UNIVERSITY OF ESWATINI

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND MANAGEMENT 2020

FIRST SEMESTER RE-SIT EXAMINATION PAPER

JANUARY, 2020

TITLE OF PAPER:	INTRODUCTION TO EDUCATIONAL RESEARCH
COURSE CODE:	EFM 515
TIME ALLOWED:	Three (3) hours
INSTRUCTIONS :	1. THIS PAPER IS DIVIDED INTO **TWO SECTIONS** (**A** AND **B**). ANSWER **ANY TWO** QUESTIONS FROM EACH SECTION **2.** UTILISE THE ATTACHED STATISTICAL FORMULAS AND TABLES WHERE NECESSARY.
TOTAL MARKS :	100

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION TO DO SO HAS BEEN GRANTED BY THE INVIGILATOR.

SECTION A

Question 1

Assess the value and significance of literature review in Educational research. [Total: 25 mark].

Question 2

(a) Explain four reasons why research questions are necessary or valuable in a research study. (12 marks)

(b) Describe 5 characteristics of good research questions using practical examples? (13 marks)

[Total 25 marks]

Question 3

(a) Explain the difference between research designs and research methods using practical examples. (5 marks)

(b) What are the merits and demerits of using a questionnaire-based survey design? (20 marks)

[Total 25 marks]

SECTION B

Question 4

Below is a data set for Social Studies scores for 36 Grade seven pupils.

37	28	10	14	70	19	13	46	8
30	22	8	5	11	45	67	56	89
16	64	34	50	56	94	41	81	57
19	7	12	60	15	14	8	21	63

a) Re-arrange the data in descending order. (3 marks)

b) Complete the frequency distribution table below using a uniform class interval of 10.

CLASS	TALLY	FREQUENCY
0 - 9		

(10 marks)

c) Comment on the class performance (2 marks)

d) Using the data above draw a histogram/ bar graph. (10 marks)

[Total 25 marks]

Question 5

Table 1 below shows the number of hours spent by 10 students preparing for the final examinations.

Table 1:

Hours spent in preparation for the final examination

STUDENT	**Q**	**R**	**S**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**
TIME IN HOURS (X)	22	26	20	19	27	24	25	23	18	20
EXAMINATION SCORE (Y)	74	74	69	68	73	71	72	69	65	66

Calculate Pearson's Product Moment correlation co-efficient for the data and comment on it.

[Total 25 marks]

Question 6

Table 2 below shows the marks which were obtained by 10 Form 5 learners in Mathematics and Science Mid-Year examinations.

Table 2

Form 5 mid- year examination scores

PUPIL	A	B	C	D	E	F	G	H	I	J
MATHEMATICS	62	71	72	62	74	83	54	78	67	57
SCIENCE	63	61	51	62	58	48	75	57	60	75

i) Calculate the Standard Deviation of the Science marks. (10 marks)

ii) Given that the Standard Deviation of Mathematics marks is 9.29 determine the subject in which pupil **D** did better. (10 marks)

iii) Calculate the range of Mathematics marks. (3 marks)

iv) State one advantage and one disadvantage of range. (2 marks)

[Total: 25 marks]

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STATISTICAL FORMULAE

Sample Variance: $S^2 = \frac{\sum(x-\bar{x})^2}{n-1}$

Sample Standard Deviation: $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$

Product moment correlation coefficient:

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Spearman's rank order correlation coefficient: $rho = 1 - \frac{6\sum d^2}{n(n^2-1)}$

Chi-squared Test Statistic: $x^2 = \sum \frac{(0-E)^2}{E}$

Z-score: $z = \frac{x-\bar{x}}{s}$

Standardisation: $z = \frac{u-\mu}{\sigma}$ **Where Z ~N(0,1)**

T-score: $T = 50 + 10\left(\frac{x-\bar{x}}{s}\right)$

Student t-test: $t = \frac{\sqrt{(n-1)}\sum d}{\sqrt{n\sum d^2 - (\sum d)^2}}$

ANALYSIS OF VARIANCE (ANOVA)

1. $SS\,(\text{TOTAL}) = \sum x^2 - \frac{(\sum x)^2}{n}$

2. $SST = SS(\text{Treatment}) = SS(Btwn\ Grps) = \sum \frac{T_i^2}{n_i} - \frac{(\sum x)^2}{n} = \frac{T_1^2}{n_1} + \frac{r_2^2}{n_2} + \cdots + \frac{T_p^2}{n_p} - \frac{(\sum x)^2}{n}$

3. $SSE = SS\ (TOTAL) - SST$

   [N.B. $SSE = SS\ (\text{Error}) = SS\ (\text{Within Groups}) = SS\ (\text{Residual})$]

4. $MST = \frac{SST}{p-1}$

5. $MSE = \frac{SSE}{n-p}$

6. $F_{calc} = \frac{MST}{MSE}$

ONE-WAY ANOVA TABLE

Source of variation	**Sum of squares**	**Degrees of Freedom (df)**	**Mean Square**	F_{calc}
Between Groups (Treatments)	SST	$p-1$	$MST = \frac{SST}{p-1}$	$F_{calc} = \frac{MST}{MSE}$
Within Groups (Error or Residual)	SSE	$n-p$	$MSE = \frac{SSE}{n-p}$	
Total	$SS(\text{TOTAL})$	$n-1$		

n = total number of observations

p = number of treatments (number of samples or groups)

p-1 = numerator degrees of freedom

n-p = denominator degrees of freedom

T_i= total for group i(i = 1, 2, 3, …, p)

n_i= number of observations in group i(i = 1, 2, 3, …, p)