

# Psychometrics

## Brief description of course content (According to the programme's verification report)

- General competences
  1. Ability to detect technical deficiencies in psychological measuring instruments.
  2. Ability to choose a suitable instrument for the measurement's requirements.
  3. To adequately interpret and report the results obtained through the use of psychological measuring instruments.
- Specific competences
  1. To know and understand the purpose and development of the stages which must be efficiently negotiated in the process of building a psychological measurement instrument and to apply this knowledge to any test constructed, and all of this with a dual intention:
    - To know how to choose the instrument which best adapts to the purpose and the context it will be used in from a group of instruments.
    - Before using a specific instrument, to insist that the technical and psychometric indicators have been obtained by the appropriate procedure and that their levels are optimal.
  2. Ability to use a psychological measuring instrument properly in a specific context.
  3. To be able to apply psychometric knowledge to the different tests, with a triple purpose:
    - To inspect and evaluate the existing tests and choose the most appropriate.
    - To know how to determine, before using a specific test, whether its technical indicators are appropriate.
    - To correctly use a psychological measuring instrument in line with the instructions provided.

## Learning outcomes

- To ensure that students become responsible 'users' of psychological measuring instruments (tests, questionnaires, scales, etc.), making interpretations of the measurements based on robust evidence of their quality.
- Students will be able to choose from several measuring instruments the one which best meets the technical and psychometric conditions for the specific context and the purposes it will be used for.
- To make critical judgements about the quality and suitability of different measuring instruments before using them to perform their professional duties, identifying the premises which support the decision to use the measuring instrument and the interpretation of the measurements.
- To understand different measuring theories and procedures which provide evidence to justify the use of a measuring instrument and the interpretation of the measurements.

- To understand and know how to use the documentary sources related to the field of Psychometrics.
- To understand the role the measurement of psychological constructs plays in proper professional activity as well as in the process of acquiring scientific knowledge in the field of Psychology in general.
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## **Planned learning activities**

### **Theory Syllabus**

#### **Topic 1. Psychometric inference: Why and how are tests and questionnaires used?**

Validity as an argument to make decisions as of psychological measurements. Interpretations which justify decisions about the people assessed.

Variables as ‘constructs’: What are they and how can they be defined?

Where do the numbers come from? Measurement in Psychology

What kinds of tests are there and where can they be accessed?

#### **Topic 2. What does the test measure? Relevance and usefulness of the content**

General steps of the process of test construction

Test planning: decision about what to measure and how to do it as of the items. Creation and quality analysis of the items.

Commercial tests: How to find and evaluate information about planning and quality of the items.

#### **Topic 3. Precision of psychological measurements**

Errors which contaminate test and questionnaire scores. ‘Classic’ concept of reliability.

Procedures to estimate the precision of the scores. Interpretation and decisions as of the reliability coefficient.

Commercial tests: Where is it, how to interpret it and what to do with information about the measurements’ accuracy.

#### **Topic 4. Validity: Evidence to test the interpretations of the measurements**

The search for scientific evidence to support the interpretations. Concept of validity: the construction and analysis of arguments.

‘Ecology’ of the measurement: What is the behaviour of answering tests and questionnaires like? Sources of evidence of validity.

Methods to carry out validation studies.

Commercial tests: Where is it, how to interpret it and what to do with information about validity.

### **Topic 5. Scales and standards for interpreting measurements**

Type of interpretation and decisions. Main statistics.

Commercial tests: How to evaluate and use scales from commercial tests.

### **Topic 6. Introduction to the Items Response Theory and new developments in Psychometrics.**

Advantages and assumptions. Models and applications.

Current and future research in Psychometrics.

## **Practical Syllabus**

### **Practical exercise 1. First steps in creating test scales and questionnaires**

- To identify the construct to be measured, target population, context of the measurement and intended use of the measurements the development of a measurement tool is targeted at.
- To propose the semantic definition as of different theoretical proposals and transfer the test specifications to the table.
- To develop proposals of syntactic definition as of the different procedures.
- To deal with common problems in measuring constructs in a professional practical situation.

### **Practical exercise 2. Writing, item analysis and precision of psychological measurements**

- Recognise the general recommendations and rules for writing and editing items in the Likert-type response format.
- Analyse the items' psychometric properties.
  - Descriptive statistics.
  - Discrimination of the items.
  - Contribution of each individual item to reliability.
- To estimate the reliability coefficient with procedures which require a single administration of the test.
  - Procedure based on covariance between items: Alpha and omega coefficients.
  - Procedure based on correlation between the two halves.

### **Practical exercise 3. Obtain evidence of validity**

- Identify the 'desired interpretation' of measurements obtained through tests, scales and questionnaires.

- Propose the appropriate ‘source of evidence of validity’ to obtain evidence to support the ‘desired interpretation’ of the measurements.
- Identify the most relevant characteristics of the validation studies to obtain the ‘evidence of validity’.
- Analyse the ‘evidence of validity’ and the extent to which they support the ‘desired interpretation’ of the measurements.
- Analyse the positive or negative consequences, expected or unexpected, from using the measurements provided by tests, scales and questionnaires.