

UNIVERSITY OF ESWATINI



FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL FOUNDATIONS AND

MANAGEMENT 2021

FIRST SEMESTER RE-SIT EXAMINATION PAPER

JULY, 2021

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

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SECTION A

Answer any two questions in this section.

Question 1

(a) List five major components of a research report. (5 marks)

(b) Give six reasons why a research proposal is necessary in educational research. (20 marks)

[Total 25 marks]

Question 2

Examine four non-probability sampling techniques and explain when each one may be used in educational research. [Total 25 marks]

Question 3

Discuss six features of ethnographic research and its suitability for educational research in secondary schools in Eswatini. [Total 25 marks]

SECTION B

Answer any two questions in this section.

Question 4

Table 1 below shows the marks which were obtained by Form 3 pupils in Mathematics and Science end of year examinations.

Table 1:

Mathematics and Science Marks

PUPIL	A	B	C	D	E	F	G	H	I	J
Maths Mark	80	60	72	47	62	75	64	58	72	70
Science Mark	78	61	70	52	60	75	65	60	70	70

- Calculate the mean of Mathematics (4 marks)
- State the Mode of Science marks (2 mark)
- Find the median of Science marks (3 marks)
- Compute the Standard deviation of Mathematics marks and comment on it(12 marks)
- State any 2 disadvantages of the mean (4 marks)

Question 5

Table 2:

Time spent studying and performance during examination

Student	Q	R	S	T	U	V	W	X	Y	Z
Time 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

Using information from table 2 above calculate Pearson's product moment correlation coefficient and comment on it. [Total 25 marks]

Question 6

Two lecturers conducted an interview for prospective students and awarded them marks as follows;

Student	A	B	C	D	E	F	G	H	I	J
Lecturer x	50	48	52	70	70	72	55	70	80	72
Lecturer y	45	44	60	66	80	60	40	68	84	72

Carry out a t-test at 0,05 significance level the hypothesis that there is no significant difference in how they awarded marks using a t-test by;

- i) Stating the null and alternative hypothesis (2 marks)
- ii) Calculating the degrees of freedom (1 mark)
- iii) Stating the rejection criteria (1 mark)
- iv) Conducting the test (19 marks)
- v) Stating the conclusion (2 marks)

TABLE II Critical Values of t Student t -test

df	Level of significance for 2 directional (one-tailed) test					
	Level of significance for non-directional (two-tailed) test					
	.10	.05	.025	.01	.005	.0025
1	3.078	3.143	3.200	3.277	3.357	3.449
2	2.924	2.977	3.021	3.078	3.141	3.198
3	2.776	2.819	2.861	2.917	2.971	3.024
4	2.650	2.693	2.734	2.789	2.841	2.893
5	2.576	2.618	2.658	2.712	2.763	2.814
6	2.507	2.548	2.587	2.640	2.690	2.740
7	2.449	2.489	2.527	2.579	2.628	2.677
8	2.402	2.441	2.478	2.529	2.577	2.625
9	2.364	2.399	2.435	2.485	2.532	2.579
10	2.327	2.361	2.396	2.445	2.491	2.537
11	2.292	2.325	2.359	2.407	2.452	2.497
12	2.259	2.291	2.324	2.371	2.415	2.459
13	2.228	2.259	2.291	2.337	2.380	2.423
14	2.200	2.230	2.261	2.306	2.348	2.391
15	2.174	2.203	2.233	2.277	2.318	2.360
16	2.150	2.178	2.207	2.250	2.291	2.332
17	2.128	2.155	2.183	2.225	2.265	2.305
18	2.108	2.134	2.161	2.202	2.241	2.281
19	2.090	2.115	2.141	2.181	2.219	2.258
20	2.074	2.098	2.123	2.162	2.199	2.237
22	2.052	2.075	2.099	2.137	2.173	2.210
24	2.033	2.055	2.078	2.115	2.150	2.186
26	2.017	2.038	2.060	2.096	2.130	2.165
28	2.003	2.023	2.044	2.079	2.112	2.146
30	1.990	2.009	2.029	2.063	2.095	2.128
35	1.971	1.989	2.008	2.041	2.072	2.104
40	1.955	1.972	1.990	2.022	2.052	2.083
50	1.938	1.954	1.971	2.002	2.031	2.061
60	1.925	1.940	1.956	1.986	2.014	2.043
80	1.905	1.919	1.934	1.963	1.990	2.018
100	1.888	1.901	1.915	1.943	1.969	1.996
∞	1.881	1.893	1.905	1.932	1.957	1.982

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_{α} is the intersection of the row and that column. If $t_{\alpha} > t_{obs}$, then H_0 is rejected.

FACULTY OF EDUCATION

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STATISTICAL FORMULAE

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

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

Pearson 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:
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Chi-squared Test Statistic:
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Z-score:
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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. $SST = SS(Treatment) = SS(BtwnGrps) = \sum \frac{T_i^2}{n_i} - \frac{(\sum x)^2}{n} = \frac{T_1^2}{n_1} + \frac{T_2^2}{n_2} + \dots + \frac{T_p^2}{n_p} - \frac{(\sum x)^2}{n}$

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

[N.B. $SSE = SS(Error) = SS(Within Groups) = SS(Residual)$]

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, ..., p)

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

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T Test

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	.10	.05	.025	.01	.005	.001
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	.20	.10	.05	.01	.01	.001
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2	2.954	4.779	11.203	19.853	12.925	9.525
3	2.876	4.541	10.648	19.246	12.522	9.348
4	2.821	4.370	10.247	18.868	12.227	9.200
5	2.777	4.257	9.946	18.592	11.999	9.075
6	2.741	4.179	9.700	18.397	11.831	8.968
7	2.711	4.120	9.548	18.256	11.716	8.875
8	2.687	4.073	9.444	18.147	11.633	8.793
9	2.668	4.034	9.371	18.062	11.567	8.721
10	2.653	4.001	9.312	18.000	11.516	8.658
11	2.642	3.973	9.263	17.948	11.470	8.603
12	2.633	3.949	9.222	17.904	11.428	8.555
13	2.626	3.928	9.187	17.867	11.390	8.512
14	2.620	3.909	9.156	17.834	11.356	8.473
15	2.615	3.892	9.128	17.804	11.325	8.437
16	2.611	3.877	9.102	17.776	11.296	8.403
17	2.607	3.863	9.078	17.750	11.269	8.371
18	2.604	3.850	9.056	17.726	11.244	8.341
19	2.601	3.838	9.035	17.703	11.220	8.312
20	2.598	3.827	9.015	17.681	11.197	8.285
21	2.596	3.816	8.996	17.660	11.175	8.259
22	2.594	3.806	8.978	17.640	11.154	8.235
23	2.592	3.796	8.961	17.621	11.134	8.212
24	2.590	3.787	8.945	17.602	11.114	8.190
25	2.589	3.778	8.930	17.584	11.095	8.169
26	2.587	3.770	8.916	17.566	11.076	8.149
27	2.586	3.762	8.902	17.549	11.058	8.130
28	2.585	3.754	8.889	17.532	11.040	8.112
29	2.584	3.746	8.876	17.516	11.023	8.095
30	2.583	3.739	8.864	17.500	11.006	8.078
35	2.580	3.725	8.835	17.464	10.970	8.045
40	2.578	3.712	8.810	17.430	10.936	8.013
50	2.575	3.695	8.775	17.380	10.890	7.975
60	2.573	3.680	8.745	17.340	10.850	7.940
70	2.571	3.667	8.715	17.300	10.810	7.905
80	2.570	3.655	8.685	17.260	10.770	7.872
90	2.569	3.644	8.655	17.220	10.730	7.840
∞	2.568	3.634	8.625	17.180	10.690	7.810

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