RESEARCH METHODS

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Topic 5

Important Terms in Research, Development of Objectives and Hypothesis
How Research Objective is Formulated

- RESEARCH IDEA
- RESEARCH PROBLEM
- RESEARCH QUESTION
- RESEARCH OBJECTIVE / GOAL

Common research problem:
- lack of research
- Some of the phenomena is still unexplained
- Inconsistencies in findings
- Methodological problem in mist research

By getting answers to those research questions, the study goals are met and a contribution towards solving the problem is made (Leedy & Ormrod, 2005)
The Study Population

- From whom the required information to our research question is obtained.
- Should decide very specifically & clearly who constitutes your study population in order to select the appropriate respondents.
- **Quantitative research** – the research problem and the study population should be specific.
- **Qualitative research** – the study population and the research problem should remain loose and flexible – to ensure the freedom necessary to obtain varies and rich data.
Language of Research

- Models
- Construct
- Operational definitions
- Variables
- Hypothesis/Proposition
- Concepts
- Theory

Terms used in research

Cooper & Schindler (2007)
Important Terms

A construct = a definition specifically invented to represent an abstract phenomena for a given research project – cannot be measured/observed directly.

* Develop by combining concepts
A concept = an accepted collection of meanings/characteristic associated with certain events, objects, conditions, situations and behaviors.

* Involves classifying & categorizing common characteristics.

* Clarification of concepts are through definitions:
  i) **Conceptual definition**
      ~defines the meaning of the concept.
  ii) **Operational definition**
      ~defines a variable in terms of specific measurement and testing criteria.

~may vary depending on the purpose and the way you choose to measure them.
### Example: Operationalisation of concepts and the study population

<table>
<thead>
<tr>
<th>Study</th>
<th>Concept to be studied</th>
<th>Population to be studied</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Poverty line</td>
<td>Children</td>
<td>Who would you consider a child?</td>
</tr>
<tr>
<td>2</td>
<td>Family roles</td>
<td>Immigrants</td>
<td>Who would you consider an immigrant?</td>
</tr>
<tr>
<td>3</td>
<td>Effectiveness</td>
<td>The young</td>
<td>Who would you consider a young person?</td>
</tr>
</tbody>
</table>

**Issues**
- What constitutes ‘poverty line’?
- What constitutes ‘family roles’?
- What constitutes ‘effectiveness’?

**You must:**
- Operationalise the concepts: define in practical, observable & measureable terms ‘poverty line’, ‘family role’ and ‘effectiveness’.
- Operationalise the population: define in identifiable terms ‘children’, ‘immigrants’ and ‘young’.
Example: Conceptual vs. Operational Definition

Job satisfaction
- **Conceptual definition**: a pleasurable emotional state resulting from the appraisal of one’s job.
- **Operational definition**: a person’s feeling toward his salary, supervisor, work condition and colleague.

Self-efficacy:
- **Conceptual definition**: individuals’ beliefs about their capabilities to produce designated levels of performance (Bandura, 1994).
- **Operational definition**: individuals’ beliefs about their future capabilities to produce designated levels of performance at work.
A variable = an attribute/characteristic stated in a specific/applied way.

* Concept that can be measured

* Can be assigned with values

Construct ➔ Student achievement

Concept ➔ Student academic & non-academic achievement

Variable ➔ Grade Point Average
A Variable
(Characteristic / Attribute)

Measured
(Can be assessed & recorded on an instrument)

Varies
(Can assume different values/scores for different individuals)

<table>
<thead>
<tr>
<th>Differences between a Concept and a Variable</th>
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<tbody>
<tr>
<td><strong>Concept</strong></td>
</tr>
<tr>
<td>Example:</td>
</tr>
<tr>
<td>• Effectiveness</td>
</tr>
<tr>
<td>• Satisfaction</td>
</tr>
<tr>
<td>• Excellent</td>
</tr>
<tr>
<td>• Domestic violence</td>
</tr>
<tr>
<td>- Mental image/perception</td>
</tr>
<tr>
<td>- Subjective impression</td>
</tr>
<tr>
<td>- No uniformity as to its understanding</td>
</tr>
<tr>
<td>among different people</td>
</tr>
<tr>
<td>- Cannot be measured</td>
</tr>
</tbody>
</table>
Converting concepts into variables

- Concepts are subjective impressions which, if measured as such would cause problems in comparing responses obtained from different respondents.
- Therefore, it's important for the concepts to be converted into variables as they can be subjected to measurement.

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Indicators</th>
</tr>
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<tbody>
<tr>
<td>Rich</td>
<td>Income</td>
</tr>
<tr>
<td></td>
<td>Assets</td>
</tr>
<tr>
<td></td>
<td>Average marks obtained in examinations</td>
</tr>
<tr>
<td></td>
<td>Average marks obtained in practical work</td>
</tr>
<tr>
<td></td>
<td>Aggregate marks, etc.</td>
</tr>
<tr>
<td></td>
<td>Percentage of marks</td>
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<tr>
<td></td>
<td>Percentage of marks</td>
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<td></td>
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<tr>
<td></td>
<td>If &gt; RM 100 000</td>
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<td></td>
<td>If &gt; RM 250 000</td>
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<tr>
<td></td>
<td>If &gt; 75%</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>If &gt; 80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income / year</td>
</tr>
<tr>
<td>Total value of: home; car; investment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision level (working definitions)</th>
</tr>
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<tr>
<td>If &gt; RM 100 000</td>
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<tr>
<td>If &gt; RM 250 000</td>
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</table>
TYPES OF VARIABLE

Causal Model
- Independent Variables
- Intervening Variables
- Extraneous Variables
- Dependent Variables

Study design
- Active variables
- Attribute variables
- Constants

Unit of measurement
- Quantitative variables
- Continuous variables
- Categorical or discrete variables
- Dichotomies
- Polytomies
TYPES OF VARIABLE

Causal Model

- Independent Variables
  - Changed variables.
  - The cause.

- Intervening Variables
  - Variables that link to a cause-and-effect relationship.

- Extraneous Variables
  - Unmeasured variables affecting the cause-and-effect relationship.

- Dependent Variables
  - Outcome/effect/endogenous variables.
Study Design

Study Intervention
- Different teaching models
- Experimental intervention
- Programme service, etc.

Study population
- Age
- Gender
- Level of motivation
- Attitudes
- Religion, etc.

Active variables
A researcher can manipulate, control or measure

Attribute variables
A researcher cannot manipulate, control of measure
# Units of Measurement

<table>
<thead>
<tr>
<th>Measurement scale</th>
<th>Examples</th>
<th>Characteristics of the scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal or classificatory</strong></td>
<td>Tree, house, taxi, etc&lt;br&gt;Gender: male/female&lt;br&gt;Attitude: Favourable/unfavourable&lt;br&gt;Political parties – UMNO, PAS, DAP, etc.&lt;br&gt;Religions -- Islam, Christian, Hindu, etc.</td>
<td>Each subgroup has a characteristic/property which is common to all classified within that subgroup</td>
</tr>
<tr>
<td><strong>Ordinal or ranking</strong></td>
<td>Income&lt;br&gt;• Above average&lt;br&gt;• Average&lt;br&gt;• Below average&lt;br&gt;Attitudes&lt;br&gt;• Strongly favourable&lt;br&gt;• Favourable&lt;br&gt;• Uncertain&lt;br&gt;• Unfavourable&lt;br&gt;• Strongly unfavourable&lt;br&gt;Attitudinal scale (Likert scale-these are numerical categories)&lt;br&gt;• 0-30&lt;br&gt;• 31-40&lt;br&gt;• 41-50, etc.</td>
<td>It has the characteristics of a nominal scale, e.g. individuals, groups, characteristics classified under a subgroup have common characteristics&lt;br&gt;PLUS&lt;br&gt;Subgroups have a relationship to one another. They are arranged in ascending or descending order.</td>
</tr>
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<td>Measurement scale</td>
<td>Examples</td>
<td>Characteristics of the scale</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
| **Interval**      | Temperature: • Celsius $\rightarrow$ 0c  
                   • Fahrenheit $\rightarrow$ 32F  
                   Attitudinal scale (Thurstone scale)  
                   • 10-20  
                   • 21-30  
                   • 31-40  
                   • 41-50 | It has all the characteristic of an ordinal scale (which also includes a nominal scale)  
PLUS  
It has a unit of measurement with an arbitrary starting and terminating point. |
| **Ratio**         | Height: cm  
                   Income: $  
                   Age: years/months  
                   Weight: kg  
                   Attitudinal score: Guttman scale | It has all the properties of an interval scale.  
PLUS  
It has a fixed starting point, e.g. a zero point |
Example: Independent, dependent, extraneous and intervening variables

Organizational Justice

Independent Variable

Job satisfaction

Intervening variable

Workplace deviance

Dependent variable

- Attitudes towards job among the population
- Level of education of the population
- Socioeconomic status of the population
- Motivation of the individual
- Age of the individual
- Religion, gender etc.

Extraneous variables
Hypothesis = a proposition formulated for empirical testing.

* A logical supposition, reasonable guess.
* A conjectural statement of relationship between two variables.
* A tentative statement/prediction to show the relationship between two/more variables which can be generated from deduction.

Function:

i) Provides a study with focus.
ii) Tells you what data to collect and what not to collect.
iii) Enhances objectivity in a study.
iv) Enable you to conclude specifically what is true or false.
Characteristics of a Hypothesis

- Should be simple, specific and conceptually clear
- Should be capable of verification
- Should be related to the existing body of knowledge
- Methods & techniques must be available for data collection & analysis.
- Should be operationalisable
- Can only be achieved if the hypothesis has its roots in the existing body of knowledge.
- Can be measured

Unidimensional
- You must be familiar with the subject area.
Types of Hypothesis

Null hypothesis
- No change in the DV.
- e.g. There will be no difference in the level of infant mortality among the different treatment modalities.

Directional alternative hypothesis
- Specify the direction of the change in the dependent variable that the researcher predicts will take place.
- e.g. There is a negative and significance relationship between job satisfaction and workplace deviance.

Testing a Hypothesis

1. Formulate your hunch or assumption
2. Collect the required data
3. Analyze data to draw conclusions about that hunch – true or false
Guidelines for Writing Hypotheses

- State the variable in this order: Independent (1st position), dependent (2nd position), and control (3rd position).
- When comparing, explicitly state the groups; if variables are related, specify the relationship between the variables.
- Make a prediction about changes you expect in your groups.
- State information about the participants and the site unless it repeats information stated in your purpose of statement.
Example of Hypothesis

This study addresses the aforementioned limitations. A longitudinal research design was used with a large, representative sample of full-time employed individuals. It is unique because hypothesised antecedent variables were collected one year prior to the career change. With regard to examining the antecedents of career change, we took two approaches. First, we compared career changers with stayers on the hypothesised variables. Second, we examined whether the hypothesised variables predicted career change versus staying. Using a slightly different longitudinal data set we were also able to examine the effect of the career change one year after it was made.

Based on the literature review the following hypotheses were proposed:

**Hypothesis 1.** Higher levels of the traits Openness to Experience, Extraversion and general self-efficacy will be associated with a greater probability of career change.

**Hypothesis 2.** Younger employees with fewer children will be more likely to change careers than older employees with a greater number of children.

**Hypothesis 3.** Lower levels of job satisfaction, higher job search activity and greater turnover intentions will be associated with a greater probability of career change.

**Hypothesis 4.** Lower salary and job security will be associated with a greater probability of career change.

As there was no reason to expect Conscientious, gender, marital status, and human capital (educational level and occupational tenure) to be associated with career change, no hypotheses were posed. Rather we explored whether these were related to career change.

With regard to post career change we proposed the following hypothesis:

**Hypothesis 5.** After a career change, there will be an improvement in levels of job satisfaction, job security and salary compared to prior career change and a decrease in the number of hours worked and intentions to leave.
Other important terms

- **A proposition** = a statement about observable phenomena that may be judged as true/false.
- **A theory** = a set of systematically interrelated concepts, definition, and propositions that are advanced to explain/predict phenomena.
- **A model** = a representation of a system constructed studying some aspect of that system.