Research Methodology Exam_M1DID_Sem. 1 (2025/2026) / Model Answer

i.   Consider the exam you have in your hands.

1. What tool is used to account for your performance?

   Test   0.25

<u>Justification</u>:

   Our performance is being measured through a set of stimuli that yield responses on the basis of which a   0.5
   numerical score will be assigned.

2. Which type of such a tool is used?

   Verbal, Criterion-referenced, Non-Standardized, Achievement test.   1

<u>Justification</u>:

   ***Verbal**: paper-and-pencil. **Criterion-referenced**: it measures the level of mastery of the course being*   2
   *taught without reference to the performance of others. **Non-standardized**: teacher-made, not published,*
   *validity/reliability unknown. **Achievement**: it measures what students have learned (achieved) after*
   instruction.

ii.   Once students' grades on this exam are collected,

1. Which scale of measurement is more appropriate for statistical analysis?

   interval scale   0.25

Justification:

   a) *Higher marks represent more achievement.*   0.75
   b) *Equal intervals between values (2 − 1 = 6 − 5, for example).*
   c) *No absolute zero; 0 means no items were answered correctly, not complete absence of knowledge.*

2. Which parameters should be used to statistically summarize students' performance?

   - *Measures of central tendency:*   1) *the mean,*   2) *the median,*   3) *the mode.*   1.5
   - *Measures of variability:*   1) *range,*   2) *variance,*   3) *standard deviation.*

3. How are these parameters expressed statistically?

                                                                                                          3

Mean (μ)	Median (n is odd)	Median (n is even)
$\mu = \frac{1}{N}\sum_{i=1}^{N} X_i = \frac{X_1 + X_2 + \cdots + X_n}{N}$	Median $= (\frac{N+1}{2})^{th}$ observation	Median $= \frac{(\frac{N}{2})^{th} + (\frac{N}{2})^{th}\ observations}{2}$
Range (x)	**Variance (σ^2)**	**Standard Deviation (σ)**
$R = X_{max} - X_{min} + 1$	$\sigma^2 = \frac{\sum_{i=1}^{N} x_i}{N}$	$\sigma = \sqrt{\frac{\sum_{i=1}^{N} x_i}{N}}$

iii.   **To study the effects of the RM course on students' performance in today's exam,**

1. Which research method should be used?

   The Experimental Method   0.25

2. Which research design is the most appropriate?

   One shot case study design   0.25

Justification:

   Such a study has not been planned for in advance (no pretest, no control, and no (random) assignment to   0.5
   different conditions). Therefore, the only chance we have to investigate the effect of the independent
   variable on the dependent is through a pre-experimental design, namely the one shot case study design.

3. Which conditions for establishing causality would be fulfilled, and which would not, using such a design?

   a) **Temporal precedence** (*X precedes Y in time*): *fulfilled*   1.5

   b) **Co-variation** (*a statistical relationship between X and Y is established*): *not fulfilled, X has one value.*

   c) **Control** (*other factors did not determine Y*): *not fulfilled*

iv.   **In addressing the validity of today's exam,**

1. Should one be concerned about external validity?

   NO.   0.25

Justification:

   External validity is concerned with generalizing findings from a sample to a population. Here, data is   0.5
   collected from the entire population.

2. What does the validation of this exam involve with respect to the corresponding course? Illustrate.

   *The validation of this exam involves gathering three main categories of evidence. 1) **Content-related***   7.5
   ***evidence** (0.5 pt.): the extent to which exam questions are a representative (balanced and adequate)*
   sampling of the content on the basis of which students' achievement is to be judged (0.5 pt.). The test
   should assess students' knowledge of different quantitative research tools (types, uses, etc.), their
   knowledge of descriptive statistics (different measures, parameters, statistics, when to be used, etc.),
   knowledge of research validity and reliability (types, formulae, etc.), and basics of experimental research
   *(characteristics, designs, etc.) (0.5 pt.). 2) **Criterion-based evidence** (0.5 pt.): the extent to which exam*
   scores are related to scores of an outcome criterion (0.5 pt.), either collected at the same time
   (concurrent) (0.5 pt.), e.g. students' scores in a resit exam taken shortly after (0.5 pt.), or collected in the
   *future (predictive) (0.5 pt.), e.g. scores on a doctoral admission test (0.5 pt.). 3) **Construct-based evidence***
   (0.5 pt.): the extent to which the test really measures the psychological construct it claims to measure (i.e.
   achievement in the targeted domain: RM course-S1) (0.5 pt.). It is established by gathering evidence that
   indicate that test scores correlate positively with scores of a measure of the same/similar construct
   (convergent) (0.5 pt.), e.g. scores on a fieldwork project based on the same RM course (0.5 pt.), or
   evidence that indicate a negative/no relationship of test scores with a measure of a different construct
   (discriminant) (0.5 pt.), e.g. scores on a test of general English proficiency (0.5 pt.).