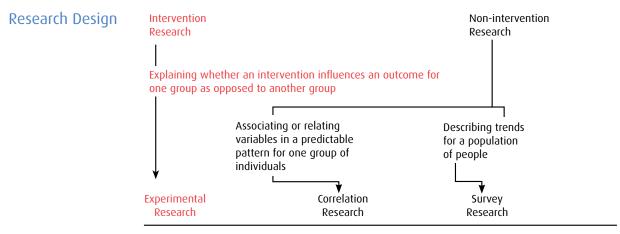




Quantitative Research in Medical Education

Key Terminology from the Literature

Independent variable	\rightarrow	Cause or treatment
Dependent variable	\rightarrow	Outcome, post-test, change being measured ('dependent' on independent)
Significance level	\rightarrow	Conventional level, p<.05
Power	\rightarrow	Conventional use, 80%
Effect size	\rightarrow	Difference between groups
Sampling error	\rightarrow	Difference between data from sample and data from target population
Sample bias	\rightarrow	Can occur if data is not representative of target population
Confidence level	\rightarrow	Conventional use, 95%
Confidence interval	\rightarrow	Margin of error for results
Validity	\rightarrow	Instrument measures what it is supposed to measure
Reliability	\rightarrow	Consistency of measurement outcomes



Intervention Research

1.

Design	Characteristics	Examples*	
Experimental	 Cause & effect relationship between inde- pendent and dependent variables 	Pretest-posttest control group design	O X1 O O X2 O
	 Two groups: (1) Experimental; (2) Control 	Post-test only control group design	X1 O
	 Key factors: (1) Control; (2) Manipulation; (3) Randomization 		
Quasi-Experimental	No randomization	Control group pretest-postt <mark>est desig</mark> n	O X1 O
			O X2 O
		Time series design O	<u>0 0 X 0 0 0 </u>

Design	Characteristics	Examples*	
Pre-experimental	 One or multiple groups are observed after an intervention presumed to cause change No randomization 	One-group pretest-posttest design One-shot case study Static group comparison	O X O X O X1 O X2 O

*X or X1 = Intervention, X2 = Control, O = Test, Pretest or Posttest

Non-Intervention Research

Design	Characteristics
Survey Research	Self-report data
Correlational	 Determine whether, and to what degree, a relationship exists between two or more quantifiable variables When you can't manipulate an independent variable and have no control, but still want to do a comparison
Cross-Sectional	Collect data at one point in time or over a short period
Longitudinal	Data collected at multiple points in time

2. Sampling & Sample Size

- Sample representative of target population
- Probability sampling (random sampling)
- Non-probability sampling (convenience sampling, purposive sampling)
- Depends on design, population, intervention, etc.

4. Managing Data

- Considerations:
 - Time
 - Resources
 - Expertise
- Paper-based vs. electronic
- Data storage and security

Key Pearls

- Start small
- Use the literature
- Use FoM or MUN resources statistician, etc.
- Don't get caught up in statistics and significance – want results to make a substantial contribution to the field

Sampling & Sample Size

Survey

3.

- Design your own instrument, i.e. pre/ post-test
- Utilize existing and validated instruments
- Utilize previously collected data
- (i.e. NBME, other assessments, disease statistics, etc.)

Survey Design

Literature Review

- Other questionnaires, validated instruments, knowledge about topic
- Mixed methods
 - Interviews, focus groups, etc. to support content development
- Develop items
- Expert validation
- Pilot testing
- Consider validity, reliability

5. Analyzing Data

Descriptive statistics	Frequencies, central tendency, standard deviation
Parametric	Assumes data is normally distributed
Non-parametric	No assumptions
Key factors	 Type of scale # of variables

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