

Graduation Projects

US and THEM

Starting GP

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<http://www.hciegypt.com/ayman/graduation-projects/>



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Scientific method for research project

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

1
July 2018

Why this Lecture



HR Manager
Question for
next 5 years



What GP idea I should
do?

Good GP Team

- 4 ~ 5 members:
 - 2 Library developers (The algorithm Man)
KNN, ANN, CNN, RNN
 - 1 Core member (Team leader) void main
 - 1 GUI (Form programming) not **Photoshop**
 - 1 ----- ????



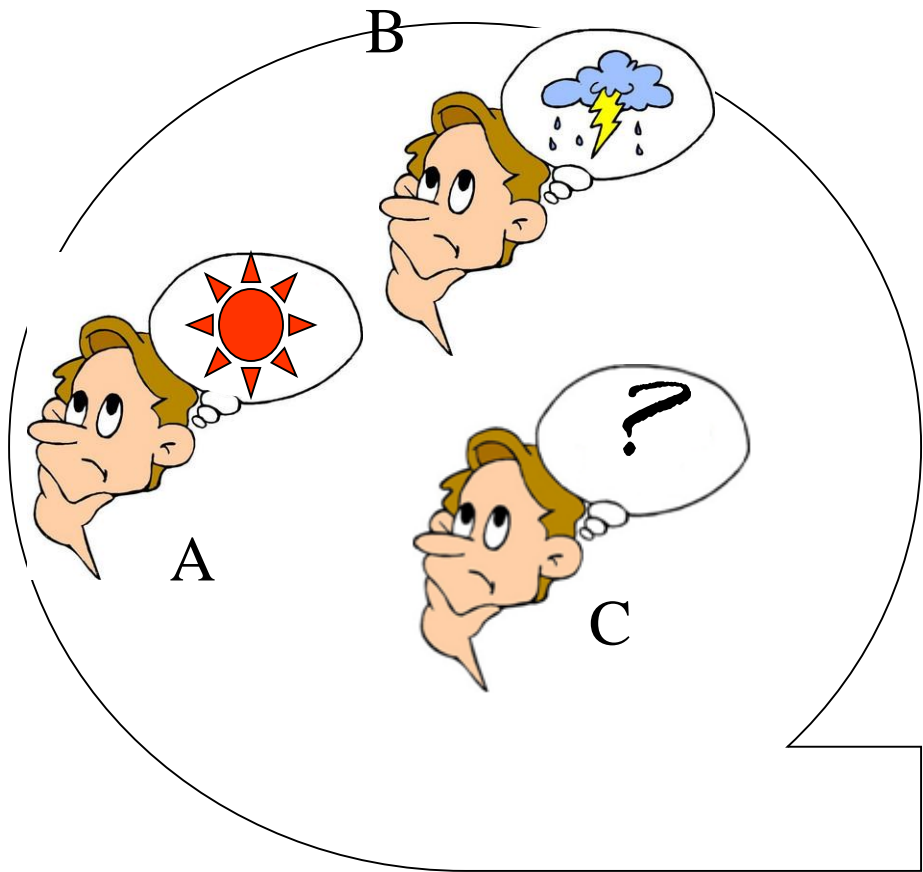
Hard workers



Mixed Groups



Friends



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.



6
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.



Oh! Your pen torch works.

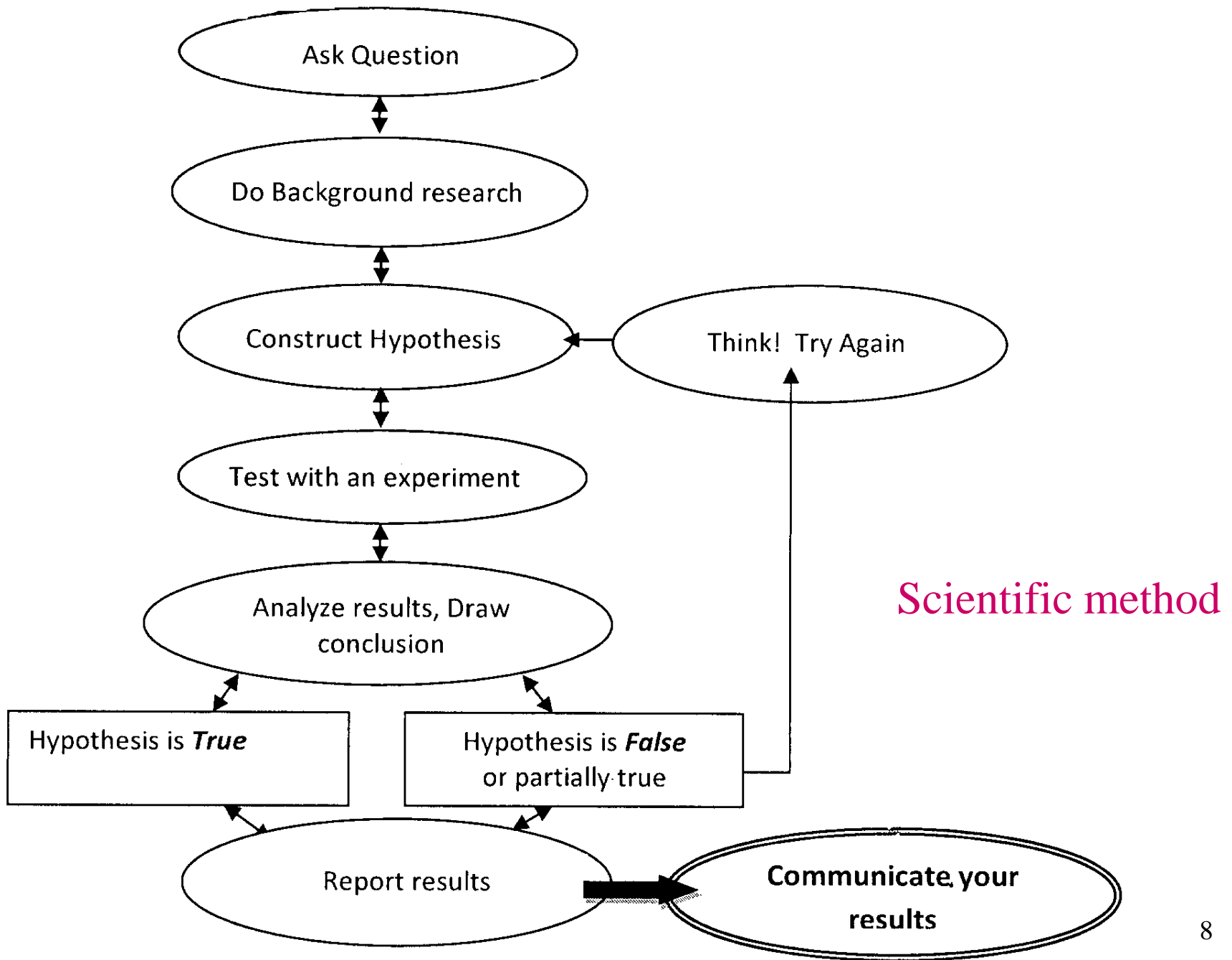
Conduct an experiment.



Oh! Your pen torch works.

Reach a conclusion.





Science Project Topics to Avoid

Any topic that boils down to a simple **preference** or taste comparison. For example, "Which tastes better: Coke or Pepsi?"

Most consumer product testing of the "Which is best?" type. This includes comparisons of popcorn, bubblegum, make-up, detergents, cleaning products, and paper towels.

Any topic that requires people to recall things they did in the past.

Why

Such experiments don't involve the kinds of **numerical measurements** we want in a science fair project. They are more of a survey than an experiment.

These projects only have scientific validity if the Investigator fully understands the science behind why the product works and applies that understanding to the experiment. The science behind them is often at the **level of a graduate student in college.**

The data tends to be **unreliable.**

Science Project Topics to Avoid

Why

Effect of colored light on plants

Several people do this project at almost every science fair. You can be more creative!

Using figure gestures to translate sign language

Effect of music or talking on plants

Difficult to measure.

Effect of running, music, video games, or almost anything on blood pressure

The result is either obvious (the heart beats faster when you run) or difficult to measure with proper controls (the effect of music).

Effect of color on memory, emotion, mood, taste, strength, etc.

Highly subjective and difficult to measure.

Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.

Without measurement, you can't do science.

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</p> <p>ACM http://dl.acm.org/</p> <p>Springer http://www.springer.com/gp/</p> <p>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



UIST2017

30th ACM User Interface Software and Technology Symposium

CFP

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Schedule

Attending

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WELCOME The ACM Symposium on User Interface Software and Technology (UIST) is the premier forum for innovations in Human-Computer Interfaces. Sponsored by ACM Special Interest Groups on Computer-Human Interaction (SIGCHI) and Computer Graphics (SIGGRAPH), UIST brings together people from diverse areas including graphical & web user interfaces, tangible & ubiquitous computing, virtual & augmented reality, multimedia, new input & output devices, and CSCW. The intimate size and intensive program make UIST an ideal opportunity to exchange research results and ideas. Join us in Quebec City!



CHI 2018

Engage with CHI

Montréal, Canada • April 21-26

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guide2research.com/topconf/human-computer-interaction

Guide2Research

Top Conferences for Human Computer Interaction

Ranking is based on *Conference H5-index* = 12 provided by Google Scholar Metrics

Show Due only

Hindex	Publisher	Conference Details
1	158	CVPR : IEEE Conference on Computer Vision and Pattern Recognition, CVPR Jun 18, 2018 - Jun 18, 2018 - Salt Lake City , United States http://cvpr2018.thecvf.com/submission/timeline
3	98	ECCV : European Conference on Computer Vision Sep 8, 2018 - Sep 14, 2018 - Munich , Germany https://eccv2018.org/
5	89	ICCV : IEEE International Conference on Computer Vision Jan 30, 2018 - Jan 31, 2018 - Istanbul , Turkey http://waset.org/conference/2018/01/istanbul/ICCV

Welcome to CHI 2018

Palais des Congrès de Montréal

CHI 2018 Teaser



Montréal, Canada

April 21-26
chi2018.acm.org

The ACM CHI Conference on Human Factors in Computing Systems is the premier international conference of Human-Computer Interaction. For first-

News

24th April 2018
Breaking news! CHI est dans la press: [comment combattre les incessantes distractions au bureau?](#)
 (How to fight the incessant distractions at the office).

21st April 2018
 Registration has closed.

19th April 2018
 Long flight? Download the papers and extended abstracts video previews to watch offline on the plane.

11th April 2018
 Planning your trip to Montréal?

Starting Graduation Project

- Good Impact Project

Users of project



Undergraduate

MSC, PHD

A good undergraduate project must have a wide range of users

Motivation – Market 1/2

- A **real company** request to solve it's problem (Rare case, depends on strong relationships in Egypt)



Stanford 2018:

<https://cs210.github.io/fair-guide/>

Motivation 2/3

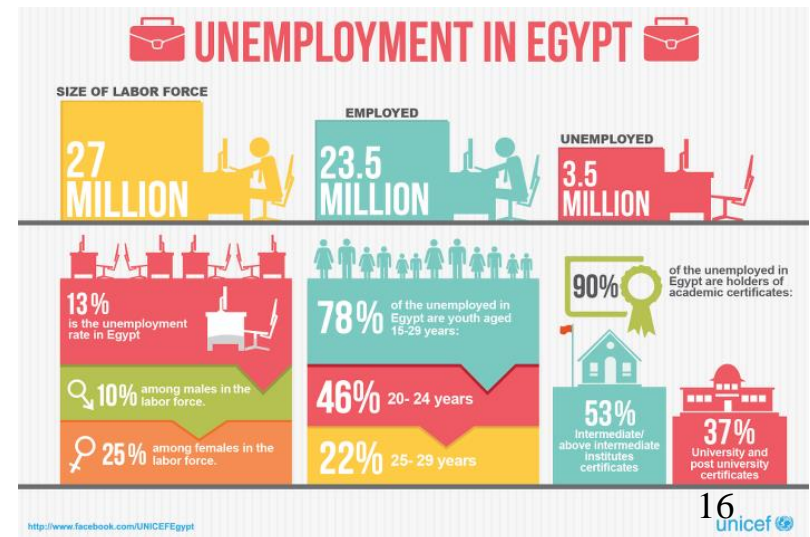
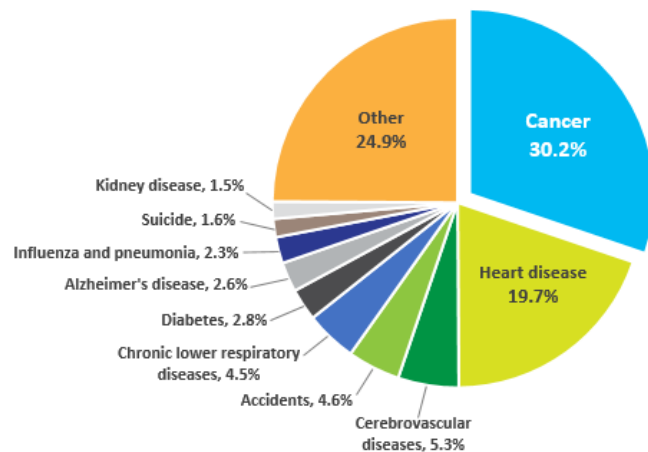
- A **real problem** all people face direct and clear like (Water shortage, electricity control, Car accidents, GAS smuggling)



Motivation 3/3

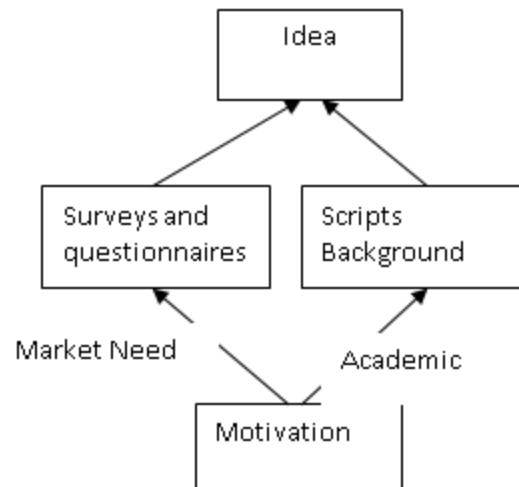
- A **questionnaire** fire the motivation of the idea either statistically from organization (FDA, Unicef(معهد الاحصاء) or done by students.

Proportion of deaths due to cancer and other causes, Canada, 2012



Academic Motivation 1/2

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



Academic Motivation 2/2

TRing: Instant and Customizable Interactions with Objects Using an Embedded Magnet and a Finger-Worn Device

Sang Ho Yoon, Yunbo Zhang, Ke Huo, Karthik Ramani
School of Mechanical Engineering, Purdue University
West Lafayette, IN 47907, USA
{yoon87, zhan2014, khuo, ramani}@purdue.edu

CONCLUSION

We have proposed an instant and customizable interaction mechanism through a finger-worn device. Employing a magnetic sensing technique with a particle filter, we obtain 3D fingertip tracking around the magnet. To this extent, we bring interactivity to objects by simply embedding a magnet. Through evaluations, we have verified system accuracy (8.6 mm in 3D space) as well as user performance (button: 92% accuracy, cursor control: 91% accuracy). We also showcase our approach of making various objects interactive with high customization flexibility. **We believe that our work will benefit novice interaction designers as well as general users who want to quickly implement a personalized physical interface without deeper knowledge of electronic components.**

HandMark Menus: Rapid Command Selection and Large Command Sets on Multi-Touch Displays

Md. Sami Uddin¹, Carl Gutwin¹, and Benjamin Lafreniere²
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Saskatoon, Canada
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²Autodesk Research
Toronto, Canada

Our work shows that the hands, and people's intimate knowledge of them, are an under-used resource for interaction. We demonstrate that hand-centric interfaces are feasible, can be faster than standard techniques, and are preferred by users. **Techniques using hands as landmarks can improve the performance and usability of interfaces for tables and other multi-touch systems.**

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? **SciHub facebook free papers**

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.

What Makes a Good Experimental Procedure?

**For a Good Experimental Procedure,
You Should Answer "Yes" to Every
Question**

Have you included a description and size for all experimental and control groups?

Yes / No

Have you included a step-by-step list of all procedures?

Yes / No

Have you described how to change independent variable and how to measure that change?

Yes / No

Have you explained how to measure the resulting change in the dependent variable or variables?

Yes / No

Have you explained how the controlled variables will be maintained at a constant value?

Yes / No

Have you specified how many times you intend to repeat the experiment (should be at least three times), and is that number of repetitions sufficient to give you reliable data?

Yes / No

The ultimate test: Can another individual duplicate the experiment based on the experimental procedure you have written?

Yes / No

What Makes a Good Science Experiment?

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

Did you take detailed notes about your observations and record them in your laboratory notebook?

Yes / No

Did you collect your data using a data table?

Yes / No

Were you consistent, careful, and accurate when you made your measurements?

Yes / No

Were you careful to insure that your controlled variables remained constant so as not to affect your results?

Yes / No

If you ran into any unexpected problems, did you adjust your experimental procedure accordingly?

Yes / No

Data analysis

What Makes for a Good Data Analysis Chart?

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

Is there sufficient data to know whether your hypothesis is correct?

Yes / No

Is your data accurate?

Yes / No

Does your chart specify units of measurement for all data?

Yes / No

Have you verified that all calculations (if any) are correct?

Yes / No

What Makes for a Good Graph?

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

Have you selected the appropriate graph type for the data you are displaying?

Yes / No

Does your graph have a title?

Yes / No

Have you placed the independent variable on the x-axis and the dependent variable on the y-axis?

Yes / No

Have you labeled the axes correctly and specified the units of measurement?

Yes / No

Does your graph have the proper scale (the appropriate high and low values on the axes)?

Yes / No

Is your data plotted correctly and clearly?

Yes / No

Conclusions

Avoid again the big mouse

We solve the education problem in
Egypt !!!!

What Makes for Good Conclusions?

For Good Conclusions, You Should Answer "Yes" to Every Question

Do you summarize your results and use it to support the findings?

Yes / No

Do your conclusions state that you proved or disproved your hypothesis?

Yes / No

If appropriate, do you state the relationship between the independent and dependent variable?

Yes / No

Do you summarize and evaluate your experimental procedure, making comments about its success and effectiveness?

Yes / No

Do you suggest changes in the experimental procedure and/or possibilities for further study?

Yes / No

Competitions and Fund

1. Imagine Cup: <https://imagine.microsoft.com/en-us/egypt>
2. Tiec Incubation: <http://www.tiec.gov.eg/en-us/Departments/Incubation/Pages/default.aspx>
3. Valeo: <https://valeoinnovationchallenge.valeo.com/en/challenges/innovationchallenge2018>
4. Startup Reactor: <http://mailchi.mp/6f8747b74a43/innoventures-startup-reactor-call-for-applications?e=%5BUNIQID%5D>
5. NBD Emirates Bank : <http://www.emiratesnbd.com.eg/egypt-en/future-intelligence-program/>
6. EgyptIoT: <http://www.egyptiotchallenge.com/>
7. Cairo Invent: <http://www.asrt.sci.eg/>
8. BELL Labs Priza : <https://www.bell-labs.com/prize/?tw2>
9. GESR: <https://gesr.net/smartkartoon/>
10. Alecsoapps Prize: http://award.alecsoapps.com/?utm_source=newsletter_58&utm_medium=email&utm_campaign=2017
11. IEEE Global Student Challenge: http://news.computer.org/ef1/preview_campaign.php?lf1=1031641659e222316078222f62499361
12. Orange Social: <https://www.orange.eg/en/about/company-overview/social-responsibility/social-venture-competition>
13. Made in EGYPT <http://www.miecompetition.org/news/january-2017/mie12-registration-is-now-open/>
14. ITWORX : <http://www.itworx.com/itworx-students/graduation-projects-competition/>
15. Injaz Egypt: <http://injaz-egypt.org/start-up-egypt/>
16. Innovate Egypt : <http://www.egyptinnovate.com/innovation-awards>
17. Samsun Entaleq: <http://cairoict.com/entaleq/>
- 18. Academy of Scientific Research & Technology (ASRT): <http://submission.asrt.sci.eg>**
19. General Electric with TIEC: <http://www.geniuslink.com/EGYPT>
20. DELL-EMC <http://middle-east.emc.com/campaign/emea/envisionthefuture/index.htm>
21. Vodafone : <http://www.vodafone.com.eg/vodafoneportalWeb/en/P29200172621441710339415>
22. Qatar 22 Challenge: <http://www.sc.qa/en/opportunities/challenge-22/how-it-works> open until 12 December
23. ITIDA GP support (10,000 LE) <http://www.itida.gov.eg/EN/OURPROGRAMS/RESEARCHINNOVATION/ITACADEMIACOLLABORATION/Pages/Graduat>
24. Microsoft ATL Fund (not regular) <http://research.microsoft.com/apps/catalog/default.aspx?p=1&sb=no&ps=25&t=events&sf=&s=&r=81481&vr=>
25. Young Innovation Award https://www.facebook.com/yiaprogram?_rdr=p&fref=ts&ref=br_tf
26. Egyptian Engineering DAY
27. INJAZ EGYPT <https://www.facebook.com/InjazEgypt?fref=ts>
28. ITAC <http://www.itida.gov.eg/En/OurPrograms/ResearchInnovation/ITAcademiaCollaboration/Pages/default.aspx>
29. Nahdet Elmahroosa <http://www.nahdetelmahrousa.org/apply>

Appendix

Variables

A variable is any factor, trait, or condition that can exist in differing amounts or types.

1.Independent

2.Dependent

3.Controlled

The **independent variable** is the one that is changed by the scientist. As the scientist changes the independent variable, he or she **observes** what happens.

The scientist focuses his or her observations on the **dependent variable** to see how it responds to the change made to the independent variable.

Experiments also have **controlled variables**. Controlled variables are quantities that a scientist wants to remain constant, and he must observe them as carefully as the dependent variables.

Question	Independent Variable (What I change)	Dependent Variables (What I observe)	Controlled Variables (What I keep the same)
Does an electric motor turn faster if you increase the voltage?	Voltage of the electricity measured in volts	Speed of rotation measured in revolutions per minute (RPMs)	Same motor for every test

Question	Independent Variable (What I change)	Dependent Variables (What I observe)	Controlled Variables (What I keep the same)
How much water flows through a faucet at different openings?	Water faucet opening (closed, half open, fully open)	Amount of water flowing measured in liters per minute	<ul style="list-style-type: none"> •The Faucet •Water pressure, or how much the water is "pushing"

Question	Independent Variable (What I change)	Dependent Variables (What I observe)	Controlled Variables (What I keep the same)
Does heating a cup of water allow it to dissolve more sugar?	Temperature of the water measured in degrees Centigrade	Amount of sugar that dissolves completely measured in grams	Stirring Type of sugar

Question	Independent Variable (What I change)	Dependent Variables (What I observe)	Controlled Variables (What I keep the same)
Does fertilizer make a plant grow bigger?	Amount of fertilizer measured in grams	Growth of the plant 1.measured by its height 2.measured by the number of leaves 3.more ways to measure plant growth	Same size pot for each plant Same type of plant in each pot Same type and amount of soil in each pot Same amount of water and light Make measurements of growth for each plant at the same time

What Makes for Good Variables?

For Good Variables, You Should Answer "Yes" to Every Question

Is the independent variable measurable?

Yes / No

Can you change the independent variable during the experiment?

Yes / No

Have you identified all relevant dependent variables, and are they all caused by and dependent on the independent variable?

Yes / No

Are all dependent variable(s) measurable?

Yes / No

Have you identified all relevant controlled variables?

Yes / No

Can all controlled variables be held at a steady value during the experiment?

Yes / No