communications and the Digital Economy: www.dbcde.gov.au
- **NGOs' websites**
  - United Nations: www.un.org/en
  - UNESCO: http://en.unesco.org
- **International Telecommunications Union**:

  http://www.itu.int/en/Pages/default.aspx

Finding High Quality Info: Industry & Gov't

- **Pew Research Centre**: www.pewresearch.org
- Reports by **research companies**
  - AC Nielsen: www.nielsen.com/au/en.html
  - Gartner Reports (see Journal Databases)
- Company **whitepapers**
- High quality **professional 'magazines'**
  - *Communications of the ACM*
  - *IEEE Spectrum*, *Technology & Society*
  - Australian Computer Society's *Information Age*

Next Week



- Read the Subject Outline and descriptions of the assessment tasks carefully
- Look at UTSOnline and some of the resources there
- Start thinking about what topic you would like to research
- Read **Week 1** from the course notes and finish **Tutorial B** as a homework and bring it in your next tutorial
- Attend the Library Hand-on Session