

Lesson 1: What is Research?

Scientific and Engineering Research Methods

Definition

What is Research?

Research is a process for obtaining knowledge on a particular topic

It could be something that is well established, but is unknown to you
(Informal research)

It could be a brand new discovery;
something no one knew before
(Formal research)

Informal or Everyday Research

Gathering knowledge to make informed decisions

Buying a car

Choosing a hotel for a vacation stay

Picking a cell phone plan

Learning how to perform a task

Setting up a home wireless network

Staining furniture

Determining how to edit a picture

Need not follow any particular rules or procedures; although that would be helpful

Do whatever works for you

However, following a structured process will give better results

Read Customer or Expert Reviews

The image displays two overlapping screenshots related to the Samsung Galaxy S4. The background screenshot is from Tech Radar, showing an expert review titled "Samsung Galaxy S4 review" by Gareth Beavis, dated June 6th. The review discusses the phone's features and includes a "tech radar RECOMMENDED" badge. The foreground screenshot is from Amazon.com, showing customer reviews for the "Samsung Galaxy S IV/S4 GT-I9500 Factory Unlocked Phone - International Version (Black Mist)".

Amazon.com: Customer Reviews: Samsung Galaxy S IV/S4 GT-I9500 Factory Unlocked Phone - International Version (Black Mist)

99 Reviews

5 star:	(48)
4 star:	(19)
3 star:	(7)
2 star:	(3)
1 star:	(22)

Average Customer Review: ★★★★★ (99 customer reviews)

Share your thoughts with other customers

Create your own review

Questions? Get fast answers from reviewers

What do you want to know about this product?

See all 145 questions & their answers

Ask

The most helpful favorable review

102 of 115 people found the following review helpful

★★★★★ **Awesome phone, incremental upgrade from SIII**

Galaxy S4 is an incredible phone. I have been using this unlocked S4 for past 2 days helping a friend to migrate from iPhone 4S. My friend has been on iPhone and it also gave me a unique perspective. I used iPhone for couple of years and been using Android for past 3+ years.

I have used Galaxy S3, Note II and for me S4 is more like a S3s :) If you have a...

[Read the full review](#)

Published 2 months ago by rpv

> See more [5 star](#), [4 star](#) reviews

The most helpful critical review

6 of 8 people found the following review helpful

★★★☆☆ **Not a Verizon compatible Phone**

Just wanted it be clear here this is not a Verizon Phone and will not work on there network, I know when you type Verizon Unlocked S4 it brings you here, but this phone will not work on Verizon.

Published 10 days ago by R. Salas

> See more [3 star](#), [2 star](#), [1 star](#) reviews

Ask Someone Who Knows

Depending
on what
you want
to know,
you can

- Ask a friend
- Ask a salesperson
- Call a product's support number or go to their website (Support/FAQs)
- Ask a teacher
- Read a book

Formal Research

- Used when seeking to create new knowledge or to design a new or improved product or service
- One needs to follow a formal process or methodology
- Methods differ depending on the area
 - A historian will use methods very different from a scientist or engineer
 - We will learn about formal *scientific* research

Formal Scientific Research

Applies to areas of Science, Technology, Engineering, and Mathematics (STEM)

- Examples: Cancer, Climatology, Green energy, Diabetes, Smartphones, Transportation, Data Mining

Must follow a formal research process or methodology such as:

- The Scientific Method
 - Used in areas of science which often involve experimentation
- The Engineering Design Process
 - Used when designing and building a product or service

Following the process is at least as important as the end results

- Helps achieve results more efficiently
- Helps validate the results you get
- Allows others to repeat what you did (so they can improve on your work)
- Allows you to protect your work (patents, recognition)

Formal Scientific Research (cont.)

- Makes use of well established experimental, mathematical, statistical, or engineering techniques as appropriate
- Is well documented
 - Keep a project notebook
 - Write a research paper
 - Give oral presentations

What is *Good* Research?

Good Research

- Is in an important area
- Uses appropriate scientific and mathematical techniques
- Achieves useful or interesting results
- Can be defended as valid and correct
- Is complete within the given scope
- Points to applications or next steps

Main Points

- Formal research must follow a formal process or methodology
- For projects in PACE, follow either the *Scientific Method* or the *Engineering Design Process*
- Following a formal process has several benefits: it is efficient, it helps validate results, it is repeatable, it demonstrates you are responsible for the results
- In addition to using a formal process, good research tackles important questions, is thorough, and uses appropriate techniques to achieve correct and valid results