

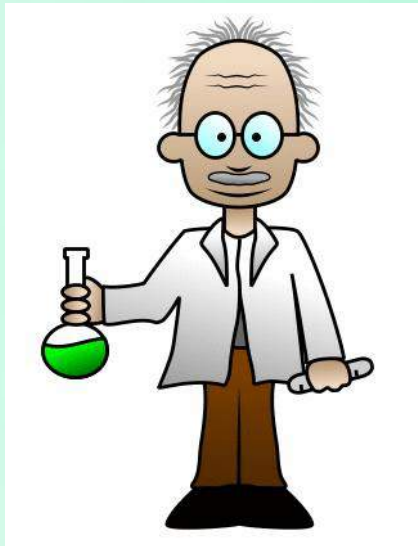
Research Ethics

Why & How?

If the **ax is dull** and its edge unsharpened, **more strength** is needed **but skill will bring success.**

- A wise king

Researcher – What comes to your mind?



Research could be fun!



What?

Process of Steps Used to Collect & Analyze Information to
Increase Our Understanding of a Topic or Issue

1. Pose a Question
2. Collect Data to Answer the Question
3. Present an Answer to the Q

- Creswell, J. W. (2008)

Why?

1. Electronic Cooling

Mobiles, PC

2. AC – Power Consumption

3. CFD - Aero

Bird flies, Fish swims

4. Sensors

Skin, High Temperature

Relations?

Relations

1. How best can I help mankind?
2. Optimize to reach the everyone!

How?

Fundamentals are important

Core subjects –

Self Discipline

Set goals & Accomplish

Regular Discussion with Supervisor

You cannot underestimate his/her experience

Research Ethics?

Lectures of Leonard V. Interrante, Editor-in-chief, Chemistry of Materials, Presented in the Symposium on Scientific Publishing, ACS National Meeting, Atlanta, GA March 2006.

On Being a Scientist: Third Edition, Committee on Science, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine.

<http://www.nap.edu/catalog/12192.html>

Where do we learn Ethics?

Parents

Family

Friends

Mentor

Religious beliefs

Discussions in labs...

Courses dealing with ethical issues



Why bother about Ethics?

You are entrusted by somebody

Somebody is going to trust your results

Fabrication?

**Making up data/results
& recording/reporting them**

Falsification?

**Manipulating research materials,
equipment, changing or omitting**

Plagiarism?

**Using ideas or words of another person
without giving appropriate credit.**



What are the reasons of Plagiarism?



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Soon or Later?

... ethical violations get exposed.

A Chemist... has been found guilty of plagiarizing and/or falsifying more than 70 research papers published in a wide variety of Western scientific journals between 2004 and 2007, according to documents from his university, copies of which were obtained by C&EN.

Some journal editors left reeling by the incident say it is one of the most spectacular and outrageous cases of scientific fraud they have ever seen.

-Science & Technology, Vol. 86 (07), 2008.

Integral part of Graduate Research!

Research Ethics is an integral part of graduate research.

- Proper Citation
- Report your Genuine work

How?

- Look for a real Problem (Lit.)
- See how you can solve it
- Remember the time-frame
- Have fun in solving
- Ask enough basic questions
- Do it as group

You are Rich!

Research is Exciting **But** Future Needs **Your** Intervention

He is no fool who gives what he cannot keep to
gain that which he cannot lose.

- Jim Elliot