ITP500

Disain Riset

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Disain Riset

"If you don't have the time to do it right, you must have the time to do it over."

- Author unknown

Disain Riset

- Disain riset bisa berubah
  - Studi (pustaka), diskusi, konsultasi, evaluasi hasil, dll
  - "pembuktian", verifikasi, validasi argumentasi, dll
  - penemuan baru
  - dll

Disain Riset

- Disain yang baik :

  menyajikan data yang baik sehingga memudahkan kesimpulan dengan menyakinkan
  - ·····> Fakta/data yang dapat dipercaya dan diverifikasi.
  - ·····> Data primer atau pun data sekunder:

    data statistik, demonstrasi, testimonials, kejadian, or pameran.

Disain Riset → *Anatomi*

- Latar belakang : ide/topik/batasan?
- Tujuan dan ukuran keberhasilan (*what is the objective and what constitutes success*)?
- Metodologi : bagaimana melakukannya (*how to proceed*)?
- bagaimana mengetahui bahwa riset telah berjalan dengan baik ~ hasil yang ingin dicapai (*expected results : how to measure progress*)
- *Wrap up* : Signifikansi?

1 LATAR BELAKANG

Ide/topik dan batasan kegiatan riset

- Ide/topik riset ~ interest periset.
  - *Nothing will keep you going in doing research more than research topic you are passionate about*.
- Belajar dari pengalaman : studi pustaka.
  - *Many "big bosses in the field" have accomplished a great deal and they've completely screwed up. They've had deep insights and they've been unbelievably blind. They've been heroes and cowards. And all of this at the same time.*
  - *What's wrong with them*.
  - basis pustaka yang lemah : topik terlalu lebar, terlalu luas, terlalu kecil, dan *nobody will be able to understand it*.

1 LATAR BELAKANG
Ide/topik dan batasan kegiatan riset

- Batasan kegiatan riset :
  cut your idea down to a solvable size while keeping it big enough to be interesting.
- Jawab pertanyaan
  (i) *what's the thesis of your research*?'
  (ii) *what are you trying to show/do/accomplish*?
- *If you don't know where you are going, people won't take you seriously, and, worse, you'll end up wandering around in circles*.

1 LATAR BELAKANG
Ide/topik dan batasan kegiatan riset

IDE/TOPIK RISET :

- Paling sulit dan penting dalam riset
- Topik atau ide yang baik :
  - menunjukkan visi periset
  - menunjukkan konsultasi intens dengan literatur mutakhir.
  - memudahkan penyusunan batasan riset

2 TUJUAN

~ ukuran keberhasilan

•Kapan riset tersebut selesai?

•Topik riset :

- •memberikan gambaran tentang akhir dari riset yang berhasil.
- •perlu ukuran keberhasilan

3 Metodologi:

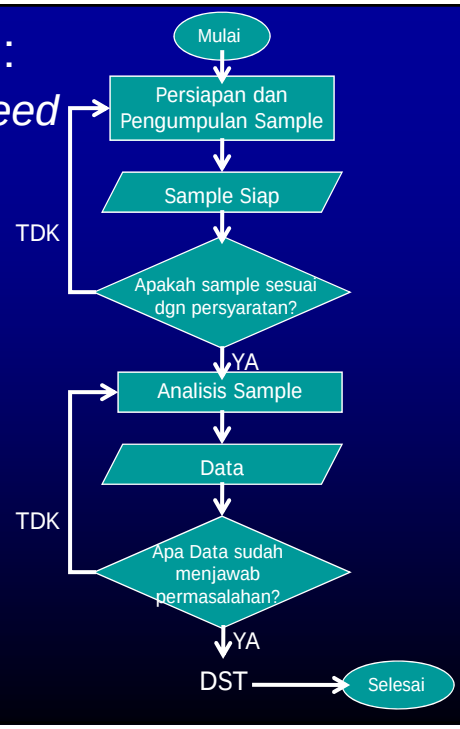
how to proceed

- HOW? → Kenali tujuan dengan baik
  - ·····> faktor yang mempengaruhi (pencapaian) tujuan
  - ·····> alternatif pencapaian tujuan
  - ·····> biaya, ketersediaan bahan, dll
  - ·····> plan A, plan B

3 Metodologi: *how to proceed*

- Tata cara melakukan
  ·····> untuk mencapai tujuan
- Buat ***Flow Chart***

3 Metodologi: *how to proceed*

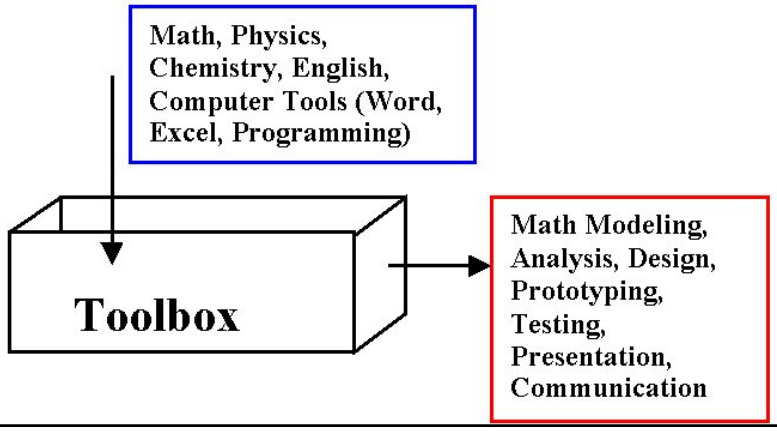


3 Metodologi:
how to proceed

- *Experimental design : teknis*
- Prasyarat :
  - kuasai bidang riset : "physical/chemical/biological phenomena behind the idea/topic"
  - unsur terpenting : logika dan teori

3 Metodologi:
how to proceed

- *Experimental design : teknis*
- Prasyarat :



3 Metodologi: *how to proceed*

- *Experimental design : teknis*
- Prasyarat :
  - Contoh : "*minimal experimental design*" yang diperlukan, dll.
- "*garbage in garbage out*".
  - *I have one good news and one bad news. The good news is that statistical analysis in now easy to perform. The bad news is that statistical analysis in now easy to perform* (Sastroasmoro, 2000)

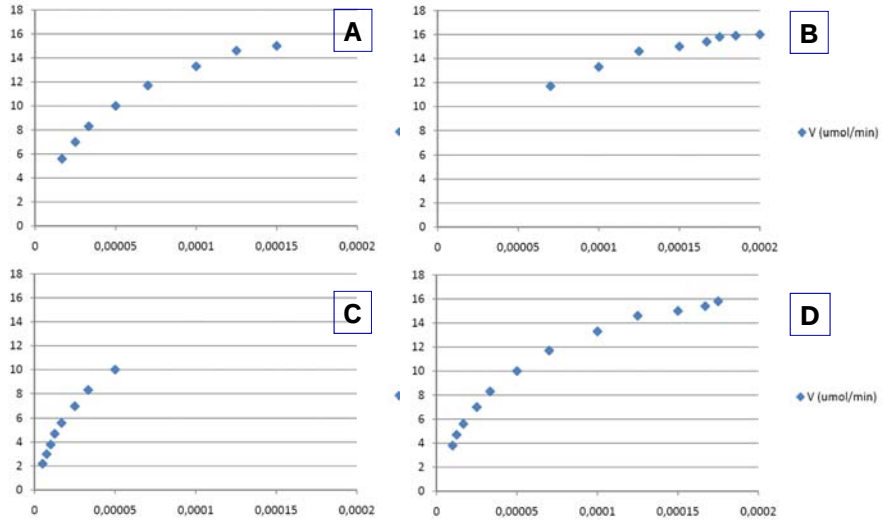
3 Metodologi: *how to proceed*

Minimal Experimental Design?

- hati-hati dengan transformasi data
- hati-hati dengan ekstrapolasi
- hati-hati dengan “minimum set of data” yang diperlukan :
- Hati-hati dengan *well established model* :
  - kinetika,
  - reologi,
  - dll

3 Metodologi:

how to proceed → *biasakan untuk memetakan (plotting) data*



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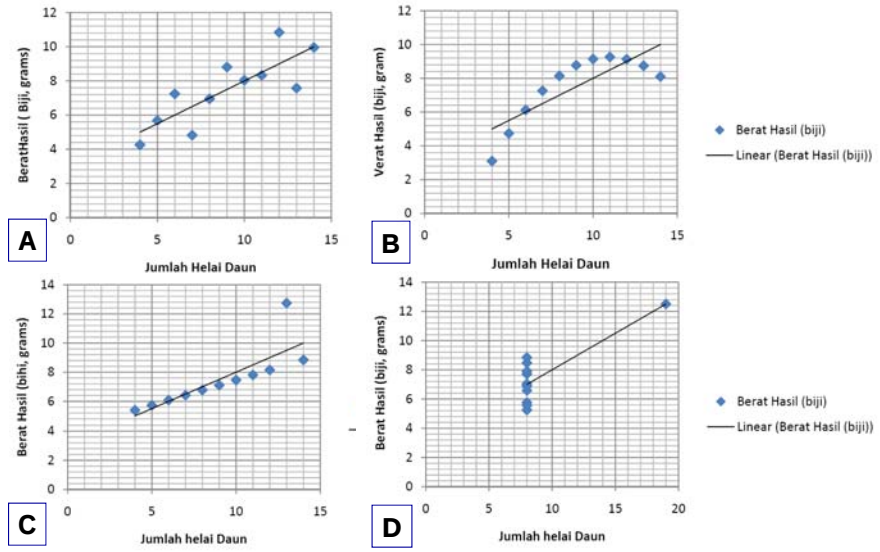
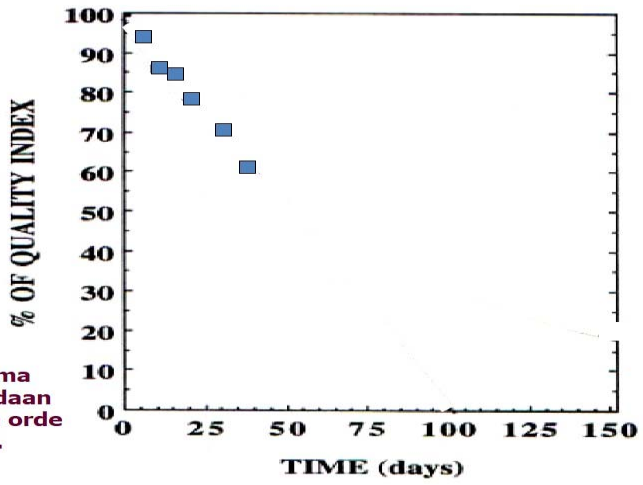


3 Metodologi:
how to proceed → *Korelasi???*

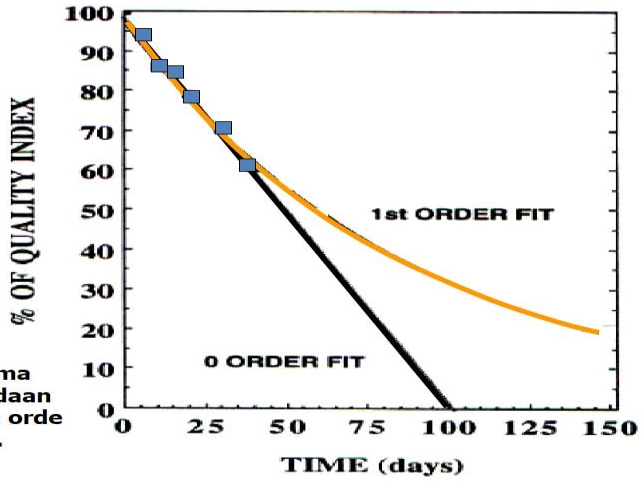
Orde Nol Atau Orde Pertama??



Penurunan mutu selama penyimpanan : Perbedaan antara model kinetika orde nol dan orde pertama.

3 Metodologi:
how to proceed → *Korelasi???*

Orde Nol Atau Orde Pertama??



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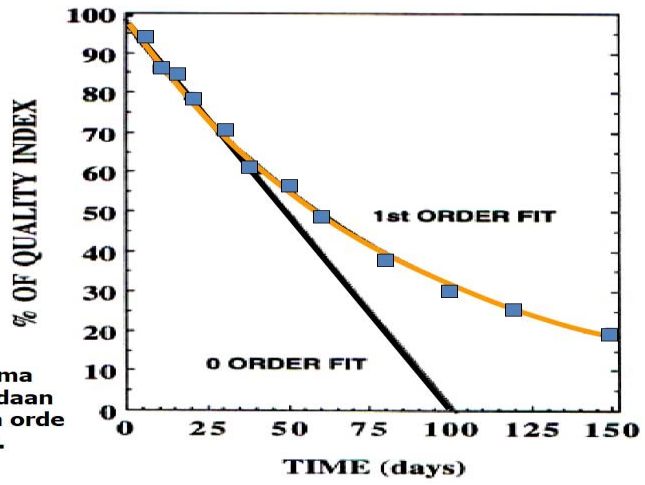

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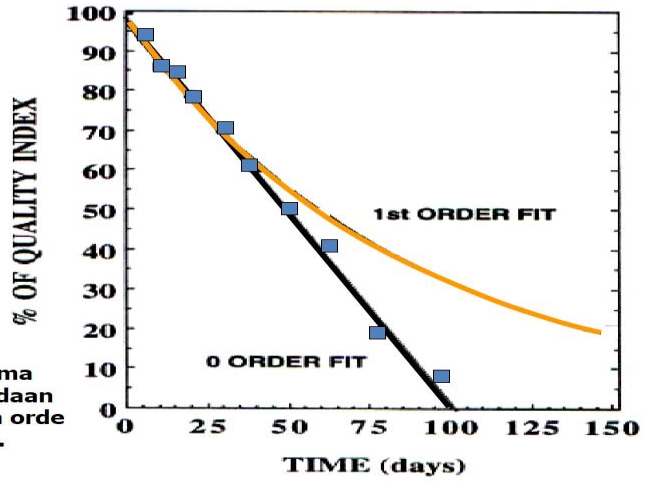

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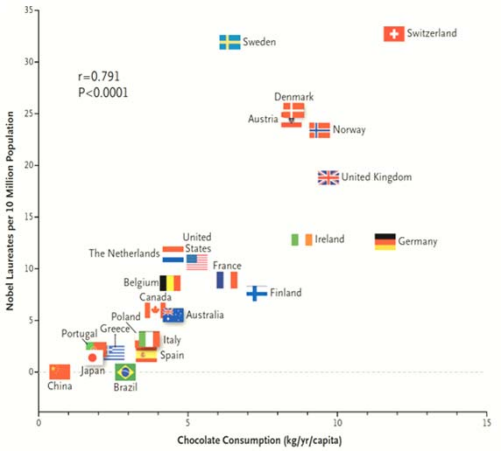
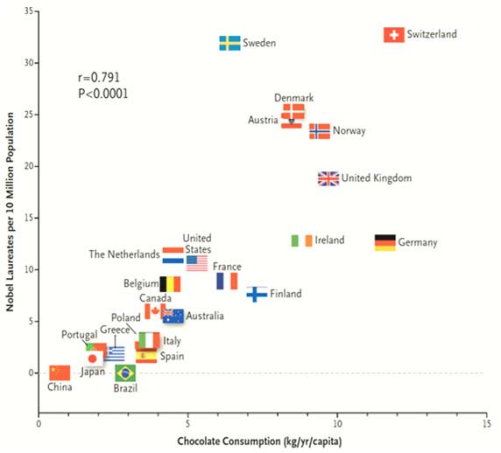


Figure 1. Correlation between Countries' Annual Per Capita Chocolate Consumption and the Number of Nobel Laureates per 10 Million Population.

Messerli, F.H. 2012. Chocolate Consumption, Cognitive Function, and Nobel Laureates. The New England Journal of Medicine. October 18, 2012

3 Metodologi:
how to proceed → *Korelasi???*



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DISCUSSION

The principal finding of this study is a surprisingly powerful correlation between chocolate intake per capita and the number of Nobel laureates in various countries. Of course, a correlation between X and Y does not prove causation but indicates that either X influences Y, Y influences X, or X and Y are influenced by a common underlying mechanism. However, since chocolate consumption has been documented to improve cognitive function, it seems most likely that in a dose-dependent way, chocolate intake provides the abundant fertile ground needed for the sprouting of Nobel laureates. Obviously, these findings are hypothesis-generating only and will have to be tested in a prospective, randomized trial.

3 Metodologi: *how to proceed*

→ *Error Bars ???/SD??*

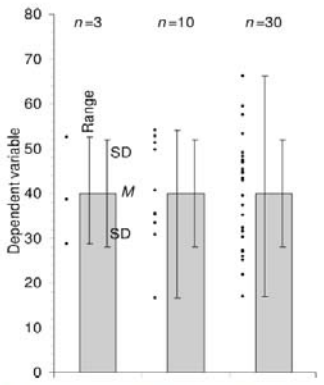

Figure 1. **Descriptive error bars.** Means with error bars for three cases: $n = 3$, $n = 10$, and $n = 30$. The small black dots are data points, and the column denotes the data mean M. The bars on the left of each column show range, and the bars on the right show standard deviation (SD). M and SD are the same for every case, but notice how much the range increases with n. Note also that although the range error bars encompass all of the experimental results, they do not necessarily cover all the results that could possibly occur. SD error bars include about two thirds of the sample, and 2 x SD error bars would encompass roughly 95% of the sample.

SD of your results will tend to more and

3 Metodologi: *how to proceed* → *Error Bars ???*

Messerli, F.H. 2012. Chocolate Consumption, Cognitive Function, and Nobel Laureates. The New England Journal of Medicine. October 18, 2012

Table I. **Common error bars**

Error bar	Type	Description	Formula
Range	Descriptive	Amount of spread between the extremes of the data	Highest data point minus the lowest
Standard deviation (SD)	Descriptive	Typical or (roughly speaking) average difference between the data points and their mean	$SD = \sqrt{\frac{\sum (X - M)^2}{n - 1}}$
Standard error (SE)	Inferential	A measure of how variable the mean will be, if you repeat the whole study many times	$SE = SD/\sqrt{n}$
Confidence interval (CI), usually 95% CI	Inferential	A range of values you can be 95% confident contains the true mean	$M \pm t_{(n-1)} \times SE$, where $t_{(n-1)}$ is a critical value of t. If n is 10 or more, the 95% CI is approximately $M \pm 2 \times SE$.

4 How to measure progress?

- tujuan riset telah tercapai?
  - Kualitatif
  - kuantitatif : will it works and how much it will cost
- Tool analisis dan pengambilan kesimpulan
  - anova?
  - regresi ?
  - survei?
  - interview?
  - skoring?
  - pengamatan?
  - Dll

5 SIGNIFIKANSI

- So what?
- Jawab dengan baik
  - menyakinkan reviewer/pembaca
    - tunjukkan → *"you really know what you are doing"*
  - memberikan motivasi periset itu sendiri.
- Jika perlu:

  nyatakan signifikansi secara kuantitatif (risk/benefit analysis, $, dll).

SUMMARY

Ingat : Anatomi Disain Riset

- Latar belakang?
- Tujuan?
- Metodologi?
- Hasil yang ingin dicapai (*expected results*)
- Signifikansi?

Satu kesatuan yang utuh

Akhirnya……
selamat melakukan riset
(dengan BAIK)