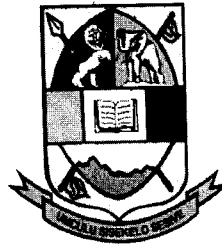


Course code: EFM515 (PGCE Full Time/IDE)

UNIVERSITY OF ESWATINI



FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND

MANAGEMENT 2018

MAIN EXAMINATION PAPER:NOVEMBER, 2018

TITLE OF PAPER:	INTRODUCTION TO EDUCATIONAL RESEARCH
COURSE CODE:	EFM 515
TIME ALLOWED:	Three (3) hours
INSTRUCTIONS:	Answer Two questions from each section.
TOTAL MARKS:	100 MARKS

THIS PAPER CONSISTS OF THREE PAGES INCLUDING THE COVER PAGE

DO NOT OPEN THIS PAPER UNTIL YOU ARE TOLD TO DO SO BY THE
INVIGILATOR

SECTION A

Instructions: Answer any two questions in this section

Question 1

- (a) Describe the meaning of educational research showing how it is different from journalism? **(5 marks)**
- (b) Using practical examples, discuss any four different purposes of educational research. **(20 marks)**
- [Total 25 marks]**

Question 2

- (a) Examine the significance of the literature review in enhancing the quality of a research study. **(15 marks)**
- (b) Describe the features of each of the four sub-sections in organizing and developing a proper literature review with a beginning, the middle and an end. **(10 marks)**
- [Total 25 marks]**

Question 3

Discuss any five differences between a survey and a case study research design. **[Total 25 marks]**

SECTION B

Instructions: Answer any two questions in this section

Question 4

Scores below are pairs of marks for siSwati (X) and Geography (Y).

Table 1 SiSwati and Geography scores

Student	A	B	C	D	E	F	G	H	I	J
SiSwati (x)	50	80	55	75	60	70	65	65	58	72
Geography(y)	60	80	45	85	50	65	55	60	50	70

- a) Using the scores above calculate the Spearman's rank order correlation coefficient. (20 marks)
- b) State the range for Geography. (1 mark)
- c) State one advantage and one disadvantage of the range. (4 marks)

[Total 25 marks]

Question 5

- (a) Using information in **Table 1** above draw a scatter gram. (10 marks)
- (b) Calculate the Standard deviation of Geography using information in **Table 1**. (10 marks)
- (c) Calculate the median of siSwati. (3 marks)
- (d) Give any **two** disadvantages of the median. (2 marks)

[Total 25 marks]

Question 6

A Psychologist claims that students who perform well in English do not necessarily perform well in Mathematics. She collects the scores for 10 students and construct the following table.

Table 2 Maths and English scores

Student	A	B	C	D	E	F	G	H	I	J
English	44	70	70	78	80	45	70	56	80	78
Maths	36	64	86	72	84	35	84	64	70	62

Using information in Table 2 above calculate Pearson's product moment correlation coefficient and comment on it. [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: $\chi^2 = \sum \frac{(O-E)^2}{E}$

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) FORMULAE

1. $SS(TOTAL) = \sum x^2 - \frac{(\sum x)^2}{n}$
2. $SST = SS(\text{Treatment}) = SS(\text{Btwn Grps}) = \sum \frac{T_i^2}{n_i} - \frac{(\sum x)^2}{n} = \frac{T_1^2}{n_1} + \frac{T_2^2}{n_2} + \dots + \frac{T_p^2}{n_p} - \frac{(\sum x)^2}{n}$
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	$SS(TOTAL)$	$n-1$		

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 ($i = 1, 2, 3, \dots, p$)

n_i = number of observations in group i ($i = 1, 2, 3, \dots, p$)

TABLE IV Critical Values of Chi Square

df	Level of significance for a non-directional test					
	.20	.10	.05	.02	.01	.001
1	1.64	2.71	3.84	5.41	6.64	10.83
2	3.22	4.60	5.99	7.82	9.21	13.82
3	4.64	6.25	7.82	9.84	11.34	16.27
4	5.99	7.78	9.49	11.67	13.28	18.46
5	7.29	9.24	11.07	13.39	15.09	20.52
6	8.56	10.64	12.59	15.03	16.81	22.46
7	9.80	12.02	14.07	16.62	18.48	24.32
8	11.03	13.36	15.51	18.17	20.09	26.12
9	12.24	14.68	16.92	19.68	21.67	27.88
10	13.44	15.99	18.31	21.16	23.21	29.59
11	14.63	17.28	19.68	22.62	24.72	31.26
12	15.81	18.55	21.03	24.05	26.22	32.91
13	16.98	19.81	22.36	25.47	27.69	34.53
14	18.15	21.06	23.68	26.87	29.14	36.12
15	19.31	22.31	25.00	28.26	30.58	37.70
16	20.46	23.54	26.30	29.63	32.00	39.29
17	21.62	24.77	27.59	31.00	33.41	40.75
18	22.76	25.99	28.87	32.35	34.80	42.31
19	23.90	27.20	30.14	33.69	36.19	43.82
20	25.04	28.41	31.41	35.02	37.57	45.32
21	26.17	29.62	32.67	36.34	38.93	46.80
22	27.30	30.81	33.92	37.66	40.29	48.27
23	28.43	32.01	35.17	38.97	41.64	49.73
24	29.55	33.20	36.42	40.27	42.98	51.18
25	30.68	34.38	37.65	41.57	44.31	52.62
26	31.80	35.56	38.88	42.86	45.64	54.05
27	32.91	36.74	40.11	44.14	46.96	55.48
28	34.03	37.92	41.34	45.42	48.28	56.89
29	35.14	39.09	42.69	46.69	49.59	58.30
30	36.25	40.26	43.77	47.96	50.89	59.70
32	38.47	42.59	46.19	50.49	53.49	62.49
34	40.68	44.90	48.60	53.00	56.06	65.25
36	42.88	47.21	51.00	55.49	58.62	67.99
38	45.08	49.51	53.38	57.97	61.16	70.70
40	47.27	51.81	55.76	60.44	63.69	73.40
44	51.64	56.37	60.48	65.34	68.71	78.75
48	55.99	60.91	65.17	70.20	73.68	84.04
52	60.33	65.42	69.83	75.02	78.62	89.27
56	64.66	69.92	74.47	79.82	83.51	94.46
60	68.97	74.40	79.08	84.58	88.38	99.61

Find the row corresponding to the indicated degrees of freedom, find the column corresponding to the chosen level of significance, the critical value of χ^2_{crit} is at the intersection of that row and that column. If $\chi^2_{obs} \geq \chi^2_{crit}$ then H_0 is rejected.

TABLE II Critical Values of *t*: Student *t*-test

df	Level of significance for a directional (one-tailed) test					
	.10	.05	.025	.01	.005	.0005
	Level of significance for a non-directional (two-tailed) test					
	.20	.10	.05	.02	.01	.001
1	3.078	6.314	12.706	31.821	63.657	636.619
2	1.886	2.920	4.303	6.965	9.925	31.598
3	1.638	2.353	3.182	4.541	5.841	12.941
4	1.533	2.132	2.776	3.747	4.604	8.610
5	1.476	2.015	2.571	3.365	4.032	6.859
6	1.440	1.943	2.447	3.143	3.707	5.959
7	1.415	1.895	2.365	2.998	3.499	5.405
8	1.397	1.860	2.306	2.896	3.355	5.041
9	1.383	1.833	2.262	2.821	3.250	4.781
10	1.372	1.812	2.228	2.764	3.169	4.587
11	1.363	1.796	2.201	2.718	3.106	4.437
12	1.356	1.782	2.179	2.681	3.055	4.318
13	1.350	1.771	2.160	2.650	3.012	4.221
14	1.345	1.761	2.145	2.624	2.977	4.140
15	1.341	1.753	2.131	2.602	2.947	4.073
16	1.337	1.746	2.120	2.583	2.921	4.015
17	1.333	1.740	2.110	2.567	2.898	3.965
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850
21	1.323	1.721	2.080	2.518	2.831	3.819
22	1.321	1.717	2.074	2.508	2.819	3.792
23	1.319	1.714	2.069	2.500	2.807	3.767
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690
28	1.313	1.701	2.048	2.467	2.763	3.674
29	1.311	1.699	2.045	2.462	2.756	3.659
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.291

Find the row corresponding to the indicated degrees of freedom, find the column corresponding to the chosen level of significance, taking into account the type of H_1 (directional or non-directional). The critical value t_{crit} is at the intersection of that row and that column. If $t_{obs} \geq t_{crit}$ then H_0 is rejected.