

Scientific Writing Session 3

KES FSS MUNI
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evropský
sociální
fond v ČR



EVROPSKÁ UNIE



MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY









OP Vzdělávání
pro konkurenceschopnost



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Reminder: 6 hats

COLOURED HAT	THINK OF	DETAILED DESCRIPTION
	<i>White paper</i>	The white hat is about data and information. It is used to record information that is currently available and to identify further information that may be needed.
	<i>Fire and warmth</i>	The red hat is associated with feelings, intuition, and emotion. The red hat allows people to put forward feelings without justification or prejudice.
	<i>Sunshine</i>	The yellow hat is for a positive view of things. It looks for benefits in a situation. This hat encourages a positive view even in people who are always critical.
	<i>A stern judge</i>	The black hat relates to caution. It is used for critical judgement. Sometimes it is easy to overuse the black hat.
	<i>Vegetation and rich growth</i>	The green hat is for creative thinking and generating new ideas. This is your creative thinking cap.
	<i>The sky and overview</i>	The blue hat is about process control. It is used for thinking about thinking. The blue hat asks for summaries, conclusions and decisions.

Determining research question

- ▶ **Feasible:**
 - ▶ Adequate number of subjects
 - ▶ Adequate technical expertise
 - ▶ Affordable in time and money
 - ▶ Manageable in scope
- ▶ **Interesting:** Getting the answer intrigues investigator, peers and community
- ▶ **Novel:** Confirms, refutes or extends previous findings
- ▶ **Ethical:** Amenable to a study that institutional review board will approve
- ▶ **Relevant:**
 - ▶ To scientific knowledge
 - ▶ To clinical, societal, technological policy/applications
 - ▶ To future research

Determining research question: guiding questions

- ▶ What is the research question?
- ▶ What exactly do you mean by ...?
- ▶ Who has already studied this question? What did they find?
- ▶ Where is the boundary between known and unknown in this area? Where is the knowledge gap?
- ▶ How could ... be determined/measured? Which methods can be used? How they differ? What are their limitations?
- ▶ How can the answer distilled from the data? How will I analyze it?

Team activity: abstract preparation/presentation

15 min Status update, improvements

10 min Summarization of current research design, writing a paper abstract

20 min Presentation and feedback

Searching for evidence

- ▶ looking for information sources
 - ▶ databases (ISI, google(scholar), EBSCO, Scopus,...)
 - ▶ reference software (jabref, endnote, zotero, citeulike)

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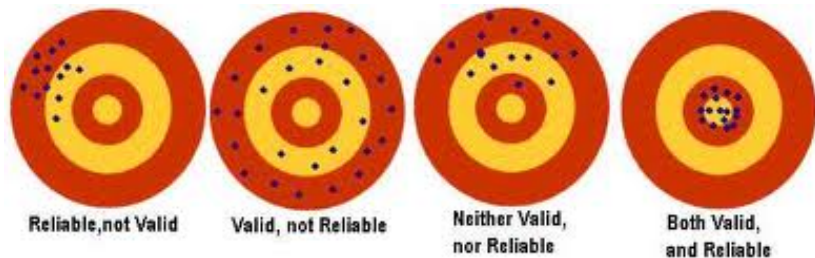
- ▶ looking for information sources
 - ▶ databases (ISI, google(scholar), EBSCO, Scopus,...)
 - ▶ reference software (jabref, endnote, zotero, citeulike)
- ▶ evaluating evidence: CRAAP
 - ▶ Currency
 - ▶ Relevance
 - ▶ Authority
 - ▶ Accuracy
 - ▶ Purpose

Analysing evidence: methodology notes

- ▶ reliability and validity
- ▶ representativity
- ▶ statistical methods

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Methodology notes - types of validity

Criterion validity

- Divided into concurrent (other criteria assessed simultaneously) and predictive (predicting future or past events) sub-areas
- Deals with whether the assessment scores obtained for participants are related to a criterion outcome measure
- For example for predictive, do SAT scores predict post-secondary performance?

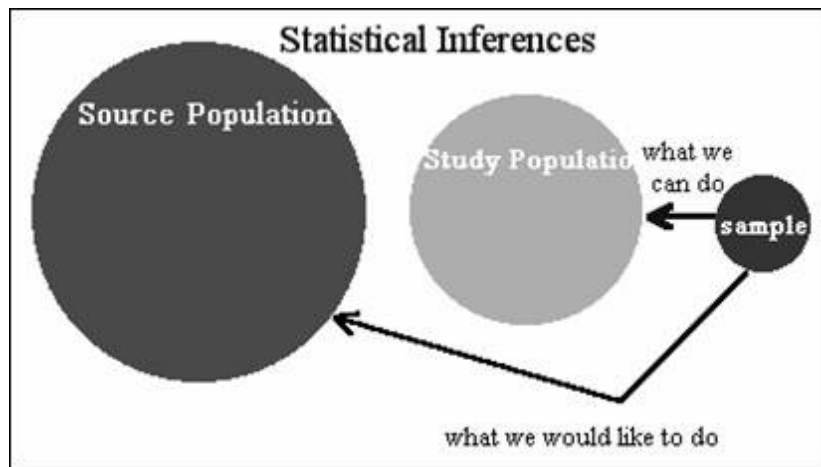
Content validity

- Deals with whether the assessment content and composition is appropriate given what is being measured (e.g., does the test reflect the knowledge/skills required to do a job or demonstrate that one grasps the course material)
- For example, is there an appropriate representation of questions from each topic area on the assessment that reflect the curriculum that is being taught
- Related to but not to be confused with "face validity"

Construct validity

- Deals with whether the assessment is measuring the correct construct (trait/attribute/ability/skill)
- For example, is this human biology exam actually measuring human biology constructs

Methodology notes - sample representativity



Methodology notes - statistical methods

Variable	Test
Nominal	McNemar's Test
Ordinal (Ordered categories)	Wilcoxon
Quantitative (Discrete or Non-Normal)	Wilcoxon
Quantitative (Normal*)	Paired t test

Methodology notes - statistical methods

		Outcome variable					
		Nominal	Categorical (>2 Categories)	Ordinal	Quantitative Discrete	Quantitative Non-Normal	Quantitative Normal
Input Variable	Nominal	χ^2 or Fisher's	χ^2	χ^2 -trend or Mann-Whitney	Mann-Whitney	Mann-Whitney or log-rank ^a	Student's <i>t</i> test
	Categorical (2>categories)	χ^2	χ^2	Kruskal-Wallis ^b	Kruskal-Wallis ^b	Kruskal-Wallis ^b	Analysis of variance ^c
	Ordinal (Ordered categories)	χ^2 -trend or Mann-Whitney	*	Spearman rank	Spearman rank	Spearman rank	Spearman rank or linear regression ^d
	Quantitative Discrete	Logistic regression	*	*	Spearman rank	Spearman rank	Spearman rank or linear regression ^d
	Quantitative non-Normal	Logistic regression	*	*	*	Plot data and Pearson or Spearman rank	Plot data and Pearson or Spearman rank and linear regression
	Quantitative Normal	Logistic regression	*	*	*	Linear regression ^d	Pearson and linear regression

Studying literature: reading a paper

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- ▶ “Why am I reading this?”

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- ▶ Pose questions

Studying literature: reading a paper

How to read a paper?

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- ▶ Pose questions
- ▶ Look at the right places

Studying literature: reading a paper

How to read a paper?

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- ▶ Pose questions
- ▶ Look at the right places
- ▶ Trick for deeper understanding “How would I approach that question?”

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Team activity: research design

- 10 min Summarization of current research design
- 60 min Optimalization/detection of current design gaps
- 20 min Presentation and feedback
- 10 min Timeline preparation