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# Science of Research

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# SCIENCE OF RESEARCH

Zhaohao Sun

Updated 080804, 090907, 050615, 080616, 090517, 18-210717, 02-040817, 25 08 17, 150917, 081117, 060618, 02 08 18, 060219

Abstract. Science of research is a set of principles and methods for scientific investigation into technology of research, engineering of research and management of research to improve research and research decision making. This article looks at the fundamentals of Science of research and presents a set of scientific principles and methods though answering the questions such as What is research? How can do research? How can manage research? How can automate a research? How can engineer a research? And etc. This article also explores technology of research, engineering of research, system of research and management of research as a part of science of research. The approaches in science of research will benefit all aspects of science, engineering, technology, system and management.

## 1 Introduction

Science of research (research science) is not new, because science and technology have been developed dramatically in the past few hundred years. Scientific inquiry underpins the science of research during that time. Research methodologies have become a discipline in order to train higher degree students in the past few decades. Many universities have offered Research methodology as a course or subject for undergraduate or postgraduate students.

Science of research has been drawn some attention in some research fields including Sport and Tourism (Harris, 2006), education (Carlson & Marshall, 2009), social psychology (Kassin, Fein, & Markus, 2011), families (Olson, 2011) and molecular and cellular cognition (MCC) (Silva & Bickle, 2009). For example, Silva (2007) proposes the principles underlying the discovery of cognitive and other biological mechanisms as a part of the science of research. He proposes a new general framework for science of research and applies it to the search for molecular mechanisms of cognitive functions (Silva & Bickle, 2009). However, research has not been considered as a science, that is, science of research has been not considered as a member of science realm, because [en.wikipedia.org](http://en.wikipedia.org) has no items of either “Science of research” or “research science”(retrieved on 18 July 2017).

Science of research can be defined as a set of principles and methods for scientific investigation into technology of research, engineering of research and management of research to improve research and research decision making. It mainly addresses the following questions. What is research? How can do research? How can manage research? How can automate a research? How can engineer a research? And etc. The approaches in science of research will benefit all aspects of science, engineering, technology, system and management.

It should be noted that the author motivated science of research based on his predilection on research methodology for three decades. Just as that F Taylor developed science of management (scientific management) from 1908 to 1911 and it later underpins science of business. Science of research should become a member of science realm. What F Taylor dreamed in 1908 is similar to what the author has dreamed about science of research.

The author believes that this is a topic for a series of books or research papers, if we can build a school of business based on science of management, or science of business, why cannot we build a school of

research based on science of research, technology of research, and engineering of research and management of research. Research is a profession. Research management creates a job, research technology is what some software companies do, like ResearchGate, Google Scholar, Engineering of research is enabling technology and management for science of research.

what is a minimum research? What is the input of minimum research? What is the maximum output of a minimum research. These three questions are the most significant, fundamental question for the science of research, which has been published here at ResearchGate. These questions are also useful for understanding the Gate of ResearchGate.

Zhaohao Sun

20 July 2017

### **1.1 Researcher as a Project Manager, Idea Generator, Politician, and Entrepreneur**

Andrew,

delegation

## **2 Blog published template**

Prof Dr Zhaohao Sun

2017-10-11

The above is extracted from Z. Sun (2018) Science of Research.

## **3 Anatomy of Research**

This section will provide foundations of Research as a Science.

We must first answer the following fundamental problems: what is a minimum research? What is the input of minimum research? What is the minimum input of research? What is the maximum output of a minimum research? What is life cycle of a research or research life cycle?

### **3.1 Why science of research is important?**

Why science of research is important, because almost everyone does not know how to do research. Even if one is a guru in some research areas, he or she may be a beginner in another research area. Further, almost everyone has not received the education of Science of Research in the science-happy world, everyone has an ordeal of publishing a paper in a prestigious journal, even if he or she has published a significant number of papers in prestigious journals. Therefore, Science of Research is always important before we realize the complete automation of research.

Science of Research aims to realize automation of research. In the age of automation of research, one needs not publish any papers in journals any more. As soon as one has an idea, then the idea has been automatically published as top journal paper within one minute. 3D Printing has been used to realize automation of research. This will terminate the traditional research methodologies, research of PhD, research office, research professorships. ... you know more than me!

Prof. Dr. Zhaohao Sun

2017-8-19

### **3.2 The minimum input to any research**

I have asked question on the minimum input to any research. I also mentioned the following

- An example can lead to a science
- A case study can lead to a theory
- A proof can lead to a top journal paper
- A counterexample can overthrow an existing theory
- A story can lead to a book
- An approach can lead to an industry
- A formula can lead to a world class company (Dupont, Google)
- An idea can rich a country, industry, family and individual and found a research field or discipline (McKinsey & Company)

From here we can infer that the minimum input to any research is an idea, a written or recorded idea. In traditional time, we wrote our idea on the paper, as soon as we can, in order to develop it as a part of research. In the age of trinity: big data, analytics and artificial intelligence, we can record our idea using start phone, WebChat, Facebook, Twitter, QQ, emails and their media.

From a research viewpoint, idea should be classified further. For example, idea is original to an individual, a community and a country and the world. If the idea is original to the individual, then she or he can record it as a part of curiosity and process it further. If the idea is original to a community, then the community can develop it as a research and development. If the idea is original to a country, then the country might use funds to develop it as national project. If the idea is original to the world, then it can be developed by researchers to project, journal papers, and other artefacts.

The basic characteristics of original idea is that it is in the set of unknown to an individual, a community and a country and the world and interesting to each of them respectively.

### **3.3 A maximum output of a research with minimum Input**

### **3.4 In physics a formula can outline the whole world (用一个公式概括整个世界)**

### **3.5 Science of Research: A scientific investigation into a process**

Updated 04 aug 2017

An example can lead to a science

A case study can lead to a theory

A proof can lead to a top journal paper

A counterexample can overthrow an existing theory

A story can lead to a book

A approach can lead to an industry

A formula can lead to a world class company (Dupont, Google)

An idea can rich a country, industry, family and individual and found a research field or discipline (McKinsey & Company)

Research is the process of transforming from the former of each of the above mentioned to the latter of that mentioned. Research science aims to scientific investigation into these processes.

### **3.6 Research as a search**

You are concerning how to write your assignment. Please follow the order (from 1, 2, .. to 6) of following to do your best

1. visit [https://en.wikipedia.org/wiki/Main\\_Page](https://en.wikipedia.org/wiki/Main_Page) to know the related information for your topic, also to use it as references
2. visit <http://www.wikicfp.com/cfp/> to detail or refine your topic
3. visit <https://scholar.google.com.au/> or [https://www.researchgate.net/profile/Zhaohao\\_Sun](https://www.researchgate.net/profile/Zhaohao_Sun) to get scholar articles for your research,
4. visit [https://www.google.com.au/?gws\\_rd=ssl](https://www.google.com.au/?gws_rd=ssl) get more information, including organisations information
5. visit <https://www.google.com.au/imghp?hl=en&tab=wi&authuser=0> to get model or framework or tables or images for your development
6. visit <https://www.youtube.com/> to get video information of the related topic or organisation.

This is an iterative and incremental process of Research as a search

### **3.7 Research Delegation**

Recently I talked with my research collaborator. He believes that researcher as politician, researcher as idea generator, researcher as entrepreneur, and researcher as project manager. These four roles of a researcher must be all-round great. Otherwise, a researcher is difficult for survival in some countries including developed countries.

However, one researcher cannot be a 4 in one. Therefore, which role is most important for a researcher? Maybe a researcher should be a politician, because if he is a politician, then he can get research grant, and delegate the research to others in the name of research team members.

He can delegate his research idea to a team member to develop, and generate more ideas for research grants, research publications, and attending conferences in the name of world class experts. Therefore, he is considered as a great idea generator or great thinker.

As a politician in the research world, he can delegate his team member to be an entrepreneur and build a company using the money from the Government. His company is research entrepreneurship company and enjoy the benefit from the taxi payers. Therefore, he is considered as a great entrepreneur in the country, then in the world.

As a politician in the research world, he can delegate the research realization to his team member as a project manager. Every month, he will ask his assigned project manager report to him the progress of the research. What he likes to say "well done" and therefore, he is considered as a great project manager, he is the first author of all the publications: top journal articles, books, etc..

The core of the above is research delegation. Some have become the master of the research delegation. The others are still confusing about how to use research delegation, they are still worrying about how to play a better role in one or two of the above four roles.

I have published a paper on delegation intelligence. Research delegation is a part or an example of delegation intelligence.

Prof Zhaohao Sun

2019-1-30

### **3.8 What is a research paper**

What is a research paper? Edit

One famous professor motivates me to ask this question: what is a research paper?

This also means we really need Science of Research.

Prof Dr Zhaohao Sun

2017-9-15

#### **3.8.1 Can a conceptual and descriptive paper be a research paper?**

One famous professor motivates me to ask this question: what is a research paper?

This also means we really need Science of Research.

Prof Dr Zhaohao Sun

2017-9-15

#### **3.8.2 What is a problem?**

What is a problem? This is a simplest problem, but it is most difficult to answer.

According to Dictionary (Orford, 7th edition) problem is "a thing that is difficult to deal with or to understand".

However, in reality, there are a lot of problems that are not difficult to deal with or not difficult to understand. Therefore, based on the above definition, these problems are not problems. Behind it is that problem has characteristics of relativity.

Further, there are really a lot of problems. For example, in any research project or research paper, one must raise research problems, they are really difficult to deal with or to understand, at least from a perspective of the researchers or authors. Sometimes, the reviewers of the project or papers might not agree with this point. They believe that this is not research problem.

What do you believe? My idea is that there are a lot of problems on problems. We have not understood about these.

If we have a complete understanding of problem, Then we will have a better understanding of problem based teaching and learning, problem solving, and so on.

It seems that we do not care about problems around us and annoying us often.

Prof Dr Zhaohao Sun

2017-10-11

#### **3.8.3 Can we generate a problem automatically?**

Can we generate a problem automatically?

This section look at what is a problem, and can we generate a problem automatically?

## 1. What is a problem?

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Prof Dr Zhaohao Sun

2017-10-11

Can we generate a problem automatically? Here, we mean human beings and intelligent agents or robots.

For we as human beings, can we generate a problem automatically? This is an important topic for problem based reasoning or problem based teaching and learning, because one course has not a lot of problems for students. For example, for computer programming course of undergraduate students, there are only a few dozens of algorithms that are worthy of studying and questioning. Therefore, if we can generate 1000 problems automatically for one course. at least the lecturers are happy.

For intelligent agents or robots, can we generate a problem automatically? This is an important problem for AI, because intelligent agents or robots can generate world class research problems, significant research problems for researchers and developers, so that researchers need not think about research problems, they can then focus on how to solve these world class research problems, significant research problems using their own intelligence or artificial intelligence. Problemless research is more important than driverless car, because researchers have liberated from the hardest stage of research, that is what are the research problems for the research or research articles.

Prof Dr Zhaohao Sun

2017-10-11

### **3.9 Granularity of Research and Development**

Updated 08 11 17

Granularity of Research and Development Level of Research and Development can be classified into science level, framework level, platform-level algorithm level, problem solving level and so on.

### 3.9.1 Science level research

F. Taylor has a dream and had done his best to conduct science level research and development. The result he has done research was that he created management science for the world. This is the most respectful career.

Theory level research is close to science level research. At this level, we have to mention Albert Einstein, who created the theory of relativity.

### 3.9.2 Platform-level Research

Bill Gates, Zuckerberg are all pioneer in the Platform-level Research

### 3.9.3 Algorithm-level research?

Some researchers are good at algorithm level research, and they contribute their whole lives to algorithm level research. Others are not, although they work in algorithm field. A lot of PhD students or research students are asked to do algorithm-level research in some areas of ICT. Then some postdocs have to continue to do algorithm-level research and publish algorithm-level research paper. Who is the grandfather, father or pioneer(s) of algorithm level research in mathematics and ICT in ancient time, modern time and current time? These questions are important to make algorithm-level research glorious and last for another century.

An algorithm can produce an industry, a discipline, and a giant corporation (see my notes in another questions at RG). Can you give an example for each of them.

Prof Dr Zhaohao Sun

2017-9-15

### 3.9.4 Problem-solving level research and development

This is most favourite research and development. Every one love it, Journal and Conference also loves. However, it maybe provides a misunderstanding to many researchers, so that they believe that research development is only problem-solving.

### 3.9.5 Academic and Professional Writing

academic writing = academic + writing. academic means scientists or scholars, writing is what one wrote. therefore, academic writing means what a scientist or scholar wrote.

Professional writing = professional + writing. professional means any received an academic degree or any received professional training. Therefore, what a professional wrote as a set covers academic writing as a subset.

a subset of academic writing is research paper, book chapters, conference papers and books and others.

For more detail, please read my "Science of Research", in Google Scholar or RG here.

Prof. Dr Zhaohao Sun

2018-2-12 for RG.

## 3.10 Research Interest: Measuring scientists' interest in your research

Research interest or publication interest is how ResearchGate uses a new research metrics to measure scientists' interest in their research (Researchgate, 2019). The Researchgate aims to use the Research Interest to help researchers and institutions understand how their research is being received interest,

attention and applied around the world. For detail, Researchgate focuses on how ResearchGate members show interest in individual research items and how that interest is evolving over time. They believe that this new score can give an individual researcher a faster, more comprehensive picture than citations or reads alone as what Google Scholar has done. To provide an overview of a researcher's body of work, Researchgate also adds a total Research Interest score, which simply adds up the Research Interest scores from all of an author's research items on his or her profile.

The key idea behind Research Interest are as follows (Researchgate, 2019): First, a researcher accesses a research item. If it sounds of interest, they may read the full-text (if it is available). If they like what they read, they might recommend it. And if the work is really relevant, they might cite it in their own research. This implies that when researchers 1. access, 2. read, 3.1 recommend and /or 3.2 cite a research item, its Research Interest goes up. Based on this idea, Researchgate introduces a research metrics (system) for weighting the following different forms of interaction as the research interest:

- A read\* has a weighting of 0.05.
- A full-text read\* has a weighting of 0.15.
- A recommendation has a weighting of 0.25.
- A citation has a weighting of 0.5.

\*A 'read' is when someone views a publication summary or clicks on a figure, whereas a 'full-text read' is counted when someone views or downloads the full-text. Learn more about how we count reads).

That is, the research interest of an individual research,  $RIS = B \times 0.05 + D \times 0.15 + R \times 0.25 + C \times 0.5$ .

Where  $B$  is the number of researchers who view the summary or click on a figure of a publication.  $D$  is the number of researchers who download the full-text of a publication.  $R$  = The number of recommendations from the researchers to a publication.  $C$  is the number of citations for the publication. The total Research Interest  $TRIS = \sum_{i=1}^n RIS(i)$ , where  $n$  is the number of publications of an individual researchers

The total Research Interest of an individual researcher at Researchgate is an innovative research metrics, because it measures not only citations of publications of an individual researcher, but also the reads, full-text downloads, and recommendations. Therefore, if two indexes of Google Scholar focus on the citations of publications of an individual researcher whereas Researchgate uses total Research Interest score to measure the process of applying the research of publications of an individual researcher. Therefore, it will become a powerful tool to evaluate science and technology and move it forward. It might become an important research metrics for measuring the research performance of an individual researcher in specific and an organisation in general in the near future.

Reference:

<https://www.researchgate.net/application.researchInterest.ResearchInterestHelp.html>, accessed 06 Feb 2019.

## 4 Science of Research as a Discipline

I do not believe that when Fred Taylor ingeniously introduced the science of management, he had dreamed that thousands of Professors with Doctor of Business Administration (DBA) and PhD in Management will be produced a century later. However, I really believe that thousands of Professors with Doctor of Research Science and PhD in Research Science will be produced when the 22<sup>nd</sup> Century come. This is because Science of Research is an emerging discipline. In the past few centuries, we have made dramatic development in research and development of science and technology. However, the power behind them basically is individual research and group research, sometimes supported by

capitalists, investors and governments. But all the enabling powers and researchers have not really tried to develop Science of Research as a discipline, because they believe that the result of research in a terms of social reputation and commercial interest are better than the Science of Research as a Discipline. This is similar to the fact that in the early 20<sup>th</sup> century, few businessmen in USA believe that science of management or science of business is really helpful for doing business or making money (McDonald, 2017). Now it is the right time for us not make the similar mistake of American businessmen of the early 20th Century, a century ago. We can develop Science of Research as a Discipline soon. To this end, we must first answer the following fundamental problems: what is a minimum research? What is the input of minimum research? What is the minimum input of research? What is the maximum output of a minimum research? What is life cycle of a research or research life cycle?

Prof. Dr Zhaohao Sun

21 July 2017

## 5 Art of Doing Research

Art of doing research is a part of research science, because art focuses technology and techniques, while science focuses on scientific foundations. – Sun 010817

### 5.1 How to Design a research title

I prefer short research titles for publications, for example, my publications include titles: “Abductive case based reasoning” published in International J of Intelligent Systems. “Demand-driven web services”, published in a book.

However, I do not know how to design a paper title today for my latest paper. It relates privacy in the age of big data.

I hope to use "big data driven privacy and security" (I'll use it to publish a paper or book), but was rejected by my friend. Then we discussed how to design a research title. Finally, we concur that the good research title should have three principles:

1. Integrate abstract with concrete,
2. Integrate fuzzy with exact,
3. Integrate big and small.

“big data driven privacy and security” can be a book title rather than a journal paper, because it is against items 1 and 3.

Items 1, 2, 3 are three principles. However, it is still an art. I do not know a lot. Can you tell me your art?

Prof. Dr. Zhaohao Sun

2017-9-19

Updated on 2018-8-31

### 5.1.1 An art for generating title of thesis or paper

1. A good research paper title contains up to three keywords, A, B, C. For a thesis, maybe up to 2 key words, A, B; the most difficult title contains one key word, A. For A, B, C, one can use Boolean structure to form the basic structure of the paper or thesis: 8 main chapters. For A, B, the main structure of the paper or thesis includes 4 main chapters. For A, one likes to create a new discipline for academia. I encourage this bravery and spirit.
2. ABC,
- 3.
2. Normally, one should use learning as a search. that is, one has to use search on the web, e.g. Google Scholar, or SCOPUS for 100 titles, and summarizes the rules or laws of them. Another is to read classic books or theses or papers in the domain and think about why they are classic, seminal, or landmark. Then try to generate own title of the paper or thesis.
3. Differentiates the title of the paper from existing ones through learning as a search.
4. 1. Keep it concise and attractive 2, Use appropriate descriptive words, 3 Avoid abbreviations and jargon.
5. Finally, generating a good title, and or abstract, one should use 1. learning as a search, 2. Research as a search. 3. Research as a research, 4 Research as a learning. This is an iterative and incremental process. The life cycle normally lasts 50 years.

Thanks for Santhosh Kumar Balan's comment at RG.

Prof. Dr. Zhaohao Sun

2018-8-31

### 5.2 How to develop Literature Review

Literature review aims to determine new research problem(s) and research direction as well as research approach(es) based on the search, collection, analysis, induction and evaluation of the previous or existing research results. [LR 是对前人相关研究成果进行搜集, 整理, 分析, 归纳和评估的基础上确定新的研究问题和研究路径的论证过程, I get it from my weixin on 01 04 14].

A literature review, as a systematic review, focused on a research question, trying to identify, appraise, select and synthesize all high-quality research evidence and arguments relevant to that question. For example, a meta-analysis is typically a systematic review using statistical methods to effectively combine the data used on all selected studies to produce a more reliable result (Bolderston, 2008) Sun 030418

### 5.3 Search strategy

We used the Boolean OR to link synonyms and the Boolean AND to join the major terms. The final search string used in this study

is: (diabetes OR diabetic OR T1DM OR T2DM OR “blood sugar” OR “blood glucose” OR insulin )

AND (“self-management” OR “self management” OR “self care” OR empower\*)

AND (“data mining” OR intelligent OR predict\* OR classificat\* OR cluster\* OR associat\*)

AND (model\* OR algorithm\* OR technique\* OR rule\* OR method\* OR tool\* OR framework\*)

This search string was used to get the primary studies from the following digital libraries: IEEE Xplore, ACM Digital Library, PubMed and Science Direct. These digital libraries index millions of articles related to computer science and medical informatics.

#### **5.4 Framework oriented research**

Framework oriented research is a methodology for a class of research, belong to Science of Research (Sun, 2017).

Framework can be used for publishing a paper in a prestigious journal. You can scopus it and receive a significant number. You can google which paper's tile including Framework, which has about 4,910,000 results, in Google Scholar (retrieved on 05 09 17). 4,910,000 is good enough for big statistical analysis.

Generally, we have the following classification for such research.

1. x Framework for y.
2. y: x Framework

where x is in the form of A z, z is adjective for presenting Framework more significant, or meaningful, for example, z is conceptual, or theoretical or political.

y is a research interest or field. For example, A framework for representing knowledge (Minsky, 1975), here y = representing knowledge. x = nil.

This piece will be in the book: Sun Z (2018) Science of Research.

Prof. Dr Zhaohao Sun

2017-9-5

What are the roles, differences and similarities between.... Available from: [https://www.researchgate.net/post/What\\_are\\_the\\_roles\\_differences\\_and\\_similarities\\_between\\_theoretical\\_framework\\_and\\_conceptual\\_framework\\_in\\_research?view=5988fdf4f7b67ec0de17a78b#59adf0b1615e2780a90f2abb](https://www.researchgate.net/post/What_are_the_roles_differences_and_similarities_between_theoretical_framework_and_conceptual_framework_in_research?view=5988fdf4f7b67ec0de17a78b#59adf0b1615e2780a90f2abb) [accessed Sep 5, 2017].

#### **5.5 Approach based Research**

##### **5.5.1 An integrated approach**

The integrated approach means integration of logical approach (Boolean approach), qualitative approach (literature review) and quantitative approach (statistical analysis).

Remark: This is motivated by the alternative topic for Privacy and Security in the Big Data Paradigm, submitted to JCIS on 161117

## 5.6 What is the Difference between "Method" and "Technique"?

Updated on 25 Aug 17

Generally, a technique is a method. traditionally, method is a particular way of doing something, currently any method based on a tool is technique. If your method is based on software or computer, then it is technique. Of course, for research, one like either method or technique.

Prof Dr Zhaohao Sun

What is the Difference between "Method" and "Technique"?. Available from: [https://www.researchgate.net/post/What\\_is\\_the\\_Difference\\_between\\_Method\\_and\\_Technique](https://www.researchgate.net/post/What_is_the_Difference_between_Method_and_Technique) [accessed Aug 25, 2017].

## 5.7 The Art of Designing Research Topic

Question: Have you published research journal papers using three main words as their titles?

I read the textbook of Paul Samuelson: Economics: An Introductory Analysis in early 1980s. I was affected by his text when I worked at the Institute of Operations Research (OR), Faculty of Economic Science at RWTH Aachen in middle 1990s. Today, I carefully read the item of [https://en.wikipedia.org/wiki/Paul\\_Samuelson](https://en.wikipedia.org/wiki/Paul_Samuelson) with curiosity in order to update my knowledge about him and economics and OR. However, I have been impressed heavily by the following:

His PhD title is "Foundations of Analytical Economics" from Harvard University 1941. He later turned it into a book entitled "Foundations of Economic Analysis" Harvard University Press, 1947. He was author of the best-selling economics textbook of all time: Economics: An Introductory Analysis, first published in 1948. The PhD thesis title is narrow, because it is related analytical economics, or using mathematical methods to economics. However, this title has been extended dramatically to Foundations of Economic Analysis, although only "analytical economics" has been changed to "Economic Analysis", because Economic Analysis can be based on any techniques not only mathematical analysis. More general form for his work is to change the book name from "Foundations of Economic Analysis" to "Economics: An Introductory Analysis". This is a 3-step important extension and generalization based on his understanding. If we remove a negligible word from the titles, therefore, three books are based on three words Foundations, Analysis, Economics, because foundations are similar to "introductory" in semantics, or "introductory" is for foundations.

Therefore, how concise it is for a title of publications! We can summarize Prof Samuelson "one life, three words". We should pursue such a concise or succinct way to design our paper or book titles.

This is a part of science of research. Do you agree?

These questions are motivated by physics and software engineering.

This is a part of my revised and updated article on science of research.

Prof Zhaohao Sun

27 July 2017

# 6 Deep Learning in the Age of Big Data

We are living in the age of big data. The following deep learning is as follows

1. Learning as a search,
2. Learning as a research
3. Learning as a selection
4. Learning from others
5. Learning as an application

The deep learning as a process is important for us to have an effective learning in the age of Big Data. This deep learning can improve not only our research and development, but also our thinking. For detail please see the research upcoming paper here.

## 7 Thought of Research as a Research

### 7.1 Global openness, accountability and transparency of research

Tim\_Berners-Lee states in 2010 that “Greater openness, accountability and transparency in Government will give people greater choice and make it easier for individuals to get more directly involved in issues that matter to them” ([https://en.wikipedia.org/wiki/Tim\\_Berners-Lee](https://en.wikipedia.org/wiki/Tim_Berners-Lee), retrieved on 16 01 19). This idea motivates me to develop my original idea on openness, accountability and transparency of research, that is, I strongly believe that greater global openness, accountability and transparency in research will give researchers greater choice and make it easier for individual researchers to get more directly involved in issues that matter to them. Researchgate provides a good platform for the global openness, accountability and transparency of research.

Prof Zhaohao Sun

2019-1-16

## 8 Art of an journal paper

### 8.1 How to Write a Good Paper

From Journal of Symbolic Computation (<https://www.journals.elsevier.com/journal-of-symbolic-computation/>), but it is clearly applicable to everyone:

“Must explicitly address the following questions in succinct and informal manner:

- What is the problem?
- Why is the problem important?
- What has been done so far on the problem by others?
- What is the main contribution of the paper to the problem from your research?
- Why is the contribution original (discussion) ?
- Why is the contribution non-trivial (discussion)?

Make it complete (within page limit):

- All the related issues must be carefully discussed.

- All the previous relevant papers must be properly cited and discussed.
- All the theorems must be rigorously proved.
- All the important definitions/theorems/algorithms must be illustrated by well-chosen examples.”

## 8.2 How to write Title

Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.

## 8.3 How to face rejection

From a human perspective, review is a process of rejection with a hostile attitude. Rejection is a natural result one can receive from submission of a manuscript to a journal. Therefore, one should be happy with the rejection notice from a journal. This also means that this is a good journal, because it has some reasons for rejection. Maybe one of the rejection reason is right.

Confidence is most important in the case of rejection of the submitted paper. Please keep in mind, more rejection, more published. Finally, you are the successful explorer in scientific world. This journal could reject your paper, another journal can accept your paper for publication. It is most important for you to have confidence in that your paper is a research paper, your imagination is novel, your curiosity is novel, your writing is original and novel. If your paper is controversial and rejected by the reviewers. This means that you are true scholar and work on some problems scientifically.

Finally, please read 1. science of research (<https://www.researchgate.net/project/Science-of-Research>) and 2. imaginational intelligence ([https://www.researchgate.net/publication/323526375\\_Foundations\\_of\\_Imaginational\\_Intelligence\\_with\\_Applications](https://www.researchgate.net/publication/323526375_Foundations_of_Imaginational_Intelligence_with_Applications)). You will get some inspiration from them..

Prof. Dr. Zhaohao Sun

2018-3-15

## 8.4 Peer Review and Reviewers

Peer review was introduced to scholarly publication in 1731 by the Royal Society of Edinburgh (Shema, 2014). However, the editors of many scientific journal publications had not used the peer review to decide whether an article will be published or not until after World War II. Today, peer review is the so-called “golden standard” in evaluation of everything from scholarly publication to grants to tenure decision (Shema, 2014)

Peer-review is a phrase for ensuring the quality of scientific research. It filters from manuscripts and decides that only the highest quality research is published (News Staff, 2010). This is a phrase of research as an engineering. This is a most important phrase for any peer-reviewed publication.

Recently (retrieved on 15 May 2018), are peer-reviewers' comments really reliable? is a topic for discussion at [https://www.researchgate.net/post/Are\\_peer-reviewers\\_comments\\_really\\_reliable](https://www.researchgate.net/post/Are_peer-reviewers_comments_really_reliable). Some researchers believe that peer-review as a system is very bad and harmful; others believe that comments of peer reviewers are constructive; still others believe that the comments are not good. For the author, to answer this question, we should first classify the reviewer and comments. The reviewers could be divided into five broad categories.

1. Professional reviewers, who mostly give objective and constructive comments.

2. Biased reviewers, who mostly provide biased feedback with pride and prejudice.
3. Unprofessional reviewers, who mostly provide no feedback at all, just accept or reject research paper. Mostly reject papers have little or no feedback.
4. Ignorant reviewers, who provide a number of comments without misunderstanding of the manuscripts. The ignorance & arrogance of the reviewer shows-up in his comments. The ignorant reviewer might be an expert in a field, however, the manuscript for review is beyond his or her field.
5. Fake reviewers, who are fake peers and provide fake comments.

I have experienced every kind of reviewers in my life. I will meet more of every kind of the reviewers.

I have reviewed dozens of papers for international conferences and journals annually. I am a generous, professional reviewer. I do not like to reject manuscripts for journal publications. However, if I reject it, I will certainly provide obvious reasons (very stupid reasons) to convince the author why I reject it.

Prof. Dr Zhaohao Sun

2018-5-15

## 8.5 Peer review and Are peer-reviewers' comments really reliable?

Updated on 2018-5-15

Peer review was introduced to scholarly publication in 1731 by the Royal Society of Edinburgh (Shema, 2014). However, the editors of many scientific journal publications had not used the peer review to decide whether an article will be published or not until after World War II. Today, peer review is the “golden standard” in evaluation of everything from scholarly publication to grants to tenure decision (Shema, 2014).

Peer-review is a phrase for ensuring the quality of scientific research. It filters from manuscripts and decides that only the highest quality research is published (News Staff, 2010). This is a phrase of research as an engineering. This is a most important phrase for any peer-reviewed publication. However, this is a big issue on peer-reviewers' comments. First of all, we address: Are peer-reviewers' comments really reliable? ([https://www.researchgate.net/post/Are\\_peer-reviewers\\_comments\\_really\\_reliable](https://www.researchgate.net/post/Are_peer-reviewers_comments_really_reliable), retrieved on 15 May 2018). The following is based on the comments from ([https://www.researchgate.net/post/Are\\_peer-reviewers\\_comments\\_really\\_reliable](https://www.researchgate.net/post/Are_peer-reviewers_comments_really_reliable)). Some believe that peer-reviewing" system is generally, in principle bad and harmful.

To answer this question, we have should classify the reviewer and comments

### 8.5.1 Classification of reviewer

Reviewers could be divided into five broad categories,

1. Professional reviewers, who mostly give objective and constructive comments
2. Biased Reviewers, who mostly provide biased feedback with pride and prejudice
3. Unprofessional reviewers, who mostly provide no feedback at all, just accept or reject research paper. Mostly reject papers have little or no feedback
4. Ignorant reviewers who provide a lot of comments without misunderstanding of the manuscripts. The ignorance & the arrogance of the reviewer shows-up in his comments. The ignorant reviewer might be an expert in a field, however, the manuscript for review is beyond his or her field.
5. Fake reviewers, who are fake peers and provide fake comments.

I have experienced every kind of reviewers in my life. I will meet more of every kind of the reviewers.

I have reviewed dozens of papers for international conferences and journals annually. I am a generous, professional reviewer. I do not like to reject manuscripts for journal publications. However, if I reject it, I will certainly provide obvious reasons (very stupid reasons) to convince the author why I reject it.

### 8.5.2 Classification of comments

1. Constructive, valuable comments: genuine inputs/suggestions for improvement of manuscript.
2. Comments are reliable and helpful
3. Comments of reviewers misunderstood or wrongly interpret the manuscript. Comments seem biased by personal opinions
4. Review be honest, impartial and based on sound knowledge.

### 8.5.3 Classification of comments' recommendations

1. the recommendations of reviewers may not be much more reliable than a coin toss (News Staff, 2010) ! “Reviewers agree on the disposition of manuscripts – accept or reject – at a rate barely exceeding what would be expected by chance. Nevertheless, editors' decisions appear to be significantly influenced by reviewer recommendations”
2. The.

## 8.6 Citation

Out of some 45.5M articles and proceedings papers published and indexed in Web of Science since 1970, only .01% have been cited 2000 times or more.- © 2018 Clarivate Analytics, on 071018

### 8.6.1 Inconsistency between Reference and numbered citation using Microsoft Word 2016

As we know we use Microsoft Word Reference > Manage sources to organise personal digital library, citations and generate reference list and bibliography if writing a book or article.

However, I met a question today,

why there is an inconsistency between the cited number and the reference no in the end of article when using Microsoft word's manage source? for example,

in the article of mine, [45] considers IBA ... research [46] uses automatic service... However, the automatically generated reference list (using IEEE notation) has only 44 references. I checked there and find a big problem, because when I click shadowed [45], I found it links [41] in the reference list; shadowed [45] linking [42]... Therefore, there is an inconsistency between the cited number and the reference No in the end of article when using Microsoft word's manage source. I do not know how to solve it, it is serious because IEEE Press and ACM Press asked us to use numbered citation and reference list rather than APA notation.

After try and fail a few times, I right click the shadowed [45] (or an arrow right to it) and click "update citations and bibliography" and wait for a while. Then all the inconsistency occurrences have been disappeared! Therefore, I learn a good art for removing inconsistency between the cited number and the reference no in the end of article when using Microsoft word's manage source.

I hope you can use this art if you meet such a case.

## 8.7 Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

## 9 Technology of Research

### 9.1 Automate the scientific research using AI

Updated on 03 10 17

The best way to accomplish scientific research quickly and efficiently is to automate the scientific research using AI. I have mentioned this point in my project or paper on Science of Research. In the future, the researchers needs not write research papers any more. You only provide an idea or a topic to the research automated machine. Then, in 0.5 second, an original research paper has been produced for you freely. This speed is similar to what Google search. The produced paper can be submitted to top journal and then published automatically, because the journal reviewers could not find any flaws from it, and, nevertheless, consider it original.

This is also the topic of hard AI problems. For detail see my 10 hard problems in AI here.

### 9.2 Research as a search

1. How do I do research. Research as a search, an iterative and incremental process of search. 1. I search Wikipedia if it has item on it, e.g. research science, no, then I do research using this topic. 2. I use Google scholar, researchgate to search and get research publications and other docs. 3. I use Google image and youtube to know the related video information and background. 4. I uses wikiCFP in order to class where does my research go to. This is an important order for any research.

## 10 Engineering of Research

### 10.1 Story

A few years, a MIT group submitted a paper to a prestigious international conference and get it peer-reviewed and accepted for publication, that event shocked the scholar community, my idea is that MIT is a pioneer of engineering the research, automating research and manufacturing research articles indexed by Google Scholar, SCOPUS and Clarivate JCR (SCI) massively using modern production line, faster than Ford or Toyota's car production line, with the help of artificial intelligence including machine learning and natural language understanding. CMIT, a counterpart of MIT in China, similar to the factory of manufacturing iPhone 10 in Shenzhen, South China, will produce the largest number of highly quality research articles with greatest number of citations that required for becoming a professor at top universities in USA. Then CMIT will produce the significant number of intelligent robots with professorship. The most general science CMIT used in this direction is Science of Research. Now my question is: what is a minimum research? What is the input of minimum research?, what is the maximum output of a minimum research. This is the most significant, fundamental question for the science of research.

### 10.2 Automation of Top Research Journal Papers: A System Architecture of CMIT

Updated on 03 10 17

As I mentioned here “automate the scientific research using AI” is the 6th Hard Problem of AI and Fuzzy Logic. The new idea of it is that I mentioned the production of a research paper is 0.5 second, similar to the search speed of Google. I also mentioned CMIT as automated machine for producing research paper. Now I likes to detail it.

CMIT is an automated machine for producing original peer-review-free, plagiarismless top journal paper. CMIT has a built-in turnitin component, therefore, its produced research papers are plagiarismless or plagiarism-free. CMIT has also built-in intelligent natural language understanding and processing, component with the biggest database of peer-review data to be free any peer review, because any physical peer review has a degree of academic prejudice, academic discrimination, like sport game judge. For example, one so-called reviewer or scholar considers “if a paper is descriptive and conceptual,

then it is not a research paper”, on behalf of a top delusive journal. Therefore, CMIT has used this idea carefully. CMIT has also built-in database of research proposals, research papers, conferences proceedings papers, covering all the data of SCOPUS and Google Scholar and CNKI, to name a few, and all the professional standards including German Industry Norms. CMIT has a built-in machine learning, thinking and understanding (MLTU) app. MLTU covers all the latest technology and algorithms of machine learning. MLTU covers machine thinking app to analyse the original thinking of a researcher on a specific topic and provides a thinking map to the researcher and create the abstract of the paper to be produced. MLTU covers a machine understanding component to understand the existing state of the art on a specific topic to produce literature review and introduction, which is similar to realization of automation of introduction, literature review and related work as well as discussion.

Prof. Dr Zhaohao Sun

2017-10-03

## 11 Management of Research

### 11.1 Fundamentals of Management of Research

Management is what managers do (Robbins, Bergman, Stagg, & Coulter, 2012) (p.12). More specifically, management of research is the process of managers’ coordinating and overseeing the research activities to ensure their completion. The main management functions or activities of a research manager consist of planning, organizing, leading and controlling (Terry, 1968; Robbins, Bergman, Stagg, & Coulter, 2012).

Planning of research is a management function that defines the research’s goals, establishes an overall strategy for achieving those goals, and develops a comprehensive set of plans to integrate and coordinate research work (Robbins, Bergman, Stagg, & Coulter, 2012, p. 294). Research managers should define the nature and purpose of planning, classify the type of goals that a research uses, describe related types of plans that research uses, and discuss issues in planning of research (Sun & Firmin, 2012). Planning of research is also an important activity in project management (Smith, 1992). Any planning techniques in project management can be used in planning of research as a part of management of research, because planning activities help achieve the goals of research.

Organizing of research is also a management function that arranges and structures research work, researchers, and research infrastructure to accomplish the research plans and goals. (Robbins, Bergman, Stagg, & Coulter, 2012, p. 360). Organizing of research is to establish effective behavioral relationships among selected research work, researchers, and research infrastructure in order for the research group to work together efficiently” (Terry, 1968, p. 289). When organizing of research, research managers determine what research tasks need to be done, who is to do them, how research tasks are to be decomposed and grouped, who reports to whom, and at what level decisions are to be made. They also allocate and deploy organizational resources during the organizing process of research (Robbins, Bergman, Stagg, & Coulter, 2012).

Leading of research is a management function that involves explaining, understanding, predicting and influencing researcher behaviors (Robbins, Bergman, Stagg, & Coulter, 2012, p. 475). Leading of research involves overseeing and coordinating individual researchers and research teams to work so that research goals can be accomplished (Robbins, Bergman, Stagg, & Coulter, 2012). When leading of a research, research managers motivate their researchers, help to resolve research team conflicts, understand and influence individual researchers or research teams, select appropriate communication channels, or deal with individual or group behavior issues (Robbins, Bergman, Stagg, & Coulter, 2012). Leading researchers involves understanding their attitudes, behaviors, personalities and motivations as an individual, or as a group (Robbins, Bergman, Stagg, & Coulter, 2012) and helping them to “achieve their respective essential goals as well as their maximum potentialities” (Terry, 1968, p. 451).

Controlling of research is a management function that measures and compares actual performance against standards, and takes corrective managerial action taking into account the goals and objectives of the organization (Robbins, Bergman, Stagg, & Coulter, 2012, p. 652). This means, research managers, in the process of controlling, must monitor and evaluate the research activities to make sure they are being completed as planned, and correct any significant deviations against the established standards (Robbins, Bergman, Stagg, & Coulter, 2012). Controlling of research is also “determining what is being accomplished, that is, evaluating the performance and, if necessary, applying corrective measures to that the performance takes place according to plans” (Terry, 1968, p. 544). Controlling of operations, processes, quantity, quality, time use, budget and cost are the main tasks of research managers (Turban E. , 1995; Terry, 1968).

Management functions in organizations have improved remarkably with the development of information systems and advanced IT over the past half a century (Turban & Volonino, 2011; Laudon & Laudon, 2011). Information systems (IS) should be applied to each of the main management functions in order to aid research managers to realize their organizational objectives, that is, it is important for research information systems (RIS) to look at IS for research planning, IS for research organizing, IS for research leading, and IS for research controlling. To our knowledge, these ideas have not been explored in academic communities through books and journal papers. In what follows, we will look at each of these in some detail by extending our early work (Sun & Firmin, 2012).

Management of research has become an important division at a university. For example, in Australia, every university has a research office that directly reports to the deputy VC for research. The manager of research office aims to manage research portfolio and facilitate the research and development of provided by researchers. At the same time, he and DVC for research work together to lobby government and companies to provide funding to their university. Therefore, the better the Management of research is for a university, the better research performance is for a university.

Based on Sun Z (2017) A Strategic Framework for Management Intelligent Systems, To be published.

## **11.2 Tools for Management of Research**

There are many tools available for research management. For example, researchgate (RG) Academia, Google Scholar, are not only social networking services for researchers, but also for managing the research of researchers as individuals and as a member of an institution. For example, one can use RG to manage his or her research publications. One can also know the basic research information, e.g. number of reads of a researcher as an individual or the researchers of an institution. Information sharing is an important part of modern research management. All these mentioned tools have realized the sharing of research information globally and transparently. –Sun 020817

## **12 Automation of Research**

The completely avoiding plagiarism is the automation of research, see my science of research project, I mentioned this point at researchgate on

## **13 Research Methodology and Approach**

There are many research methodologies. This section will overview some of them.

### **13.1 Research Approach**

#### **13.1.1 Systematic Mapping**

Updated on 23 10 17

The main goal of a systematic mapping studies “is to provide an overview of a research area, and identify the quantity and type of research and results available within it” (Petersen, Feldt , Mujtaba, & Mattsson, 2008). In such a study, the research questions are high level and consider issues including sub-topics that have been addressed, empirical methods that have been used, and sub-topics that have sufficient empirical studies to support a more detailed systematic review.

## 14 Discussion and Impressions

### 15 How to read a paper:

- [How to Read a Paper](#) S. Keshav David R. Cheriton School of Computer Science, University of Waterloo Waterloo, ON, Canada

### 16 HOW TO WRITE AN ABSTRACT:

An abstract is a short summary of your completed research. If done well, it makes the reader want to learn more about your research (Berkeley, 2003).

Meet the word count limitation. An abstract word limit of 100 to 150 words is common in IT and IS fields. An abstract word limit of 150 to 200 words is some other fields such as human sciences. If your abstract runs too long, either it will be rejected or someone will take a chainsaw to it to get it down to size (Koopman, 1997). Your purposes will be better served by doing the difficult task of cutting yourself, rather than leaving it to someone else who might be more interested in meeting size restrictions than in representing your efforts in the best possible manner. Shortening a long abstract/article to a short abstract/article is an art of publishing articles or reports, requires one to study and train for years.

The following are the basic components of an abstract in any discipline (Berkeley, 2003). Note that However, it's important to note that the weight accorded to the different components can vary by discipline. For models, try to find abstracts of research that is similar to your research (Koopman, 1997). I still like to provide sentences for each components in Solution 1 based on experience.

Solution 1 (Berkeley, 2003) for one who has not time.

1. Significance: One sentence
2. Motivation/problem statement (One or two sentences): Why do we care about the problem? What practical, scientific, theoretical or artistic gap is your research filling?
3. Methods/procedure/approach (One to three sentences): What did you actually do to get your results? (e.g. analyzed 3 novels, completed a series of 5 oil paintings, interviewed 17 students)
4. Results/findings/product (One or two sentences): As a result of completing the above procedure, what did you learn/invent/create?
5. 4) Conclusion/implications (One sentence): What are the larger implications of your findings, especially for the problem/gap identified in step 1?

However, it's important to note that the weight accorded to the different components can vary by discipline. For models, try to find abstracts of research that is similar to your research (Berkeley, 2003).

Solution 2 (Koopman, 1997) for one who has time and big interest.

1. **Motivation:**

*Why do we care* about the problem and the results? If the problem isn't obviously "interesting" it might be better to put motivation first; but if your work is incremental progress on a problem that is widely recognized as important, then it is probably better to put the problem statement first to indicate which piece of the larger problem you are breaking off to work on. This section should include the importance of your work, the difficulty of the area, and the impact it might have if successful.

2. **Problem**

**statement:**

What *problem* are you trying to solve? What is the *scope* of your work (a generalized approach, or for a specific situation)? Be careful not to use too much jargon. In some cases it is appropriate to put the problem statement before the motivation, but usually this only works if most readers already understand why the problem is important.

3. **Approach:**

*How did you go about solving* or making progress on the problem? Did you use simulation, analytic models, prototype construction, or analysis of field data for an actual product? What was the *extent* of your work (did you look at one application program or a hundred programs in twenty different programming languages?) What important *variables* did you control, ignore, or measure?

4. **Results:**

*What's the answer?* Specifically, most good computer architecture papers conclude that something is so many percent faster, cheaper, smaller, or otherwise better than something else. Put the result there, in numbers. Avoid vague, hand-waving results such as "very", "small", or "significant." If you must be vague, you are only given license to do so when you can talk about orders-of-magnitude improvement. There is a tension here in that you should not provide numbers that can be easily misinterpreted, but on the other hand you don't have room for all the caveats.

5. **Conclusions:**

*What are the implications* of your answer? Is it going to change the world (unlikely), be a significant "win", be a nice hack, or simply serve as a road sign indicating that this path is a waste of time (all of the previous results are useful). Are your results *general*, potentially generalizable, or specific to a particular case?

## 17 How to write Introduction

The introduction is a key element in the structure of your report or article. Generally speaking,

There are some important things you need to do in the introduction (Monash, 2012-1):

- You need to define what you are going to talk about.
- You need to show what you are trying to do with your topic - your direction.
- You need to show what you are going to cover (and what you're not, if need be).
- You need to background information necessary to their understanding.

## 18 How to write “related work”

In this section you should discuss what you received in this research and what others work from a few perspectives, in order to convince others your work is really a worthy one. This is necessary for you to get a high quality of research paper, which can also improve your existing work, because you was said that your paper has a lot of repeats

## 19 How to write conclusion

The conclusion is also a key element in the structure of your report or article. When you finish writing, leave yourself time to stand back from your report or article so you can get some perspective on it. Read the whole thing through again, making notes before you start the conclusion (Monash, 2012-2).

There are some important things you need to do in the conclusion (Monash, 2012-2):

- You need to link it to the rest of your report.
- You need to highlight the significant elements from your report (from both parts).
- You need to draw out the main points you want to make about the topic - and make them at a general level.
- You need to avoid introducing new material.

The conclusion of many research articles also include future (research) work as the final part of the conclusion.\

## 20 HOW TO WRITE AN ABSTRACT:

An abstract is a short summary of your completed research. If done well, it makes the reader want to learn more about your research.

These are the basic components of an abstract in any discipline:

- 1) **Motivation/problem statement:** Why do we care about the problem? What practical, scientific, theoretical or artistic gap is your research filling?
- 2) **Methods/procedure/approach:** What did you actually do to get your results? (e.g. analyzed 3 novels, completed a series of 5 oil paintings, interviewed 17 students)
- 3) **Results/findings/product:** As a result of completing the above procedure, what did you learn/invent/create?
- 4) **Conclusion/implications:** What are the larger implications of your findings, especially for the problem/gap identified in step 1?
- 5) **Motivation:**  
*Why do we care* about the problem and the results? If the problem isn't obviously "interesting" it might be better to put motivation first; but if your work is incremental progress on a problem that is widely recognized as important, then it is probably better to put the problem statement first to indicate which piece of the larger problem you are breaking off to work on. This section should include the importance of your work, the difficulty of the area, and the impact it might have if successful.
- 6) **Problem statement:**  
What *problem* are you trying to solve? What is the *scope* of your work (a generalized approach, or for a specific situation)? Be careful not to use too much jargon. In some cases it is appropriate to put the problem statement before the motivation, but usually this only works if most readers already understand why the problem is important.
- 7) **Approach:**  
*How did you go about solving* or making progress on the problem? Did you use simulation, analytic models, prototype construction, or analysis of field data for an actual product? What was the *extent* of your work (did you look at one application program or a hundred programs in twenty different programming languages?) What important *variables* did you control, ignore, or measure?
- 8) **Results:**  
*What's the answer?* Specifically, most good computer architecture papers conclude that something is so many percent faster, cheaper, smaller, or otherwise better than something else. Put the result there, in numbers. Avoid vague, hand-waving results such as "very", "small", or "significant." If you must be vague, you are only given license to do so when you can talk about orders-of-magnitude improvement. There is a tension here in that you should not provide

numbers that can be easily misinterpreted, but on the other hand you don't have room for all the caveats.

9) **Conclusions:**

*What are the implications* of your answer? Is it going to change the world (unlikely), be a significant "win", be a nice hack, or simply serve as a road sign indicating that this path is a waste of time (all of the previous results are useful). Are your results *general*, potentially generalizable, or specific to a particular case?

However, it's important to note that the weight accorded to the different components can vary by discipline. For models, try to find abstracts of research that is similar to your research.

Below are links and sample abstracts that you may find helpful.

SAMPLE ABSTRACTS:

History/social science:

"Their War": The Perspective of the South Vietnamese Military in Their Own Words

Author: Julie Pham (UCB participant in UC Day 2001)

Despite the vast research by Americans on the Vietnam War, little is known about the perspective of South Vietnamese military, officially called the Republic of Vietnam Armed Forces (RVNAF). The overall image that emerges from the literature is negative: lazy, corrupt, unpatriotic, apathetic soldiers with poor fighting spirits. This study recovers some of the South Vietnamese military perspective for an American audience through qualitative interviews with 40 RVNAF veterans now living in San José, Sacramento, and Seattle, home to three of the top five largest Vietnamese American communities in the nation. An analysis of these interviews yields the veterans' own explanations that complicate and sometimes even challenge three widely held assumptions about the South Vietnamese military: 1) the RVNAF was rife with corruption at the top ranks, hurting the morale of the lower ranks; 2) racial relations between the South Vietnamese military and the Americans were tense and hostile; and 3) the RVNAF was apathetic in defending South Vietnam from communism. The stories add nuance to our understanding of who the South Vietnamese were in the Vietnam War. This study is part of a growing body of research on non-American perspectives of the war. In using a largely untapped source of Vietnamese history & oral histories with Vietnamese immigrants & this project will contribute to future research on similar topics.

Engineering:

"Quantifying the Mechanics of a Laryngoscopy"

Laryngoscopy is a medical procedure that provides a secure airway by passing a breathing tube through the mouth and into the lungs of a patient. The ability to successfully perform laryngoscopy is highly dependent on operator skill; experienced physicians have failure rates of 0.1% or less, while less experienced paramedics may have failure rates of 10-33%, which can lead to death or brain injury. Accordingly, there is a need for improved training methods, and virtual reality technology holds promise for this application. The immediate objective of this research project is to measure the mechanics of laryngoscopy, so that an advanced training mannequin can be developed. This summer an instrumented laryngoscope has been developed which uses a 6-axis force/torque sensor and a

magnetic position/orientation sensor to quantify the interactions between the laryngoscope and the patient. Experienced physicians as well as residents in training have used this device on an existing mannequin, and the force and motion trajectories have been visualized in 3D. One objective is to use comparisons between expert and novice users to identify the critical skill components necessary for patients, to identify the mechanical properties of the human anatomy that effect laryngoscopy, and thus enable the development of a realistic training simulator. In the future an advanced training mannequin will be developed whose physical properties will be based on our sensor measurements, and where virtual reality tools will be used to provide training feedback for novice users.

## **20.1 Impact Factor**

From Ramon Lopez de Mantaras [mantaras@iia.csic](mailto:mantaras@iia.csic), to BISC 11 07 12

Impact Factor is not a good indicator of the quality of a journal. It can be easily manipulated and it is indeed

often manipulated. ISI Thomson has recently started identifying manipulations in many of the journals of their

database and they are continuing their analysis on lots of many more suspicious journals. So far more than

20 journals that have manipulated their IF have been expelled from ISI Thomson database and no longer appear

in the JCR list. Many more are expected to follow the same path.

I also agree 100% with David Parnas paper entitled "Stop the Numbers Game" (Communications of the ACM,

Vol. 50, No. 11 ,2007). It is also worth reading.

Another very interesting paper is "Escape the Impact Factor" (Philip Campbell, Nature Vol. 8, 2008). This paper

reports that a small minority of Nature papers cumulate more than 80% of the citations that Nature gets.

Yes! STOP THE NUMBERS GAME! because it slows the rate of scientific progress.

Ramon

## **21 HOW TO WRITE AN Intrdouction**

### **21.1 Significance (national interest)**

Pull audience and ask them to listen to what you will say or write.

Define variable and then use it- art of programming

### **21.2 Motivation.**

### **21.3 Research problems (based on literature review briefly)**

Normally 1-3 research questions

### **21.4 How to address these questions, what is your research results**

### **21.5 Impact of your research results.**

### **21.6 How to organise your research**

## 22 Journal Publication

The selected candidates will be expected to publish in the Basket of 6(8) IS journals, such as

MISQ,           ISR,           JAIS,           JMIS,           EJIS           and           ISJ

This is required by some universities.

### 22.1 The Science of Scientific Writing

#### 22.1.1 The principle of Scientific Writing

- To improve the readability of your writing (Springer, 2017), use short sentences (Gopen & Swan, 1990). One idea per sentence and limiting the sentence length to a maximum of 20–25 words.
- Keep it simple! (Springer, 2017) You can keep your manuscript concise and precise by adhering to the following guidelines (Springer, 2017):
  - Only one idea per sentence
  - Use the active voice, not the passive voice, when possible
  - Delete unnecessary or vague words and replace them with more specific words
- Subject and verb placement (Springer, 2017): To improve the readability of your manuscript, keep subjects and verbs close together in your sentences.
- Topic position (Springer, 2017):: each sentence should discuss one idea—the topic position should introduce this idea
- Stress position (Springer, 2017): A reader will unconsciously focus at the end of the sentence to identify what is important. This information can be referred to as the stress position of a sentence. With this expectation in mind, you can emphasize what is important about your presented idea by placing that information at the end of the sentence. In addition to emphasizing what is important, the stress position also provides a clue as to what the next sentence will be about.
- Comparisons (Springer, 2017): Comparisons are frequently made in the Results section of papers. These often involve the words “between,” “among,” “like,” “with,” and “than.” When making a comparison, the following points should be adhered to:
  - 1. Only compare similar things that can be compared fairly. It’s best not to repeat the same words in a sentence, since it can bore readers.
  - 2. Avoid being vague – be as specific as possible
- Proper nouns (Springer, 2017):: A noun is a word that refers to a person, thing, or idea. A proper noun is the specific name of a person, organization, or location. Proper nouns always have their first letter capitalized.
- Articles (Springer, 2017):: There are three articles in English: a, an, and the. a and an are used before nouns that introduce something or someone you have not mentioned before. A and an are also used when talking about your profession. "I am a scientist."
- Use of respectively (Springer, 2017), It means “in the order given” and should only be used if your sentence would be unclear without it.
- Spelling (Springer, 2017) labelling (US) , labelling (UK). Microsoft Word can help you with correct spellings. Simply open your Language preferences and chose either UK or US spelling and ensure “checking spelling as you type” is selected.
- Punctuation (Springer, 2017). The colon “:” and semicolon “;” are two punctuation marks that are often misused. A colon is used to introduce a list or a clause that explains the clause before the colon. Semicolons are used in two ways:
  - To separate two independent clauses (clauses that could be complete sentences by themselves) if you do not use a connecting word like "and" or "while" between them.

- To separate items in a list if some items in the list have commas within them. In other words, **semicolons are used instead of commas if commas would be confusing**.  
Example: Dr Benaud is a French researcher; however, he lives in Antarctica.
- Size (Springer, 2017): “Large” and “small” are generally used to express variations or changes in size, dimensions, or mass. “High” and “low” are usually used to express levels or numerical values. “Large” and “small” are often mistakenly used where “high” and “low” would be better.

I have completed the quiz of <https://www.springer.com/gb/authors-editors/authorandreviewertutorials/writinginenglish/quiz> and received 88% of the quiz, that is, I answered 7 out of 8 correctly.

This is a good article recommended by Springer to me on 16 October 2017. I have downloaded it.

Gopen, George D and Swan, Judith A “The Science of Scientific Writing” American Scientist Nov-Dec 1990: 550–558 <http://www.or.org/files/Gropen,%20Science%20Writing.pdf>

Remarks: The Purdue Online Writing Lab is a fantastic writing resource and has many more examples of how to make your writing concise. [Purdue Online Writing Lab](http://www.purdue.edu/owl).

## 23 Ethics of Academic Publishing

Updated by 07 11 17.

Many Academics Are Eager to Publish in Worthless Journals published in New York Times: Science (Kolataoct , 2017), it reports that there are many predatory journals for the demands of academics. In fact, there are a website for recording predatory journals now.

## 24 Research Analytics: Index Tools

A collection of our books is indexed by the Book Citation Index in the Web of Science™ Core Collection (BKCI). BKCI is a part of Web of Science Core Collection (WoSCC) together with SCI Expanded, SSCI, AHCI and other databases. Web of Science is the world’s leading citation index with multidisciplinary content from the top tier international and regional journals, conference proceedings, and books. We are working on expanding BKCI's coverage of our titles, so expect this list to be updated with new additions on a regular basis. Titles currently indexed in BKCI are available here. -

## 25 Research Tools

1. <http://www.researchgate.net/>
2. <http://www.academia.edu/>

## 26 FAQ

Updated on 190917,

### 26.1 Evidence of Research

What you have done for the research, what is your research questions, how can you solve the questions, what is your research results.

判断论文质量水平的重要标准是----

论文在国际国内书刊的引用率。

你写了没人看，没人与时俱进你的观点证明你的观点缺乏创新，影响力不行。

数学化，到计算机化，再到智能化，这是贵民于 **2018 July mentioned**。

## 26.2 Development of the Argument / Discussion

How can you develop your research, for example, system analysis, design and coding are a kind of development here. You should have your own methodology to develop your research through Argument / Discussion

## 26.3 Presentation

For assignment, have you realized "looks good, all good"? have you used template, citation, referencing, figure, tables, mathematical equations, etc.

Advice: Learning by reading

## 27 References:

### 28

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<http://www.sccur.uci.edu/sampleabstracts.html>

## 29 References:

[3]. Berkeley, HOW TO WRITE AN ABSTRACT: Links and Tips  
<http://research.berkeley.edu/ucday/abstract.html>

[4]. Philip Koopman (1997), Carnegie Mellon University  
<http://www.ece.cmu.edu/~koopman/essays/abstract.html>

<http://www.sccur.uci.edu/sampleabstracts.html>

## 30 Diary

2018-3-15, I published How to face rejection of a submitted paper to a journal? At RG.