Measurement is the assignment of numbers to objects or events.

Any measurement can be judged by the following meta-measurement criteria values: level of measurement (which includes magnitude), dimensions (units), and uncertainty.

They enable comparisons to be done between different measurements and reduce confusion.

Even in cases of clear qualitative similarity or difference, increased precision through quantitative measurement is often preferred in order to aid in replication.

- Often lacking a direct relation with the concept
- Inexact
- Noise!
- Problems with replication

Evaluation of user experience

- Quantify
- Reliable
- Valid
5 important questions for any research

- Why do we perform the research?
- What is the research question?
- Who do we want to study?
- Where do we perform the study?
- How do we collect and analyse the data?

Measuring user experience

- Questionnaire
- Observation
- Interview
- Physiology
- Behaviour
- Eye-tracking
- Think Aloud
- Efficiency & Accuracy (mistakes) measures
The game(s) will be a success if:

- Children are empowered to make informed decisions about their sexual activity and other important choices about their lives.
- The games promote community involvement in HIV care and treatment.
- Increase levels of knowledge to curb stigma and discrimination in school communities.

Develop a game in the battle against HIV/AIDS.

The details define the setup:

- make informed decisions... (absolute)
- promote community involvement... (increase)
- increase levels of knowledge... (increase)
The details define the setup:
- make informed decisions... (absolute)
- promote community involvement... (increase)
- increase levels of knowledge... (increase)

Asking for a difference:
- Pre and post measurement (baseline)
- Control condition
- Subjective change paradigm

**Outcome oriented**

<table>
<thead>
<tr>
<th>Observation</th>
<th>Questionnaire</th>
<th>Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>Indirect</td>
<td>Flexibel, explorative</td>
</tr>
<tr>
<td>Relatively objective</td>
<td>Simple?</td>
<td>In depth information</td>
</tr>
<tr>
<td>(Unconscious) behaviour</td>
<td>Often evaluation</td>
<td>Mix</td>
</tr>
<tr>
<td>Time intensive</td>
<td>Relatively cheap</td>
<td>Time intensive</td>
</tr>
<tr>
<td>Unobtrusive</td>
<td></td>
<td>Intrusive</td>
</tr>
</tbody>
</table>

**Comparison**

**Observation, Questionnaires, and Interviews**
Levels of formality

Least formal
- Everyday / casual
- Casual / Situation specific

Most formal
- Formal / structural

Defining the level of observation

<table>
<thead>
<tr>
<th>Detailed</th>
<th>Macro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small units</td>
<td>Large units</td>
</tr>
<tr>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Precise</td>
<td>Less accurate</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Interpretation</td>
</tr>
</tbody>
</table>

- looks left
- Takes of lid
- Touches hand
- Walks home
- Eats candies
- Makes homework

Quantifying behaviour

- Frequency
- Duration
- Intensity
- Direction

- **Who** does **what**, **where**, **when** en with **whom**
- Inter rater reliability should reflect this!
"Answering an attitude question entails several tasks (Strack & Martin, 1987; Tourangeau, 1984): Respondents (a) need to interpret the question to determine the attitude object and evaluative dimension the researcher has in mind. Next, they (b) need to retrieve relevant information from memory. ... Based on this information, respondents (c) need to compute a judgment. Having formed a judgment, they (d) can rarely report it in their own words but need to map it onto a set of response alternatives provided by the researcher. Finally, (e) respondents may want to edit their private judgment before they communicate it to the researcher for reasons of social desirability and self-presentation."

[Schwartz & Bohner]

### About attitude questions


1. People perceive their own self-knowledge and insights to be more accurate and complete than that of others
2. People perceive their knowledge of other people to be more accurate and complete than other people's knowledge of them
3. People perceive the discrepancy between their self-knowledge and other people's knowledge of them to be greater than the corresponding discrepancy between other people's self-knowledge and their knowledge of those people.
4. People perceive their group's knowledge and their knowledge to be more accurate and complete than other group's knowledge of their group.

**Careful with interpretation!**
Evaluation vs Behaviour

When possible consider behaviour over evaluation
- Awareness ≠ behaviour change
- Knowledge ≠ behaviour change

Motivation and situation can result in persons to be
- Unconscious vs Conscious
- Competent vs InCompetent

Designing a Questionnaire

1. Define what you want to measure
2. Design the questions and answering scales
3. Create the questionnaire
4. Test the questionnaire

What to measure

- Brainstorm, make lists, use literature
- Reduce
- Only ask what you need to know
- Aim for no more than 15 minutes
**Design questions**

- “How much fun did you have in the last quest?”
- Good for gaining information (age, ratings of fun, etc)
- “The last quest was a lot of fun”
- Statements good for assessing agreement with an idea

**Closed (choice, easy, reactive, guessing, social desirable) vs Open (active)**

- Indicate your agreement with the following statement:
  I can avoid HIV by wearing a condom during sex.

- What are ways to avoid HIV infection?
  ..............................................................................................................................

**Answering options**

- Use clear, everyday language
- Especially for children!

  - “I really felt like I identified with the people in the game”
  - “The people in the game were just like me”

**Both the question/statement and the scale should be clear, and exhaustive**

**What education do you have?**

- Primary School
- Secondary School
- Bachelors
- Masters
What is your highest completed level of education?

- Primary School
- Secondary School
- Trade School
- Bachelors
- Masters
- PhD
- Other: ____________

Answering options

<table>
<thead>
<tr>
<th>Continuous</th>
<th>Interval</th>
<th>Dichotomous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place a mark on a continuum</td>
<td>Equal steps, circle one answer</td>
<td>Yes/No - True/False</td>
</tr>
<tr>
<td>Rich data</td>
<td>Balanced</td>
<td>Low variance</td>
</tr>
<tr>
<td>Free</td>
<td>Guided</td>
<td>Forced</td>
</tr>
</tbody>
</table>

Scale decisions

Scales

How successful have you been in life, so far?
How successful have you been in life, so far?

0 not at all successful
1  
2  
3  
4  
5  
6  
7  
8  
9  
10 extremely successful

-5 not at all successful
-4  
-3  
-2  
-1  
0  
1  
2  
3  
4  
5 extremely successful

0-10 scale

-5 to 5 scale

Unipolar
Not at all
Agree completely

0 1 2 3 4

FALSE

Bipolar

TRUE

Scales and the midpoint
Scale decisions

- Scale (numbering) influences answers and variance
  - bipolar vs unipolar
  - bipolar implies dimension
  - ‘Neutral’ point

Scale (numbering) influences answers and variance
- bipolar vs unipolar
- bipolar implies dimension & ‘0’ point

Neutral point,
- no answer?
- do not know?

Label each answering point when possible

Scales and the midpoint

<table>
<thead>
<tr>
<th>Do not agree</th>
<th>Agree Somewhat</th>
<th>Moderately agree</th>
<th>Agree a lot</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Disagree
-2

Moderately disagree

-1

Do not agree / do not disagree

0

Moderately agree

1

Agree

2

Neutral

3

Do not know

4

Layout

Whichever the scale:
- Be consistent and don’t switch scales
- Problem with lazy responding?
  - Use a ‘trick’ question/statement e.g. “Agree with this statement”

Use even spacing

Incorrect: 1 2 3 4 5

Correct: 1 2 3 4 5
Create questionnaire

- Order effects / Context
- Assimilation & Contrast
- Careful placement
- Randomisation

Let's make better mistakes tomorrow.

Test questionnaire