



UNIVERSITAS NEGERI YOGYAKARTA

Procedure for Developing Chemistry Education Research Instruments





Course Outline

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Week	Course Material	Learning Methods	Task
1	Introduction to Chemistry Education Research Instrument	Virtual Meeting	-
2	Types and Forms of Chemistry Education Research Instrument	Virtual Meeting	-
3	Procedure for developing research instrument	Virtual Meeting	-
4	A good research instrument characteristics	Virtual Meeting	Analysis of good research instrument
5	Practice for developing test research instrument	Blended learning	Draft test research instrument
6	Presentation of test research instrument that has been developed	Virtual Meeting	Reflection sheet of presentation
7	Practice for developing non-test research instrument (questionnaire)	Blended learning	Draft questionnaire
8	Presentation of non-test research instrument that has been developed (questionnaire)	Virtual Meeting	Reflection sheet of presentation
9	Mid term exam	Asynchronous BESMART	-
10	Practice for developing non-test research instrument (observation sheet)	Blended learning	Draft observation sheet
11	Presentation of non-test research instrument that has been developed (observation sheet)	Virtual Meeting	Reflection sheet of presentation
12	Practice for developing context based chemistry problem	Blended learning	Draft CBCL problem
13	Presentation of context based chemistry problem that has been developed	Virtual Meeting	Reflection sheet of presentation
14	Practice for making validation sheet	Blended learning	Draft validation sheet
15-16	Practice for analysing validity and reliability instrument	Blended learning	Validity & reliability analysis



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Basic Analysis of Instrument
Development

Instrument Arrangement

Instrument Testing/Analysis



Basic Analysis of Instrument Development

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1. Determine the type of instrument to be used

Based on research objectives because the instrument is used to answer research objectives.

Determine the type of data (quantitative or qualitative) to be collected

Example,

- 'to determine the level of chemical literacy of students'

- 'to analyze the factors that influence student learning interest'

- 'to find out students' practical skills/practical skills'

- 'to measure students' self-efficacy'

What instruments can be used to retrieve data?

2. Determine the type/method of obtaining the instrument

1. Adoption of the instrument
2. Instrument adaptation
3. Composing a new instrument



How to Adopt an Instrument?

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Fully take instruments from previous studies that have not been published (thesis, research reports) or from journals/proceedings

Include the source of the citation properly and correctly

Writing a resume from the instrument grid

Explain the validation process and the results of instrument validation by previous researchers (at least the reliability value)

Instrument Adoption Requirements:

1. The purpose of using the instrument is the same
2. The objective of using the instrument is the same
3. Prioritize in Indonesian
4. if in a foreign language, make sure that all the translated items are missing which are contradictory/unfamiliar with the context in Indonesia

The adoption result instrument can be re-validated empirically or not if the reliability is very high and involves a large sample



How to Adapt Instruments?

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Adapting one theory. Not a synthesis of multiple theories??

Taking certain parts of the instrument and adapting them to the purpose and context of our research

Translate instruments from foreign languages and adapt them to the Indonesian context

Clearly state the source of the citation and indicate which part was adapted and why (should be clear in chapter 3)

References for adaptation must also be displayed, for example adding aspects of SSI assessment according to SSI characteristics according to Zeidler (1990).

The adaptation result instrument must be re-validated theoretically/expertly and empirically



How to Build a New Instrument?

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- Gather relevant theories about the conceptual definitions of the variables to be measured by the instrument (Minimum 5 sources)
- Sources of theory from text-books can be combined with sources from previous research articles
- Develop a comparison matrix of conceptual definitions of variables as well as aspects and or indicators that are measured based on theory and various sources
- Synthesize operational definitions of variables that fit our research objectives



B. Preparation of Instruments

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1. Arrange the Instrument Grid

Determine the grid format (in the table) that is adjusted to the shape of the instrument to be made

Example

for test instruments: GPA, Concepts/Sub-concepts,
measurement indicators

(eg Bloom's cognitive level, an indicator of critical thinking
skills), item number, amount

for scale/questionnaire/observation/assessment sheet
instruments: there are aspects,

Indicators, sub-indicators if any, item no, number of items



2. Developing items/measurement items

Describe indicators into question items or statement items
Arrange answer choice options if developing a multiple choice test

Determine the type of alternative answer choices for the scale/questionnaire (Strongly agree, always, rarely, etc.)
If possible, vary the positive and negative statements for the scale instrument

for example, 'I like studying chemistry with practicum'
(Strongly Agree, score 5)

'I feel bored when doing chemistry practicum'
(Strongly Agree, score 1)

'I am not comfortable during chemistry lab' (Strongly Agree,
score 1)



B. Preparation of Instruments

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3. Create guidelines for scoring/scoring rubrics

Write down the answer key and give a score to each answer for the test instrument (depending on the form of the test (multiple choice or essay)

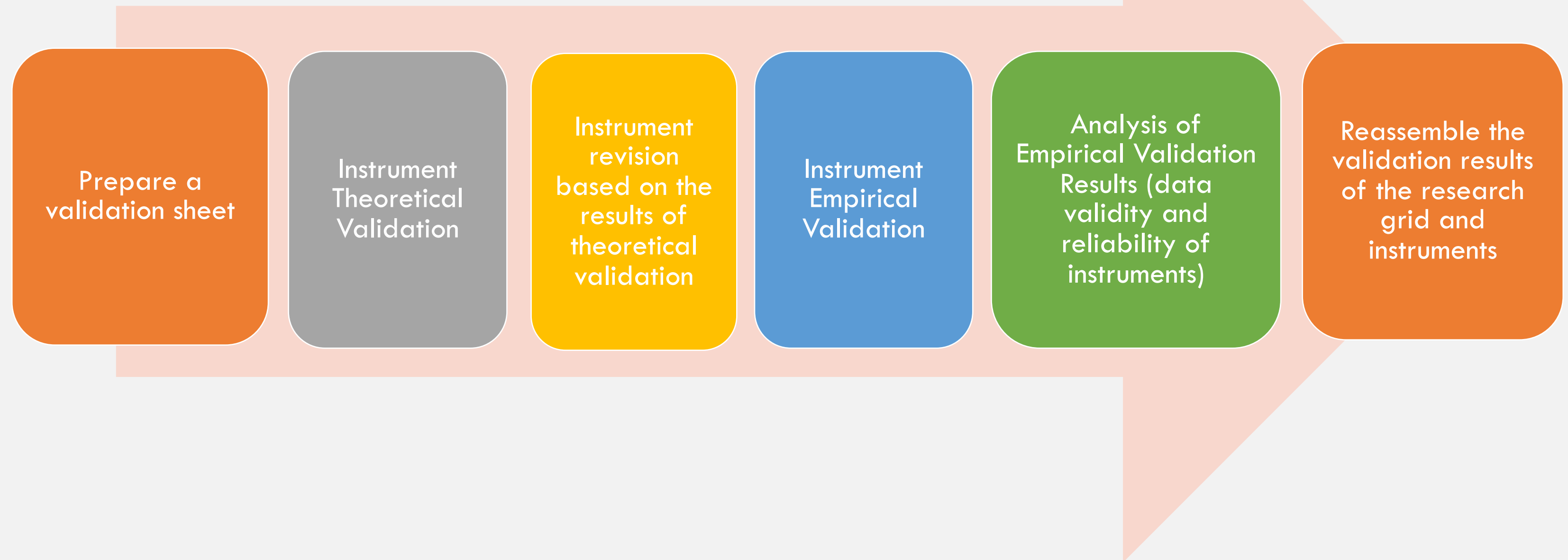
Develop ideal criteria that are expected to emerge from each measurement indicator for the observation/assessment sheet instrument and describe it in the desired score level

Determine scoring guidelines for each alternative answer chosen for a scale or questionnaire instrument (depending on the type of statement, positive or negative)



C. Instrument Testing

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Thank You
Any Question?

