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Use of Non-Parametric Tests in Extension Education

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ABSTRACT

Non-Parametric Statistical tests are very useful in extension research. Therefore, to study the extent of utilization of such non-parametric tests in extension research published in different journals was carried out. In extension research, 18.57% articles were found with the use of non-parametric statistical tests. The X^2 test is most popular and used 71.79% from the total use of non-parametric tests. The other non-parametric tests were used scantly. The use of non-parametric tests in different journals, years and areas of extension education were found homogeneous.

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INTRODUCTION

In extension education research, one has to deal with different heterogeneous population, varied sample size, weak assumption about the nature of distribution, lack of an adequate scale and so on. In such situation, the advantages of non-parametric statistical tests (NPT) are : (1) If sample sizes as small as N=6 are used, there is no alternative to use a non-parametric statistical test unless the nature of the population distribution is known exactly. (2) There are suitable NPT for treating samples made up of observations from different populations. (3) NPT can treat the data which are simply classificatory. (4) NPT are available to treat data which are inherently in ranks as well as data whose seemingly numerical scores have the strength of ranks. (5) Probability statements obtained from most NPT are exact probabilities (except in the case of large samples, where excellent approximations are available), regardless of the shape of population distribution from which the random sample was drawn. (6) NPT are easy to learn and apply. Thus, in extension education research, NPT help in great extent. However, at what extent researchers are preferring/using the NPT is matter of study.

MATERIALS AND METHODS

Out of different journals of extension education two journals i.e. (1) Indian Journal of Extension Education (IJ) and (2) Maharashtra Journal of Extension Education (MJ) were found related to extension education and all most all articles published in these journals were of research base. Hence, these two journals were finally selected for study. Amongst these journals the volume published during 1981 to 1988 of IJ and volume published during 1985 to 1988 of MJ were selected to study, as they were available at source.

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The classification of the research articles published in IJ during 1981 to 1987 in different areas of extension education is available in IJEE, Vol. XXIII, 1987 which was taken as base to study the use of NPT in respected area of extension education in proportion with the total articles in that area of extension education.

To test the homogeneity of proportion between; the research articles published and the number of articles with NPT, use of NPT in IJ and MJ, use of NPT in different years, use of NPT in different areas of extension education, the X^2 (Chi-square) test was used.

The percentage were also calculated for the different comparisions and ranks were also given according to the percentages.

RESULTS AND DISCUSSION

1. Use of NPT in IJ

Out of 255 research articles studied, 42 (16.17%) research articles were found with the use of NPT in IJ. Whereas 25 (17.60%) research papers (RP) and 17(15.04%) research notes (RN) were found with the use of NPT, out of 142 and 113 research papers and research notes published respectively. However, the X^2 value for the homogeneity (Table-1) in different years were found non-significant. Thus, the research papers, research note and total articles published in IJ during the different years have a proportionate use on NPT.

TABLE 1

Use of NPT in IJ.

Year	*Research Paper*		*Research Note*		*Articles (Total)*	
	Published	*NPT used*	*Published*	*NPT used*	*Published*	*NPT used*
1981	21	4	11	4	32	8
1982	19	4	10	1	29	5
1983	20	3	14	3	34	6
1984	14	5	15	2	28	7
1985	23	0	17	3	40	3
1986	21	3	12	2	33	5
1987	17	4	24	1	41	5
1988	7	2	11	1	18	3
Total	142	25	113	17	255	42
Percentage		17.60%		15.04%		16.47%
X^2 - Value		6.92		5.04		4.40

2. Use of NPT in MJ

Out of 165 research articles of MJ, 36(21.81%) were found with the use of NPT. Similarly, out of 103 and 62 RP and RN published, 26(25.24%) and 10(16.12%) were found with the use of NPT, respectively. The X^2 test for the homogeneity (Tabel-2) for the different years were found non-significant. Thus, the research papers, research notes and total articles published in MJ during the different years have prpoportionate use of NPT.

TABLE 2

Use of NPT in MJ.

Year	Research Papers		Research Note		Article (Total)	
	Published	NPT used	Published	NPT used	Published	NPT used
1985	23	9	10	0	33	9
1986	24	4	12	3	36	7
1987	31	9	13	2	44	11
1988	25	4	27	5	52	9
Total	103	26	62	10	165	36
Percentage		25.24%		16.12%		21.81%
X^2		2.728		2.165		1.008

3. Use of NPT in RP and RN

The X^2 value for the homogeneity for the use of NPT between RP and RN was found non-significant. Thus, the use of NPT in research papers and research notes (published in both journals) was homogenous (Table-3).

TABLE 3

Use of NPT in RP and RN.

Detail	RP/RN published	RP/RN with use of NPT
Research paper	245	51
Research Note	175	27
Total	420	78
X^2 value	1.35	

4. Use of NPT in IJ and MJ

Out of 420 articles published in IJ and MJ, 78 (18.17%) articles were found with use of NPT. The X^2 for the homogeneity between two journals in respect of the use of NPT were found non- significant. Thus, the use of non-parametric tests in both the journals were homogenous (Table-3).

TABLE 4

Use of NPT in IJ and MJ.

Name of Journals	Research paper		Research Note		Total Article	
	Published	NPT used	Published	NPT used	Published	NPT used
IJ of EE	142	25	113	17	255	42
MJ of EE	103	26	62	10	165	36
Total	245	51	175	27	420	78
Percentage		20.81%		15.42%		18.57%
X^2 value		1.372	0.026		1.2891	

5. Use of NPT in different years

The X^2 value 1.37 was found non-significant for the use of NPT during the years 1981 to 1988. Thus, the use of NPT for the different years were homogenous (Table-5).

TABLE 5

Use of NPT in different years.

Year	*Number of Articles*		*percentage*
	Studied	*NPT used*	
1981	32	8	25.00
1982	29	5	17.24
1983	34	6	17.65
1994	28	7	15.00
1985	73	12	16.94
1986	69	12	17.39
1987	85	16	18.82
1988	70	12	17.14
Total	420	78	18.57
X^2 value		1.370	

6. Use of different NPT

Only nine types of NPT were used in the journals. Out of which, the X^2 test was used most frequently, i.e. about 71.79% from the total used of NPT. Whereas Kendall Co-efficient of Concardance was used about 10.26% at second rank. At third rank, Spearman Rank Correlation was used about 5.15%. Further, the tests i. e. :

(1) Wilcoxon metched-pairs signed rank test
(2) Median test
(3) Mann-Whithey 'U' test
(4) Kolmogorov-Smirnov two sample test
(5) Xolmogorov — Smirnov one sample test
(6) Kandal Rank Correlation were used scantly.

The other NPTs e.g. (1) Bionominal test (2) One sample rank test (3) Mc. Neman test for the significant of changes (4) Sign test (5) Walsh test (6) Randomization test for matched pairs (7) Fisher exact probability test (8) Walswol-fowitz test (9) Moses test of extreme reactions (10) Cochran Q test (11) Friedman two-way analysis of varience by ranks (12) Contengenes Coefficient etc. were not found used at all during the survey (Table-6).

7. Use of NPT in different areas of extension education

The total articles published in different areas in Indian Journals of Extension Education during 1981 to 1988 and out of it the articles in which NPT used were compared proportionatly. The X^2 value 11.92 was found non-significant. Thus, the use of NPT in different areas of extension education was homogeneous. However, NPT were used 36.36% in the area of 'Special Group' at first rank, whereas in the area of 'Diffusion and Adoption of Innovation' 23.19% articles were with the use of NPT at second rank (Table-7).

TABLE 6

Use of different NPT.

Area of work	X^2 Test	Kendall co-efficnient of concordance 'W'	Spearman rank co-relation co-efficient	Wilcoxon matched pairs signed rank test	Median test	Mann Whitney 'U' Test	Kolmogorv Smirnov		Kendal rank correlation coefficient
							Two sample test	One sample test	
1. Agril. Communication	12	1	1	—	—	—	—	—	—
2. Agril. Education	—	1	—	—	—	—	—	—	—
3. Diffusion and Adoption of Innovation	17	3	2	1	—	2	2	1	1
4. Extension Management	2	2	—	—	1	—	—	—	—
5. Programme planning	7	—	—	—	—	—	—	—	—
6. Research Methodology	—	1	—	—	—	—	—	—	—
7. Rural Institutions	1	—	—	—	—	—	—	—	—
8. Special Groups	13	—	1	1	1	—	—	—	—
9. Training	3	—	—	—	—	—	—	—	—
10. Others	1	—	—	—	—	—	—	—	—
Total Articles	56	8	4	2	2	2	2	1	1
Percentage	71.79	10.26	5.15	2.56	2.56	2.56	2.56	1.28	1.28
Rank	I	II	III	IV	IV	IV	IV	V	V

TABLE 7

Use of NPT in different areas of extension education.

Area of work	*No. of Articles*		*Percentage*	*Rank*
	Published in IJ	*NPT used*		
1 Agril. Communication	44	9	20.45	3
2. Agril. Extension	12	1	8.33	6
3. Difference and Adoption of Innovation	69	16	23.19	2
4. Extension Management	44	4	9.09	5
5. Programme Planning	21	2	9.52	4
6 Research Methodology	9	–	0.00	9
7. Rural Institutions	12	1	8.33	7
8. Special groups	22	8	36.36	1
9. Training	18	1	5.56	8
10. Others	4	–	0.00	10
Total :	255	42	16.47	–
X^2 Value		11.92	–	–

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