

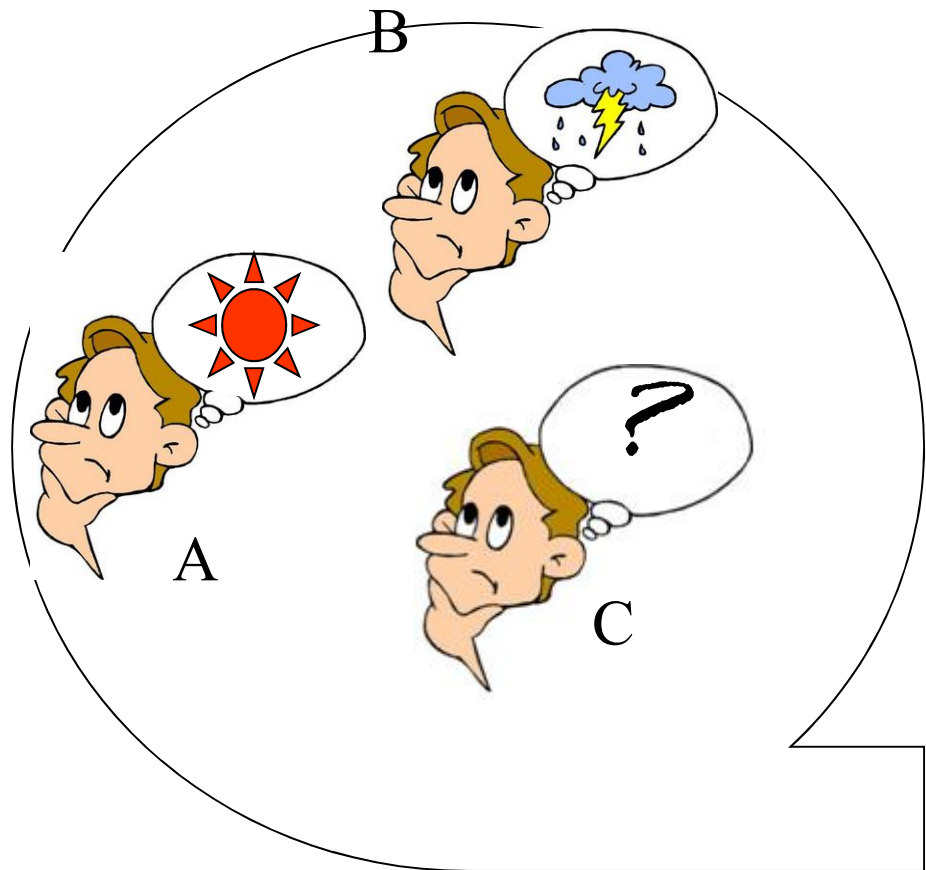
Graduation Projects US and THEM



Scientific Method for Science Projects

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<http://www.nsf.ac.lk/spd/srpc/Scientific%20Method.ppt>



Beliefs

Biases

Perceptions



We all see
the world
differently

Truth



non truth

There are five steps to the scientific method

- Identify a problem.
- Research the problem.
- Formulate a hypothesis.
- Conduct an experiment.
- Reach a conclusion.



problem ??? pen torch
doesn't work

You think back to the last time your pen torch didn't work, and you remember that it was because of worn-out batteries.

You guess that worn-out batteries is the reason this time as well

So you get some new batteries from the drawer next to your bed and replace the ones in your pen torch.

Oh! pen torch works.

finished the great book !



you're faced with the problem of not being able to read because your pen torch doesn't work, and you're not happy about it.

Identify a problem.

You think back to the last time your pen torch didn't work, and you remember that it was because of worn-out batteries.

Research the problem.

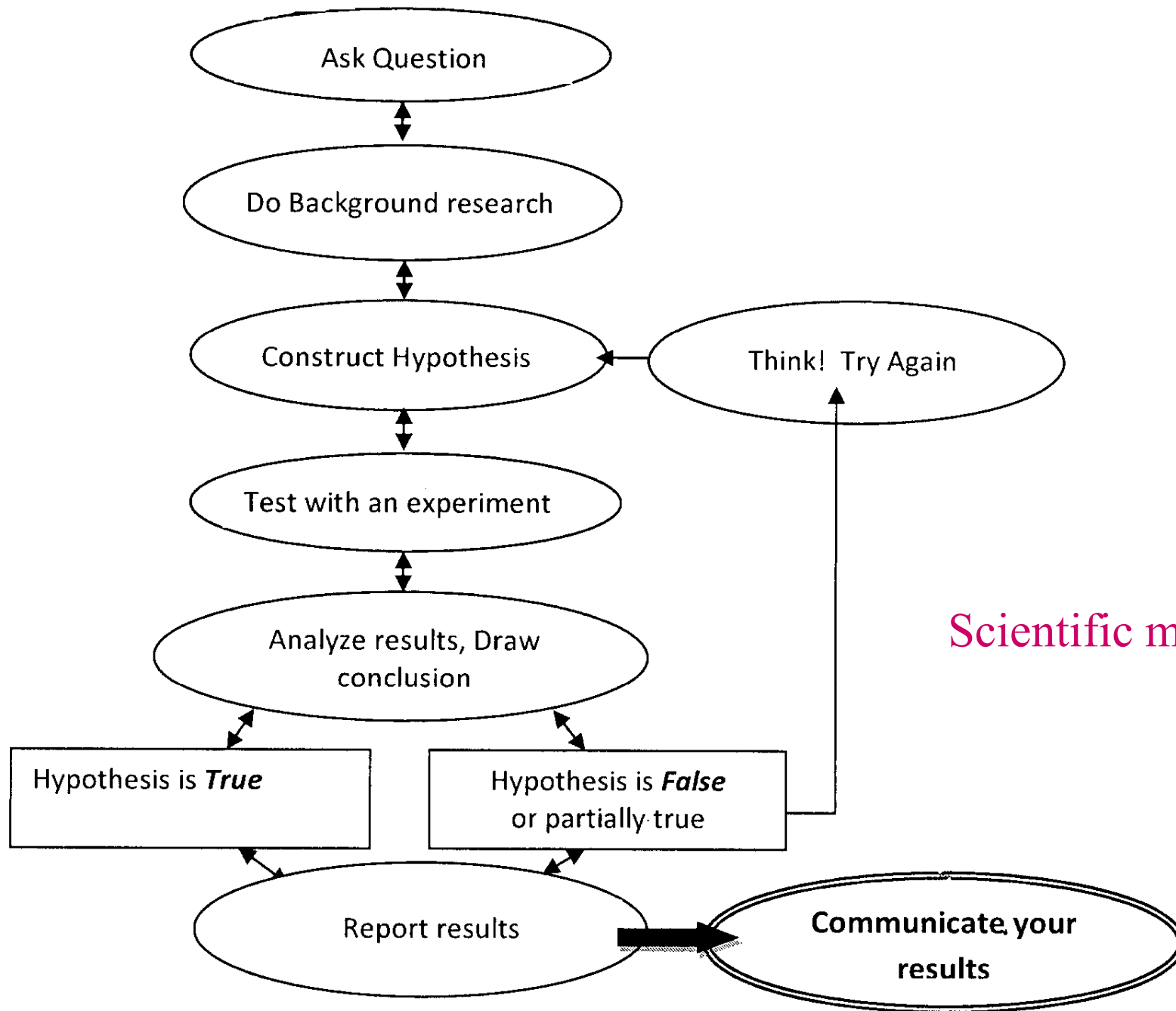
You guess that worn-out batteries is the reason your pen torch isn't working now, so you get some new batteries from the drawer next to your bed and replace the ones in your pen torch.

Formulate a hypothesis.

Conduct an experiment.

Oh! Your pen torch works.

Reach a conclusion.



Scientific method

Ideas to Avoid

- Any topic that boils down to a simple **preference**
 - experiments don't involve the kinds of **numerical measurements** (Compare OpenCv to MATLAB)
- Topic with large scale over Graduation Project
Which is the best framework for web development.
- Any topic that requires people to recall things they did in the past.
 - The data tends to be **unreliable** or **outdated**

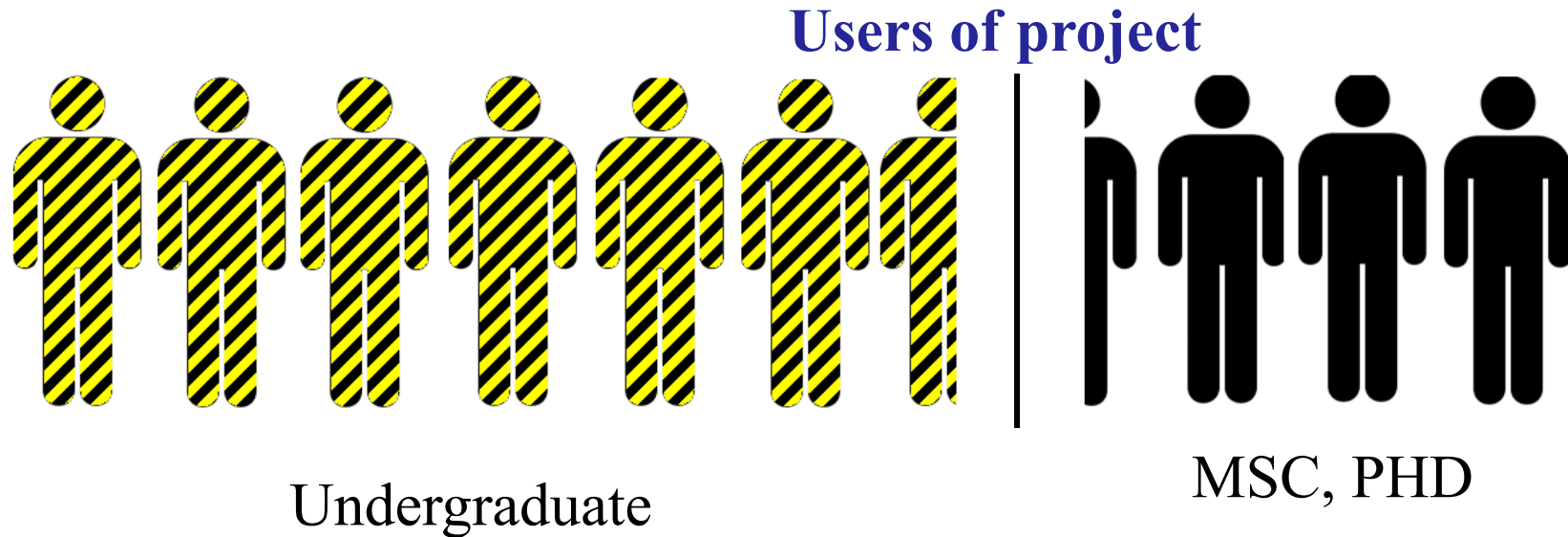
Ideas to Avoid

- Repeated Ideas:
 - Using figure gestures to translate sign language.
- Difficult to measure Projects
 - Effect of music or talking on plants
- Obvious Results
 - Using HAARCASCADE for face detection gives accuracy of 95%
- Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.

What Makes a Good Science Fair Project Question?	For a Good Science Fair Project Question, You Should Answer "Yes" to Every Question
Is the topic interesting enough to read about ? (Some hot topics within last 5 years)	Yes / No
<p>Can you find at least 3 sources of written information on the subject?</p> <p>IEEE http://ieeexplore.ieee.org/Xplore/home.jsp ACM http://dl.acm.org/ Springer http://www.springer.com/gp/ Elsevier https://www.elsevier.com/journals/title/a</p>	Yes / No
Can you measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etc.?	Yes / No
Can you design a "fair test" to answer your question? In other words, can you change only one factor (variable) at a time, and control other factors that might influence your experiment, so that they do not interfere?	Yes / No
Is your experiment safe to perform?	Yes / No
Do you have all the materials and equipment you need for your science project, or will you be able to obtain them quickly and at a very low cost?	Yes / No
Do you have enough time to do your experiment more than once before the science project closing date?	Yes / No

Starting Graduation Project

- Good Impact Project



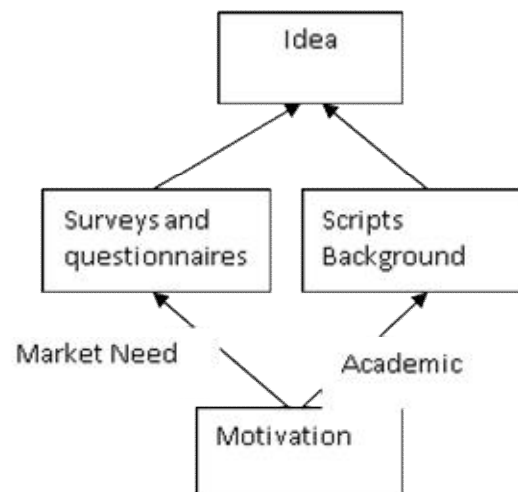
A good undergraduate project must have a wide range of users

Motivation - Market

- A **real company** request to solve it's problem (Rare case, depends on strong relationships in Egypt)
- A **real problem** all people face direct and clear like (Water shortage, electricity control, Car accidents, GAS smuggling)
- A **questionnaire** fire the motivation of the idea either statistically from organization (FDA, معهد الإحصاء) or done by students.

Academic Motivation

- Challenges that was not yet covered in some papers.
- Future work of some paper.
- Algorithms, or techniques that can fire ideas.



Academic Motivation - References

What Makes a Good Reference?

For a Good Reference, You Should Answer
"Yes" to Every Question

Does your reference come from a credible source? **ACM... avoid (..... Authors not publishing in credible sources)** Yes / No

Is your reference current? **10 years max** Yes / No

Is your reference objectively written, not **biased** towards one point of view? Yes / No

Is your reference free of **errors**? Yes / No

Does your reference properly **cite** its original sources? **plagiarism** Yes / No

Is the reference easy for other people to find or obtain?
<https://web.facebook.com/groups/freepapers/> Yes / No

Related Work and Problem statement

- Students must show some recent and **very close** related work.
- Related work always fire **many** challenges.
- We must **focus** on 1 or 2 challenges no more.

AVOID THE BIG MOUTH

- Ex. We solve education problem of EGYPT

System Overview

What Makes a Good Hypothesis?

For a Good Hypothesis, You
Should Answer "Yes" to Every
Question

Is the hypothesis based on information contained in the Research Proposal?

Yes / No

Does the hypothesis include the independent and dependent variables?

Yes / No

Have you worded the hypothesis clearly so that it can be **tested** in an experiment?

Yes / No

Project Contribution

- What is difficult in this project from CS point of view?
- What are the technical difficulty to be written
- Distinguish between class project and GP.

Algorithm

Methodology

Technique

Architecture

Experiments – The Forgettable Task

- IT IS NOT AN **OPTION** FOR GP
- If we have **no experiments** then simply we have **no contribution**.
- Experiment scenario must be done first at small population then **discussed** then generalized.

Abstract

The main idea of this project is to study the

1 Introduction

1.1 Background

Please start from very big domain for your problem then focus on some area inside this domain that match your interest.

1.2 Motivation

Discuss as much as market needs and academic needs for your project. It is expected that in this section you will get about 10 15 general technical CS challenges. Use surveys for showing the market need of your project.

1.3 Problem Definitions

Please put a focus on 1 2 challenges that this project aims to solve and state them very clear as your formal problem statement.

2 Project Description

Show down with a figure the proposed system.

2.1 Objective

Why this system is to be developed.

2.2 Scope

The scope of your project.

2.3 Project Overview

Some extra details for your system implementations.

3 Similar System Information

List down at least 10 papers from ACM and IEEE for similar work experience in the domain of your problem. You can add 5 papers or more from other sources (Springer, Elsevier, Website ..etc)

Be sure that each paper you list include the following points

1. Motivation of this work (Why the researchers do it)
2. The main problem statement of the work.
3. How the researchers contributed to solve the problem
4. What main results the researchers reach.
5. How do you think this paper you read is important for you.

3.1 Similar System Description

A system proposed by Rehm at al. [2] has been developed to ... Also the work was discussed in [[3],[1]].

3.2 Comparison with Proposed Project

3.3 Screen Shots from previous systems (if needed)

4 Project Management and Deliverables

4.1 Tasks and Time Plan

Use some software for primitive plan of your project.

4.2 Budget and Resource Costs

4.3 Supportive Documents

You can put here documents you collect for your project from customers or survey results.

Conclusions

Avoid again the big mouth

We solve the education problem in
Egypt !!!!