

Selecting a Research Design

Dr. Hanan A. Ezzat
Nursing Administration & Education
Dept.

What is the research design?

Researcher's overall
plan for answering
the *research*
questions

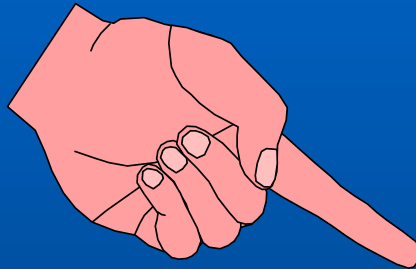
or

testing the *research*
hypotheses



Why to decide a research design??

**Decide
on**



- *What to do?*
- *When to do it?*
- *Where to do it?*
- *How to do it?*
- *Who will do it?*
- *The sequence of doing the steps.*

Remember

- ***Descriptive and correlational*** researches examine the variables ***as they exist*** in natural environment and ***do not include any manipulation.***
- ***Experimental*** researches examine ***cause and effect***, i.e.; differences in the dependent variable (D.V.) that are thought to be caused by the independent one (I.V.).

Types of research design:

- The experimental research design.
- Quasi-experimental research design.
- The non-experimental research design.

I. The experimental designs:

It is a research design in which the researcher ***manipulates*** the ***independent variable*** and measures the variations in the ***dependent variable*** accordingly.

Here, researcher is an ***active agent***.

Characteristics of experimental design:

- *Manipulation.*
- *Control.*
- *Randomization.*

Characteristics of experimental design:

- ***Manipulation.***
Researcher intentionally varies the independent variable and observes the effect of that manipulation on the dependent variable.
- ***Control.***
- ***Randomization.***



Characteristics of experimental design:

- ***Manipulation.***

- ***Control.***

Holding constant possible influences on the dependent variable (D.V.) under investigation. Such control is usually acquired by manipulation, use of control group, careful preparation of the research plan.

- ***Randomization.***



Characteristics of experimental design:

- ***Manipulation.***

- ***Control.***

- ***Randomization.***

The choice of study subjects as well as their assignment to groups randomly

Methods of randomization include:

- Flip a coin.
- Use of random table.
- Use of computers.

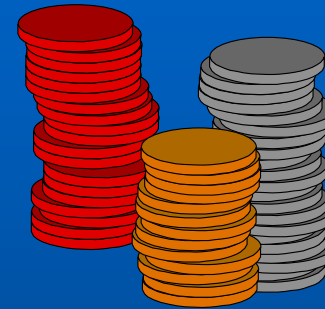
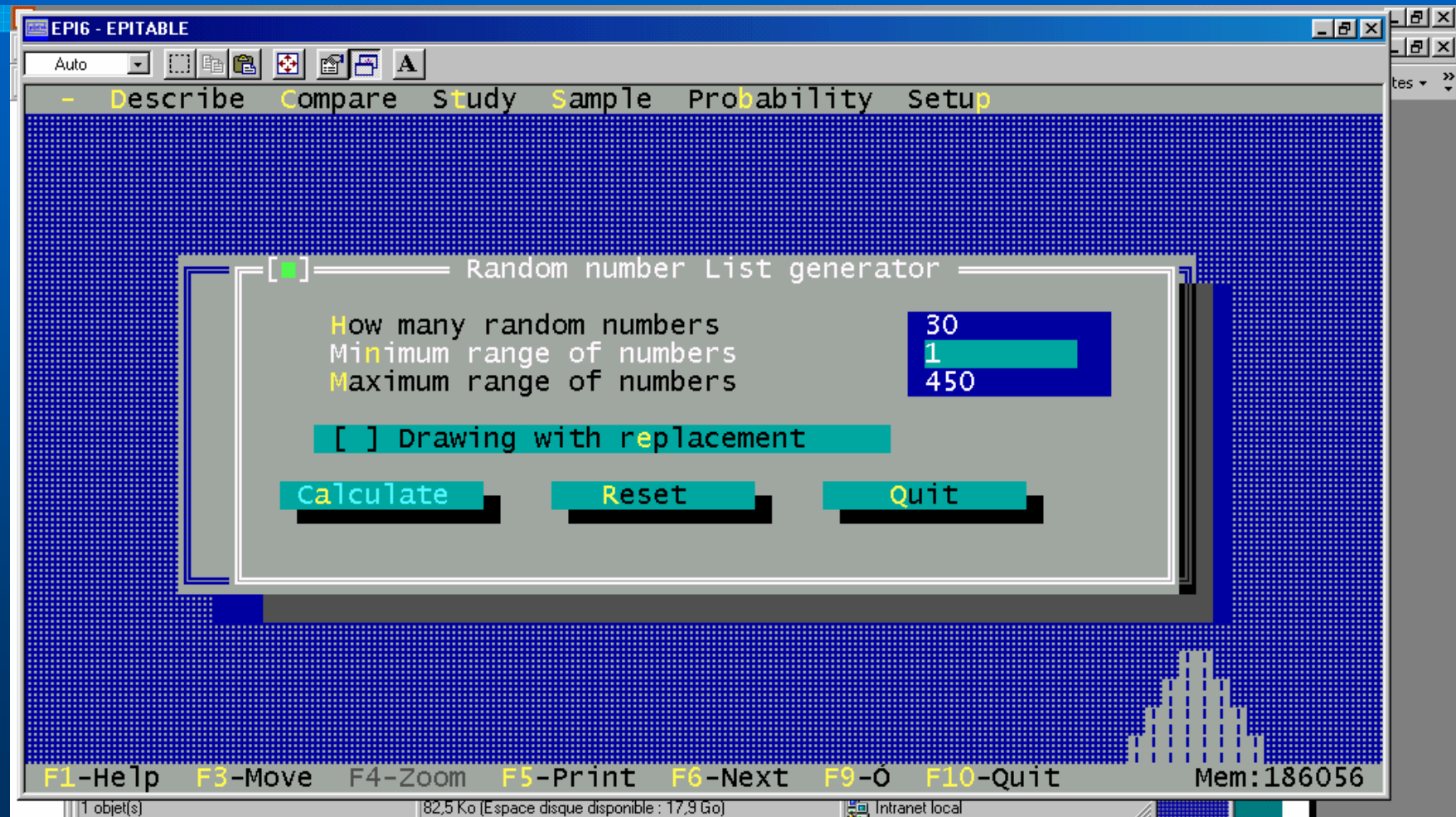


Table of random numbers

57172	42088	70098	11333	26902	29959	43909	49607
33883	87680	28923	15659	09839	45817	89405	70743
77950	67344	10609	87119	15859	74577	42791	75889
11607	11596	01796	24498	17009	67119	00614	49529
56149	55678	38169	47228	49931	94303	67448	31286
80719	65101	77729	83949	83358	75230	56624	27549
93809	19505	82000	79068	45552	86776	48980	56684
40950	86216	48161	17646	24164	35513	94057	51834
12182	59744	65695	83710	41125	14291	74773	66391
13382	48076	73151	48724	35670	38453	63154	58116
38629	94576	48859	75654	17152	66516	78796	73099
60728	32063	12431	23898	23683	10853	04038	75246
01881	99856	46747	08846	01331	88163	74462	14551
23094	29831	95387	23917	07421	97869	88092	72201
15243	<u>21100</u>	48125	05243	16181	39641	36970	99522
53501	58431	68149	25405	23463	49168	02048	31522
07698	24181	01161	01527	17046	31460	91507	16050
22921	25930	79579	43488	13211	71120	91715	49881
68127	<u>00501</u>	37484	99278	28751	80855	02035	10910
55309	<u>10713</u>	36439	65660	72554	77021	46279	22705
92034	<u>90892</u>	69853	06175	61221	76825	18239	47687
50612	84077	41387	54107	09190	74305	68196	75634
81415	98504	32168	17822	49946	37545	47201	85224
38461	44528	30953	08633	08049	68698	08759	45611
07556	24587	88753	71626	64864	54986	38964	83534
60557	50031	75829	05622	30237	77795	41870	26300



EPITABLE: random number listing



EPITABLE: random number listing

The screenshot shows the EPITABLE software interface. At the top, there is a menu bar with options: Describe, Compare, Study, Sample, Probability, and Setup. Below the menu bar, a window titled "Random number List generator" is open. This window has two input fields: "How many random numbers" with the value 30, and "Minimum range of numbers" with the value 1. Below these fields, a list of 30 random numbers is displayed in a grid format. The numbers are arranged in 6 rows and 5 columns. The first row contains: 7, 8, 18, 20, 24, 42. The second row contains: 60, 91, 120, 134, 163, 222. The third row contains: 240, 268, 290, 301, 303, 352. The fourth row contains: 368, 376, 379, 381, 395, 411. The fifth row contains: 413, 415, 421, 424, 425, 450. The sixth row contains a hyphen (-). The interface also features a menu bar with "Files", "Edit", and "Search" options. At the bottom of the window, there is a status bar with keyboard shortcuts: F1-Help, F3-Move, F4-Zoom, F5-Print, F6-Next, F9-O, F10-Quit, and Mem:184912.

How many random numbers	Minimum range of numbers
30	1

7	8	18	20	24	42
60	91	120	134	163	222
240	268	290	301	303	352
368	376	379	381	395	411
413	415	421	424	425	450
-					

Also possible in Excel

Advantages of experimental design

- The most powerful design to test ***hypotheses*** of cause-and-effect relationships.
- Its controlling properties provide for greater ***corroboration*** than any other design.

Disadvantages of experimental design:

- A number of interesting variables simply are ***not suitable to manipulation.***
- There are many variables that could ***technically*** (but not ethically) be manipulated.



II. Quasi-experimental designs

Research design that searches for *knowledge* and *examination of causality* in situations in which complete control is *not* possible.

- It *lacks* at least *one or two* characteristics of the true experiment research design, mainly *randomization, and/or control group*, but *never manipulation.*

Types of quasi-experimental research:

- *One-group post test design.*
- *One-group pre & post-test design*
- *Time-Series design*

One-group post test design

Here, the researcher, for example wants to introduce a new teaching approach to his students. He goes on and uses this approach, then evaluates the effect of this (X) new approach on students' achievement (y) at the end of the course.

- D.V. ----- students' achievement (y).
- I.V. ----- new approach (X).
- Sample: ----- one group only, *an experimental group.*

One-group post test design

Disadvantages:

- Weak research as it has ***no measure of change as a result of manipulation (X)***, because there was ***no pretest*** before the introduction of (X).
- There is ***no comparison with another group to avoid the doubt*** of having a change (if present) due to either: ***maturation or time***, and not as a result of exposure to (X).



One-group pre & post-test design

- Same as the one-group post-test design, **except** that a **pretest is performed before the manipulation**, i.e. the introduction of the (X) new teaching approach.
- **Better**, as it measures **changes after manipulation** through the **comparison** between the pre-test and the post-test.
- Lacks **comparison with another group** who is not manipulated (i.e., control group) because the change may be due to maturation, time factor, or other extraneous variable.



Time-Series design

- One-group design, i.e., without a control group. But, it is **better** as it includes a method of overcoming the **lack of the control group**.
- The collection of data, is **done 2 to 3 times before and after manipulation**. That is, data is collected over an extended time period, and (X) is introduced during the course of data collection.
- The **repeated** data collection of the dependent variable (y) controls most of the extraneous variables which may be maturation and/or time factor. Therefore, the effect of the independent variable is more **justifiable** now.

Example of a time-series design

- **Study the effect of a low-impact aerobic exercise program on fatigue and aerobic fitness among people with rheumatoid arthritis.**
- **Here, the researchers obtained measures of their outcome variables before the intervention, at mid-treatment (after 6 weeks of exercise), at the end of treatment (12 weeks of exercise), and at a 15-week follow-up.**

Advantages of quasi-experimental research design

Practical design.

In nursing, it is sometimes not feasible to conduct true experiments (because we deal mainly with human beings).

Disadvantages

- **Difficult to make a cause-and-effect inference as easily as the researcher can do with experiments.**
- **There are alternative explanations for the observed results.**

ANY
QUESTIONS

???

