CHAPTER IV

ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

IV. 1 INTRODUCTION

In the preceding chapter, the methodology which was followed in the present investigation was discussed in details. This chapter presents analysis of data, particularly, the preparation of a master matrix for all the 205 teachers, computation of percentage of questioning from the teacher talk, percentages of different kinds of questions from the teacher talk, computation of T Q R and extension of different kinds of questions. Preparation of master matrices for different groups, viz., social studies and science teachers, trained and untrained teachers, and the teachers having experience upto 5 years and the teachers having experience above 10 years are presented here. Then, the chi-square values for different groups are presented. After that, the percentages for different kinds of questions from the total questioning for different groups are presented. In addition to this, the percentages of different columns and rows related to questioning categories, students' response and initiation have been computed for different groups. The results have been presented along with their interpretation. Thereafter is

given the general discussion of results in the light of related research studies.

IV. 2 PREPARATION OF MASTER MATRICES

As mentioned in the preceding chapter, the data which were collected in the form of code numbers were transformed into 12 X 12 matrix. Thus 410 matrices were prepared. As each teacher was observed for two periods, his two matrices were combined and thus the number of matrices was reduced to 205 (one for each teacher). Again a master matrix representative of all the 205 teachers was prepared by combining all the 205 individual matrices. The process of combining matrices was carried out cell by cell addition of frequencies as described by Flanders (1970). The row which is marked as 'Total' is obtained by adding the tallies in individual categories. In computation, which follows, wherever, the sum of categories is referred to, that is obtained by summing up the totals of categories under consideration. The master matrix of 205 teachers is given in Table 4.1. In the same way, master matrices were prepared for the different groups of teachers, viz., social studies teachers, science teachers, trained teachers, untrained teachers, teachers having experience upto 5 years and the teachers having experience above 10 years. These master matrices are presented in Tables 4.2 to 4.7 respectively.

Table 4.1 : Master Matrix for 205 Teachers of Social Studies and Science

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	1675	1156	88	193	68	2	43	2749	336	1241	339	775	8665
2a	42	164	9	4	-	-	-	82	76	5656	13	1657	7703
2b	4	-	49	-	-	-	-	7	6	369	1	134	570
2c	4	-	-	42	-	-	-	15	4	736	9	404	1214
2d	2	-	-	-	37	-	-	2	1	168	-	64	274
2e	-	-	-	-	-	4	-	-	-	4	-	10	18
2f	2	-	-	-	-	-	-	2	6	375	-	48	433
3	161	3205	174	453	83	2	157	134098	821	397	610	2265	142426
4	54	391	33	43	7	-	73	1148	2551	965	89	934	6288
5	5499	1335	129	306	59	8	83	1798	1363	21201	239	1092	33112
6	1038	44	-	10	-	1	2	99	191	51	1372	112	2930
7	184	1408	88	163	20	1	75	2426	933	1939	258	14870	22365
Total	8665	7703	570	1214	274	18	433	142426	6288	33112	2930	22365	225998
%age	3.83	3.41	0.25	0.54	0.12	0.01	0.19	63.02	2.78	14.65	1.296	9.896	100

Table 4.2 : Master Matrix of 70 Social Studies Teachers

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	559 (0.71)	422 (0.54)	28 (0.036)	52 (0.066)	19 (0.024)	00 (0.00)	17 (0.022)	1038 (1.32)	119 (0.15)	449 (0.574)	80 (0.102)	243 (0.31)	3026 (3.86)
2a	10 (0.013)	102 (0.13)	2 (0.003)	3 (0.004)	00 (0.00)	00 (0.00)	00 (0.00)	89 (0.114)	38 (0.049)	1830 (2.34)	4 (0.005)	569 (0.728)	2647 (3.385)
2b	2 (0.003)	00 (0.00)	27 (0.035)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.01)	2 (0.003)	122 (0.156)	00 (0.00)	38 (0.049)	192 (0.246)
2c	3 (0.004)	00 (0.00)	00 (0.00)	7 (0.009)	00 (0.00)	00 (0.00)	00 (0.00)	2 (0.003)	00 (0.00)	233 (0.298)	00 (0.00)	111 (0.142)	356 (0.455)
2d	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	10 (0.013)	00 (0.00)	00 (0.00)	20 (0.026)	1 (0.001)	48 (0.061)	00 (0.00)	9 (0.012)	88 (0.113)
2e	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)
2f	2 (0.003)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.001)	4 (0.005)	155 (0.198)	00 (0.00)	9 (0.012)	171 (0.219)
3	109 (0.13)	1064 (1.361)	61 (0.078)	132 (0.169)	35 (0.045)	00 (0.00)	62 (0.079)	47900 (61.25)	284 (0.36)	199 (0.254)	314 (0.402)	539 (0.68)	50699 (64.83)
4	17 (0.02)	136 (0.174)	8 (0.01)	16 (0.02)	00 (0.00)	00 (0.00)	27 (0.035)	397 (0.50)	988 (1.26)	329 (0.421)	34 (0.043)	284 (0.36)	2236 (2.85)
5	1899 (2.428)	489 (0.625)	41 (0.052)	110 (0.141)	22 (0.028)	00 (0.00)	34 (0.043)	579 (0.74)	451 (0.577)	7366 (9.419)	83 (0.106)	322 (0.412)	11396 (14.573
6	373 (0.477)	16 (0.02)	00 (0.00)	2 (0.003)	2 (0.003)	00 (0000)	00 (0.00)	20 (0.026)	60 (0.077)	27 (0.035)	399 (0.51)	68 (0.087)	967 (1.237)
7	52 (0.06)	418 (0.535)	25 (0.032)	34 (0.043)	00 (0.00)	00 (0.00)	31 (0.04)	652 (0.83)	289 (0.36)	638 (0.816)	53 (0.068)	4232 (5.41)	6424 (8.21)
Total	3026 (3.86)	2647 (3.385)	192 (0.246)	356 (0.455)	88 (0.113)	00 (0.00)	171 (0.219)	50699 (64.83)	12236 (2.85)	11398 (14.573)	967 (1.237)	6424 (8.21)	78202 (100)

Note: Figures in parentheses are in terms of percentages.

Table 4.3 : Master Matrix of 70 Science Teachers

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	629 (0.83)	468 (0.624)	35 (0.047)	72 (0.096)	36 (0.048)	2 (0.003)	9 (0.012)	940 (1.25)	113 (0.15)	456 (0.608)	80 (0.10)	407 (0.54)	3247 (4.32)
2a	8 (0.011)	24 (0.032)	2 (0.003)	1 (0.001)	00 (0.00)	00 (0.00)	00 (0.00)	15 (0.02)	9 (0.012)	1986 (2.646)	3 (0.004)	574 (0.765)	2622 (3.494)
2b	2 (0.003)	00 (0.00)	18 (0.024)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.001)	154 (0.205)	2 (0.003)	52 (0.069)	229 (0.305)
2c	00 (0.00)	00 (0.00)	00 (0.00)	11 (0.015)	00 (0.00)	00 (0.00)	00 (0.00)	6 (0.008)	00 (0.00)	259 (0.345)	8 (0.011)	180 (0.24)	464 (0.618)
2d	2 (0.003)	00 (0.00)	00 (0.00)	00 (0.00)	9 (0.012)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	80 (0.107)	00 (0.00)	59 (0.079)	150 (0.20)
2e	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	4 (0.005)	00 (0.00)	00 (0.00)	00 (0.00)	3 (0.004)	00 (0.00)	9 (0.012)	16 (0.021)
2f	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.001)	1 (0.001)	99 (0.132)	00 (0.00)	15 (0.02)	116 (0.155)
3	132 (0.17)	1050 (0.40)	88 (0.117)	185 (0.246)	54 (0.72)	1 (0.001)	47 (0.063)	43213 (57.57)	245 (0.32)	125 (0.16)	198 (0.26)	799 (1.06)	46137 (61.47)
4	13 (0.01)	99 (0.132)	15 (0.02)	11 (0.015)	7 (0.009)	00 (0.00)	15 (0.02)	388 (0.51)	711 (0.94)	313 (0.41)	28 (0.03)	294 (0.39)	1894 (2.52)
5	2080 (2.771)	405 (0.54)	38 (0.051)	104 (0.139)	27 (0.036)	8 (0.011)	26 (0.035)	592 (0.789)	429 (0.572)	6719 (8.953)	68 (0.091)	439 (0.585)	10935 (14.57)
6	310 (0.413)	18 (0.024)	00 (0.00)	3 (0.004)	00 (0.00)	00 (0.00)	2 (0.003)	31 (0.041)	82 (0.109)	21 (0.028)	566 (0.754)	13 (0.017)	1046 (1.394)
7	71 (0.09)	558 (0.743)	33 (0.044)	77 (0.103)	17 (0.023)	1 (0.001)	17 (0.023)	951 (1.26)	303 (0.40)	720 (0.95)	93 (0.12)	5354 (7.13)	8195 (10.91)
Total	3247 (4.32)	2622 (3.494)	229 (0.305)	464 (0.618)	150 (0.20)	16 (0.021)	116 (0.155)	46137 (61.47)	1894 (2.52)	10935 (14.57)	1046 (1.394)	8195 (10.91)	75051 (100)

Note : Figures in parentheses are in terms of percentages.

Table 4.4 : Master Matrix of 48 Trained Teachers

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	395 (0.756)	319 (0.611)	23 (0.044)	52 (0.10)	21 (0.040)	02 (0.00)	10 (0.019)	656 (1.256)	83 (0.159)	299 (0.573)	56 (0.107)	206 (0.394)	2120 (4.06)
2a	2 (0.004)	43 (0.082)	2 (0.004)	1 (0.002)	00 (0.00)	00 (0.00)	00 (0.00)	24 (0.046)	37 (0.071)	1367 (2.618)	2 (0.004)	382 (0.731)	1860 (3.562)
2b	00 (0.00)	00 (0.00)	3 (0.006)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	00 (0.00)	93 (0.178)	00 (0.00)	22 (0.042)	119 (0.228)
2c	00 (0.00)	00 (0.00)	00 (0.00)	5 (0.01)	00 (0.00)	00 (0.00)	00 (0.00)	4 (0.008)	00 (0.00)	165 (0.316)	2 (0.004)	67 (0.128)	243 (0.465)
2d	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	5 (0.01)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	35 (0.067)	00 (0.00)	14 (0.027)	54 (0.103)
2e	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	00 (0.00)	00 (0.00)	1 (0.002)
2f	1 (0.002)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	3 (0.006)	81 (0.155)	00 (0.00)	8 (0.015)	94 (0.180)
3	65 (0.12)	643 (1.231)	38 (0.073)	77 (0.147)	18 (0.034)	1 (0.002)	38 (0.072)	30224 (57.875)	168 (0.32)	163 (0.312)	157 (0.301)	579 (1.10)	32171 (61.60)
4	13 (0.02)	96 (0.184)	8 (0.015)	10 (0.019)	00 (0.00)	00 (0.00)	24 (0.046)	238 (0.456)	671 (1.28)	279 (0.534)	14 (0.027)	235 (0.44)	1586 (3.03)
5	1362 (2.60)	345 (0.661)	35 (0.067)	69 (0.132)	7 (0.013)	00 (0.00)	11 (0.021)	418 (0.800)	370 (0.70)	5189 (9.936)	61 (0.117)	293 (0.56)	8160 (15.62)
6	228 (0.43)	9 (0.017)	00 (0.00)	2 (0.004)	00 (0.00)	00 (0.00)	00 (0.00)	26 (0.050)	45 (0.08)	23 (0.044)	321 (0.615)	18 (0.034)	672 (1.28)
7	54 (0.10)	405 (0.776)	10 (0.019)	27 (0.052)	3 (0.006)	00 (0.00)	13 (0.025)	579 (1.109)	209 (0.40)	465 (0.89)	59 (0.113)	3309 (6.33)	5133 (9.83)
T	2120 (4.06)	1860 (3.562)	119 (0.228)	243 (0.465)	54 (0.103)	1 (0.002)	94 (0.180)	32171 (61.603)	1586 (3.036)	8160 (15.625)	672 (1.287)	5133 (9.83)	52213 (100)

Note : Figures in parentheses are in terms of percentages

Table 4.5 : Master Matrix of 48 Untrained Teachers

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	118 (0.235)	161 (0.321)	7 (0.014)	25 (0.050)	1 (0.002)	00 (0.00)	3 (0.006)	485 (0.97)	47 (0.09)	188 (0.375)	19 (0.038)	129 (0.26)	1183 (2.36)
2a	5 (0.010)	19 (0.038)	1 (0.002)	1 (0.002)	00 (0.00)	00 (0.00)	00 (0.00)	7 (0.014)	9 (0.018)	985 (1.965)	1 (0.002)	325 (0.646)	1353 (2.699)
2b	00 (0.00)	00 (0.00)	10 (0.020)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	2 (0.004)	3 (0.006)	59 (0.118)	00 (0.00)	30 (0.060)	104 (0.207)
2c	00 (0.00)	00 (0.00)	00 (0.00)	000 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	2 (0.004)	112 (0.223)	00 (0.00)	69 (0.138)	183 (0.365)
2d	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	3 (0.006)	00 (0.00)	3 (0.006)	6 (0.012)
2e	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	1 (0.002)
2f	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	53 (0.106)	00 (0.00)	3 (0.006)	56 (0.112)
3	49 (0.097)	586 (1.169)	34 (0.068)	73 (0.146)	3 (0.006)	1 (0.002)	26 (0.052)	36346 (72.496)	225 (0.448)	63 (0.126)	110 (0.219)	590 (1.176)	38106 (76.006)
4	11 (0.022)	83 (0.166)	9 (0.018)	11 (0.022)	00 (0.00)	00 (0.00)	7 (0.014)	282 (0.562)	556 (1.109)	154 (0.307)	8 (0.016)	230 (0.459)	1351 (2.695)
5	861 (1.717)	199 (0.397)	17 (0.034)	43 (0.086)	2 (0.004)	00 (0.00)	4 (0.008)	396 (0.789)	234 (0.466)	2920 (5.824)	23 (0.046)	217 (0.432)	4886 (9.745)
6	111 (0.221)	4 (0.008)	00 (0.00)	4 (0.008)	00 (0.00)	00 (0.00)	00 (0.00)	41 (0.081)	49 (0.097)	5 (0.010)	206 (0.411)	8 (0.015)	428 (0.853)
7	28 (0.055)	301 (0.600)	26 (0.052)	26 (0.052)	00 (0.00)	00 (0.00)	16 (0.032)	577 (1.150)	226 (0.450)	344 (0.686)	61 (0.122)	3512 (7.005)	5117 (10.206)
T	1183 (2.36)	1353 (2.699)	104 (0.207)	183 (0.365)	6 (0.012)	1 (0.002)	56 (0.112)	38106 (76.006)	1351 (2.695)	4886 (9.746)	428 (0.854)	5117 (10.206)	50135 (100)

Note : Figures in parentheses are in terms of percentages

Table 4.6 : Master Matrix of 41 Teachers having Experience upto 5 Years

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	195 (0.419)	250 (0.538)	16 (0.034)	33 (0.071)	2 (0.004)	00 (0.00)	00 (0.00)	500 (1.076)	57 (0.122)	182 (0.392)	8 (0.017)	148 (0.318)	1391 (2.993)
2a	2 (0.004)	24 (0.052)	2 (0.004)	1 (0.002)	00 (0.00)	00 (0.00)	00 (0.00)	14 (0.030)	6 (0.013)	971 (2.090)	4 (0.009)	417 (0.897)	1441 (3.101)
2b	1 (0.002)	00 (0.00)	20 (0.043)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	66 (0.142)	00 (0.00)	25 (0.054)	112 (0.241)
2c	1 (0.002)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	1 (0.002)	105 (0.226)	00 (0.00)	93 (0.200)	201 (0.433)
2d	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	2 (0.004)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	17 (0.037)	00 (0.00)	5 (0.011)	24 (0.052)
2e	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	3 (0.006)	3 (0.006)
2f	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	46 (0.099)	00 (0.00)	3 (0.006)	49 (0.105)
3	32 (0.068)	575 (1.238)	17 (0.037)	91 (0.196)	7 (0.015)	1 (0.002)	19 (0.041)	28676 (61.717)	201 (0.432)	76 (0.194)	79 (0.170)	474 (1.020)	30248 (65.101)
4	3 (0.006)	79 (0.170)	5 (0.011)	5 (0.011)	00 (0.00)	00 (0.00)	15 (0.032)	247 (0.531)	503 (1.082)	199 (0.428)	9 (0.019)	237 (0.510)	1302 (2.802)
5	1037 (2.231)	226 (0.486)	27 (0.058)	53 (0.114)	9 (0.019)	2 (0.004)	4 (0.009)	265 (0.570)	267 (0.574)	3842 (8.269)	31 (0.067)	228 (0.490)	5991 (12.894)
6	100 (0.215)	7 (0.015)	00 (0.00)	2 (0.004)	2 (0.004)	00 (0.00)	00 (0.00)	23 (0.049)	18 (0.038)	12 (0.026)	141 (0.303)	11 (0.023)	316 (0.680)
7	20 (0.043)	280 (0.603)	25 (0.054)	16 (0.034)	2 (0.004)	00 (0.00)	11 (0.024)	522 (1.123)	249 (0.535)	475 (1.022)	44 (0.095)	3741 (8.051)	5385 (11.589)
Total	1391 (2.993)	1441 (3.101)	112 (0.241)	201 (0.433)	24 (0.052)	3 (0.006)	49 (0.105)	30248 (65.101)	1302 (2.802)	5991 (12.894)	316 (0.680)	5385 (11.589)	46463 (100)

Note : Figures in parentheses are in terms of percentages

Table 4.7 : Master Matrix of 41 Teachers having Experience above 10 years

	1	2a	2b	2c	2d	2e	2f	3	4	5	6	7	Total
1	451 (1.001)	280 (0.622)	17 (0.038)	54 (0.120)	25 (0.055)	00 (0.00)	7 (0.016)	649 (1.440)	60 (0.133)	332 (0.737)	72 (0.002)	144 (0.319)	2091 (4.641)
2a	7 (0.016)	37 (0.082)	2 (0.004)	4 (0.009)	1 (0.002)	00 (0.00)	00 (0.00)	13 (0.029)	15 (0.033)	1412 (3.135)	2 (0.004)	390 (0.866)	1783 (3.958)
2b	2 (0.004)	6 (0.013)	8 (0.018)	2 (0.004)	00 (0.00)	00 (0.00)	00 (0.00)	4 (0.009)	00 (0.00)	95 (0.211)	00 (0.00)	22 (0.049)	139 (0.309)
2c	00 (0.00)	4 (0.009)	00 (0.00)	10 (0.022)	1 (0.002)	00 (0.00)	00 (0.00)	3 (0.007)	00 (0.00)	274 (0.608)	8 (0.018)	108 (0.240)	408 (0.906)
2d	2 (0.004)	10 (0.022)	2 (0.004)	6 (0.013)	14 (0.031)	00 (0.00)	00 (0.00)	2 (0.004)	00 (0.00)	66 (0.147)	00 (0.00)	28 (0.062)	130 (0.289)
2e	00 (0.00)	3 (0.007)	2 (0.004)	1 (0.002)	00 (0.00)	4 (0.009)	00 (0.00)	00 (0.00)	00 (0.00)	1 (0.002)	00 (0.00)	1 (0.002)	12 (0.027)
2f	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	00 (0.00)	90 (0.200)	00 (0.00)	3 (0.007)	93 (0.206)
3	86 (0.190)	732 (1.625)	47 (0.104)	144 (0.320)	51 (0.113)	8 (0.018)	49 (0.095)	25160 (55.854)	122 (0.270)	99 (0.220)	116 (0.258)	441 (0.978)	27055 (60.060)
4	10 (0.022)	67 (0.149)	9 (0.020)	10 (0.022)	4 (0.009)	00 (0.00)	4 (0.009)	182 (0.404)	328 (0.728)	182 (0.404)	13 (0.029)	126 (0.279)	935 (2.075)
5	1259 (2.794)	393 (0.872)	39 (0.087)	114 (0.253)	28 (0.062)	00 (0.00)	28 (0.062)	500 (1.109)	252 (0.559)	4766 (10.580)	68 (0.151)	269 (0.597)	7716 (17.129)
6	226 (0.501)	12 (0.027)	00 (0.00)	4 (0.009)	00 (0.00)	00 (0.00)	00 (0.00)	27 (0.059)	33 (0.073)	20 (0.044)	277 (0.615)	5 (0.011)	604 (1.340)
7	48 (0.106)	239 (0.531)	13 (0.029)	59 (0.131)	6 (0.013)	00 (0.00)	5 (0.011)	515 (1.143)	125 (0.277)	379 (0.841)	48 (0.107)	2643 (5.867)	4080 (9.057)
T	2091 (4.641)	1783 (3.958)	139 (0.309)	408 (0.906)	130 (0.289)	12 (0.027)	93 (0.206)	27055 (60.060)	935 (2.075)	7716 (17.129)	604 (1.341)	4080 (9.057)	45046 (100)

Note : Figures in parentheses are in terms of percentages.

IV.3 COMPUTATION OF PERCENTAGES OF QUESTIONING FROM DIFFERENT TEACHING BEHAVIOURS

In the preceding paragraph, it is mentioned that a master matrix representing 205 teachers was prepared. With the help of this master matrix an attempt has been made to study the questioning behaviour - in the context of other teaching behaviours. For the same purpose, certain percentages and ratios were calculated. The procedure of calculations with illustrations is given in the following.

IV.3.1 Percentage of Questioning from the Teacher Talk

It was obtained by dividing the sum of categories 2a through 2f, by the sum of categories 1 through 4 and multiplying the ratio by hundred.

Percentage of questioning from the teacher talk

$$= \frac{(\text{Categories } 2a + 2b + 2c + 2d + 2e + 2f) \times 100}{(\text{Categories } 1 + 2a + 2b + 2c + 2d + 2e + 2f + 3 + 4)}$$

$$= \frac{(7703 + 570 + 1214 + 274 + 18 + 433) \times 100}{(8665 + 7703 + 570 + 1214 + 274 + 18 + 433 + 142426 + 6288)}$$

$$= \frac{10212 \times 100}{167591}$$

$$= 6.09 \text{ per cent.}$$

IV.3.2 Computation of Teacher Question Ratio (T.Q.R.)

This ratio was obtained by dividing the sum of categories 2a through 2f, by the sum of categories 2a through 3 and multiplying the ratio by 100.

$$TQR = \frac{(\text{Categories } 2a + 2b + 2c + 2d + 2e + 2f) \times 100}{(\text{Categories } 2a + 2b + 2c + 2d + 2e + 2f + 3)}$$

$$= \frac{10212 \times 100}{152638}$$

$$= 6.69$$

IV. 3.3 Percentage of Different Kinds of Questions from the Teacher Talk

It was obtained by dividing the sum of the particular category of questioning, by the sum of categories 1 through 4 and multiplying the ratio by 100.

(i) Percentage of memory questions

$$= \frac{(\text{Category } 2a) \times 100}{(\text{Categories } 1 + 2a + 2b + 2c + 2d + 2e + 2f + 3 + 4)}$$

$$= \frac{7703 \times 100}{167591}$$

$$= \frac{770300}{167591} = 4.60 \text{ per cent}$$

Following the same procedure the percentages have been calculated for all kinds of questions under study which are given subsequently.

(ii) Percentage of translation questions = 0.34 per cent

(iii) Percentage of interpretation questions = 0.72 per cent

(iv) Percentage of application questions = 0.16 per cent

(v) Percentage of higher order questions = 0.01 per cent

(vi) Percentage of routine types of questions= 0.26 per cent

These figures represent the percentages of different types of questions out of the total verbal behaviour of the teacher which includes the motivational behaviour (category 1), questioning behaviour (categories 2a to 2f), lecturing behaviour represented by category 3 and authoritarian behaviour represented by category 4.

IV 3.4 Percentage of Extension of Different Kinds of Questions

In order to study the extension of different kinds of questions, the percentages of questions' tallies in the 'steady state cells' (2a-2a, 2b-2b, etc.) which lie along the diagonals of the matrix were calculated. It was obtained by dividing the number of tallies in a particular question's steady state cell, by the total of the tallies in the row / column of that particular category and multiplying the ratio by 100. This is illustrated below for memory type of questions.

(i) Percentage of extension of memory questions

$$= \frac{\text{(Steady state cell 2a-2a) X 100}}{\text{(Sum of the tallies in the column 2a)}}$$

$$= \frac{164 \times 100}{7703}$$

= 2.13 per cent

Following the same procedure the percentages of extension for each types of questions were calculated.

(ii) Percentages of extension of translation questions = 8.59 percent

(iii) Percentages of extension of interpretation questions = 13.46 per cent

(iv) Percentage of extension of application questions = 13.50 per cent

(v) Percentage of extension of higher order questions = 22.22 per cent

(vi) Percentage of extension of routine types of questions = 00.00 per cent

IV. 3.5 Percentage of Different Kinds of Questions followed by Response

In order to study the association of different kinds of questions with response these percentages were calculated. How these percentages were obtained is illustrated for memory questions. The percentage of memory questions followed by response was arrived at by dividing the number of tallies in the cell '2a-5', by the total of tallies in column '2a' and multiplying the ratio by 100.

(i) Percentage of memory questions followed by response

$$= \frac{\text{(Cell 2a-5) X 100}}{\text{Category 2a}}$$

$$= \frac{5656 \text{ X } 100}{7703}$$

= 73.42 per cent

Following the same procedure percentages were calculated for all types of questions which are given below :

(ii) Percentage of translation questions followed by response = 64.74 percent

(iii) Percentage of interpretation questions followed by response = 60.63 percent

(iv) Percentage of application questions followed by response = 60.31 percent

(v) Percentage of higher order questions followed by response = 22.22 percent

(vi) Percentage of routine questions followed by response = 86.60 percent

IV.3.6 Percentage of Different Kinds of Questions followed by Silence

These percentages were calculated to study the association of different kinds of questions with silence. This silence represents the time required for thinking in order to respond a particular kind of question. How these percentages were obtained has been illustrated for memory questions. The percentage of memory questions followed by silence was arrived at by dividing the number of tallies in the cell (2a-7), by the total of column 2a and multiplying the ratio by 100.

(i) Percentage of memory questions followed by silence

$$= \frac{\text{(Cell 2a-7)} \times 100}{\text{Category 2a}}$$

$$= \frac{1657 \times 100}{7703}$$

= 21.51 per cent

In the same way, percentages have been calculated for all kinds of questions. These percentages are presented subsequently.

(ii) Percentage of translation questions followed by silence = 23.51 per cent

(iii) Percentage of interpretation questions followed by silence = 33.28 per cent

(iv) Percentage of applications questions followed by silence = 33.58 per cent

(v) Percentage of higher order questions followed by silence = 55.56 per cent

(vi) Percentage of routine types of questions followed by silence = 11.08 per cent

IV.4 QUESTIONING IN THE CONTEXT OF OTHER TEACHING BEHAVIOURS

The questioning which takes place in the teaching-learning process is an integral part of the total classroom interaction. Therefore, questioning earnestly claims to be studied in the context of other teaching behaviours. In this section of the present chapter, an attempt is made to study the same.

The Master Matrix of the classroom interaction generated by 205 teachers of social studies and science presents an analytical picture of the classroom episodes. In all there are 225998 tallies, each tally representing the classroom episodes at the end of three seconds. Out of this total, 161303 represent teacher talk. This has been arrived at by summating the totals for the columns 1 to 4. It is seen that in the total teaching encounter the teacher talk constitutes 71.37 per cent. Thus, the teacher dominates the classroom interaction. Of this teacher talk, questioning forms only 6.09 per cent. This indicates that in his verbal behaviour teacher uses questioning to a very small extent. Most of the time he is lecturing with a small percentage of

motivational behaviour and a smaller percentage of restrictive behaviour. From the proportion of questioning, it is evident that, certainly it is not a happy state of affairs even compared to Indian norms 14.23 per cent (Buch, 1975).

IV.4.1 Teacher Question Ratio (TQR)

This ratio, as the nomenclature indicates, is the tendency of the teacher to ask questions during the more content oriented part of the classroom discussion. The TQR in the present study is found to be 6.69 which is far below that of 16.32 (Buch, 1975) for an Indian teacher. This ratio varies as the teacher solicits pupil reactions to ideas which the teacher considers important or as he checks their understanding by asking questions. Normally, one would expect the average TQR when number of teachers are observed at several occasions, to be close to 16.32 in Indian classroom situation. But, the results of the present study indicate that the number of questions used by the teachers is unusually low in these classrooms due to which the TQR also has gone exceptionally low. This ratio indicates that the teachers check rarely the understanding of students by asking questions. If it is accepted that learning is accelerated and enriched in proportion to the interaction which the pupils have with the teachers, it can be seen that a very low percentage of teacher questioning behaviour is responsible for not promoting adequate learning by pupils. The teacher talks and talks without putting

questions which does not involve pupils in the teaching-learning process. Here, is an instance of the misguided use of teacher's efforts and energy because more learning takes place through greater interaction resulting from less of teacher talk and more of teacher questioning. The large percentage of teacher's lecturing and very small percentage of teacher's questioning indicate an ineffective programme of teacher education. It is worth remembering that hardly 25 per cent of the total 205 teachers were untrained, a vast majority being professionally trained. It is well known that in a large majority of English medium schools run on public school lines and those run by missions of different faiths the classroom climate is more or less restrictive. All the schools in the present sample are English medium schools. Is it that these schools are influenced by what is happening in missionary schools ? The present study does not provide any evidence to hazard such a conclusion. The problem may have to be researched into by future researchers. It should, however, be accepted that the obvious difference between the main characteristic of the present 205 schools and 500 schools in the Cooperative Project for Productive Teaching (Buch, 1975) is the medium of instruction which has been a foreign language in all the schools of the present study as against the mother tongue in almost all the schools in the study of Buch. In Gujarat, where the standard of English is not flattering, teachers might find it difficult to enliven the teaching-learning process

through frequent questioning. But again this is a hazardous guess.

IV.4.2 The Extent of Different Kinds of Questions in Teacher Talk

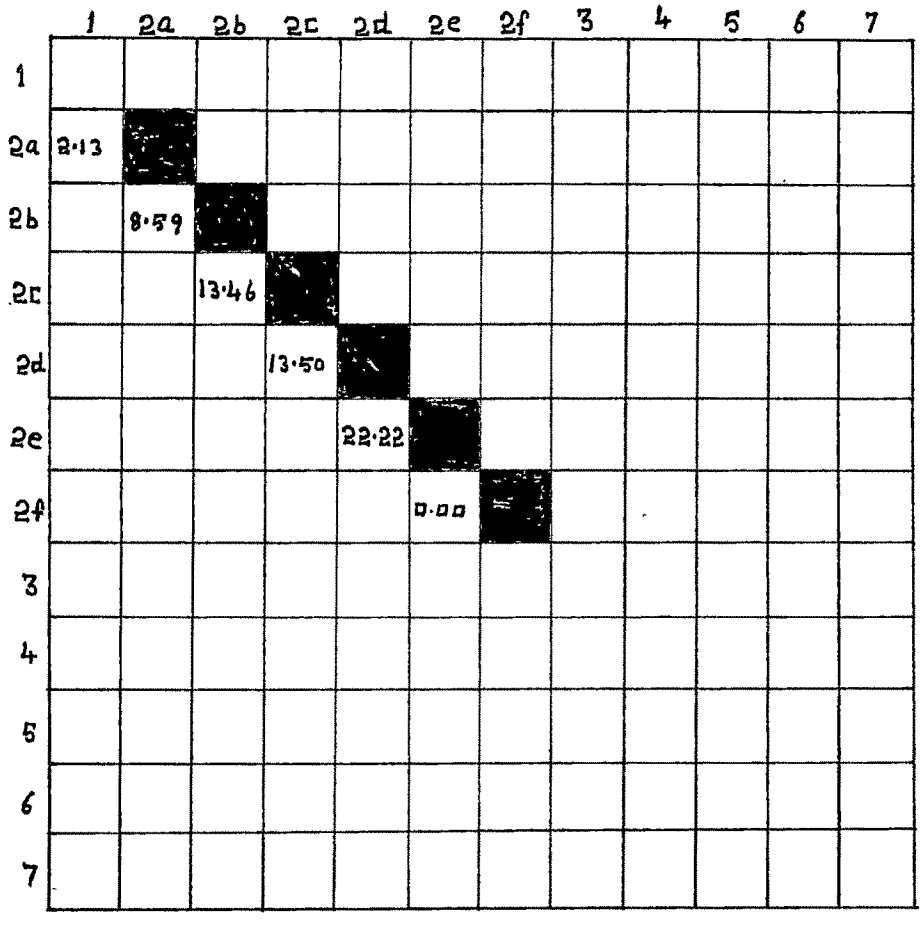
The percentages of different kinds of questions in the teacher talk are found to be 4.60, 0.34, 0.72, 0.16, 0.01 and 0.26 respectively for memory, translation, interpretation, application, higher order and routine types of questions. It reveals that the extent of memory questions is for greater than any other category and the use of application and higher order questions is negligible. It is evident from the proportions of different kinds of questions, that only knowledge part is being emphasized in the classrooms and other abilities like application, analysis, synthesis and evaluation are avoided. This is not certainly a desirable approach from instructional point of view.

IV.4.3 The Extension of Different Kinds of Questions

Figure 4.1 shows the 'steady-state cells' of questioning (2a-2a, 2b-2b), ... 2f-2f) which lie along the diagonal of the matrix. Only when the behaviour remains in a single category for longer than three seconds there will be tallies in these cells. Therefore, these cells indicate the extension of particular behaviours. Figures 3 indicates the extent to which different kinds of questions are extended. It is found that about 2.13, 8.59, 13.46, 13.50, 22.22 and 0.00 per cent of the time has

FIGURE : 4.1

PERCENTAGE OF EXTENSION OF DIFFERENT KINDS OF QUESTIONS



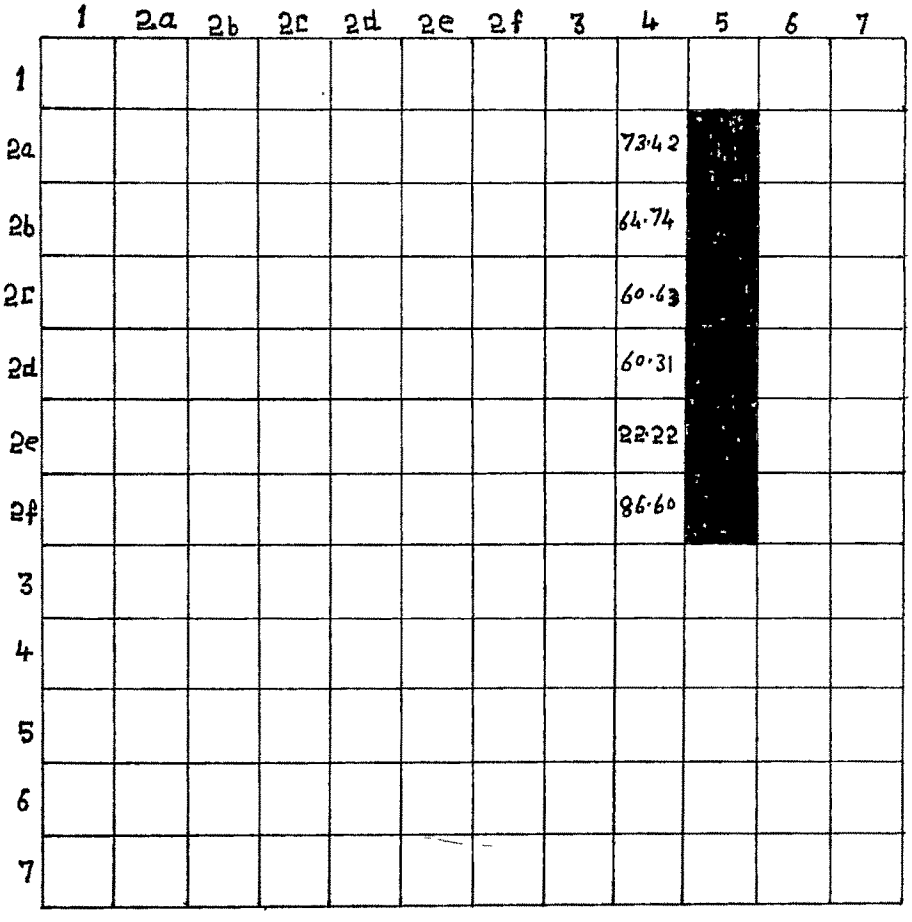
been devoted to extend memory, translation, interpretation, application, higher order and routine types of questions respectively. It is interesting to note that there is an increase in the extention with the increase in the level of questions. A careful examination of the nature of questions would reveal that questions from memory to higher order are in a hierarchical order. Therefore, the complex nature of questioning may require more explanation on the part of teacher to enable the students to understand the question. The extension for routine type of questions is found to be zero. It may be due to the reasons that these questions, being not related to the content and being of routine type in nature need not be explanatory.

IV.4.4 Response Pattern of Different Kinds of Questions

In Figure 4.2, cells 2a-5, 2b-5, 2c-5, 2d-5, 2e-5, and 2f-5 indicate the extent to which different kinds of questions are followed by responses. From Figure 4, it can be noted that in case of different kinds of questions, viz., memory, translation, interpretation, application, higher order and routine 73.42, 64.74, 60.63, 60.31, 22.22 and 86.60 per cent of the time questions have been followed by response respectively. From these results, it is evident that the routine types of questions were followed by response to the maximum. Memory questions were next to routine and it keeps on decreasing as

FIGURE : 4.2

PERCENTAGE OF QUESTIONS FOLLOWED
BY RESPONSE



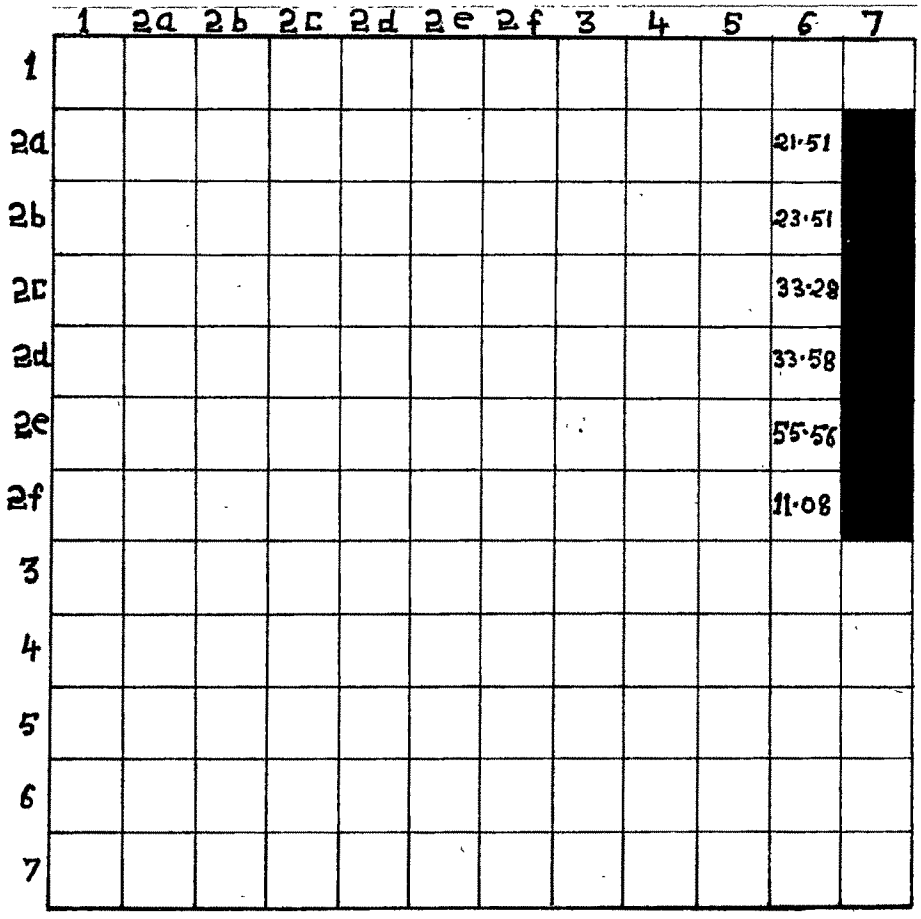
one proceeds towards higher order questions. It revealed a trend that the possibility of a question to be followed by response is inversely related to the level of questions. It means that if the level of a question is raised the possibility of question to be followed by response is reduced. This can possibly be explained by the fact that prolonged mental process is involved in responding to different kinds of questions. The complexity of the mental process keeps on increasing with the level of questions and therefore, the possibility of questions being followed by response gets decreased.

IV.4.5 Thinking Pattern of Different Kinds of Questions

In Figure 4.3, cells 2a-7, 2b-7, 2c-7, 2d-7, 2e-7 and 2f-7 represent the extent to which different kinds of questions are followed by silence. Silence in these cells indicates the time required to think in order to respond different kinds of questions. From Figure 5, it can be noted that in case of different kinds of questions, viz., memory, translation, interpretation, application, higher order and routine 21.51, 23.51, 33.28, 33.58, 55.56 and 11.08 per cent of the time questions have been followed by silence respectively. It indicates that the time required for thinking gets increased with level of questions. From the results, it is clear that the minimum time required for thinking is for routine types of questions and the maximum time is needed for higher order questions. It seems to be

FIGURE : 4.3

PERCENTAGE OF TIME REQUIRED FOR THINKING TO RESPOND DIFFERENT KINDS OF QUESTIONS



natural because the mental processes involved in responding to different kinds of questions are different and the complexity of the process gets increased with the level of questioning.

Thus, in this section questioning has been discussed in the context of different teaching behaviours. In the subsequent section, questioning behaviour is discussed in relation to certain other variables like subjects, professional qualifications, and experience taking into consideration different hypotheses.

IV.5 COMPARISON OF THE QUESTIONING BEHAVIOUR OF SOCIAL STUDIES AND SCIENCE TEACHERS

In order to compare the questioning behaviour of social studies and science teachers, the total observations made on different kinds of questions have been taken into consideration. For this purpose, the totals of the different questioning categories, viz., 2a, 2b, 2c, 2d, 2e and 2f have been taken out from the master matrices of social studies and science teachers which were presented in Tables 4.2 and 4.3. In order to study the significance of difference in the questioning behaviour of these two groups of teachers, the chi-square value was calculated. The total observations of different kinds of questions for social studies and science teachers and the chi-square value are presented in Table 4.8.

Table 4.8 : Total Observations of Different Kinds of Questions and the Chi-square Value of Social Studies and Science Teachers

Questioning Categories	2a	2b	2c	2d	2e	2f	T	X^2	Level of Significance
Social Studies Teachers	2647	192	356	88	0	171	3454	57.41	.01
Science Teachers	2622	229	464	150	16	116	3597		
Total	5269	421	820	238	16	287	7051		

Note : 2a memory, 2b, translation, 2c interpretation, 2d application, 2e higher order, and 2f routine type of questions.

From Table 4.8, it can be noted that out of the total 7051 observations made for questioning, 3454 were for social studies teachers and 3597 were for science teachers. Reading down the first row one finds that out of the 3454 observations of the social studies teachers, 2647 are for memory questions, 192 for translation questions, 356 for interpretation questions, 88 for application questions and 171 for routine type of questions. The higher order questions were not used by the social studies teachers at all. Reading down the second row one finds that out of 3597 observations of the science teachers, 2622 are for memory questions, 229 for translation questions, 464 for interpretation questions, 150 for application questions, 16 for higher order questions and 116 for routine type of questions. The chi-square value of these two groups is found to be 57.41 at df = 5. This value is significant at .01 level

of significance. This means that the questioning behaviour of social studies teachers differ significantly than that of science teachers. Therefore, the hypothesis that, 'there is no significant difference in the questioning behaviour of social studies and science teachers' is rejected.

A closer examination of Table 4.8, reveals that there appears to be some similarity in the use of memory questions although observations are little higher in case of social studies teachers. Then science teachers have used translation, interpretation, application and higher order questions to a greater extent. The use of routine type of questions is higher in case of social studies teachers. It may be due to the reason that the use of memory questions is possible in any type of content as they require only to recall the previously given information. But, other categories except routine require higher form of thinking. The application and higher order questions particularly require content which has explanatory and problem solving ability. May be that content in science might have got this ability to a greater extent, therefore, the use of these four categories is higher in case of science teachers. The routine questions are not related to content; instead they appear to be used due to force of habit. May be that social studies teachers are more habituated to use this type of questions than the science teachers. It may be for this reason that observations for routine type of questions are higher

in case of social studies teacher than those of science teachers.

IV.6 THE EXTENT OF DIFFERENT KINDS OF QUESTIONS IN THE TOTAL QUESTIONING FOR SOCIAL STUDIES AND SCIENCE TEACHERS

The observations of different kinds of questions for social studies and science teachers which were represented in Table 4.8, were converted into percentages in order to study the extent of different kinds of questions from the total questioning. The results are presented in Table 4.9.

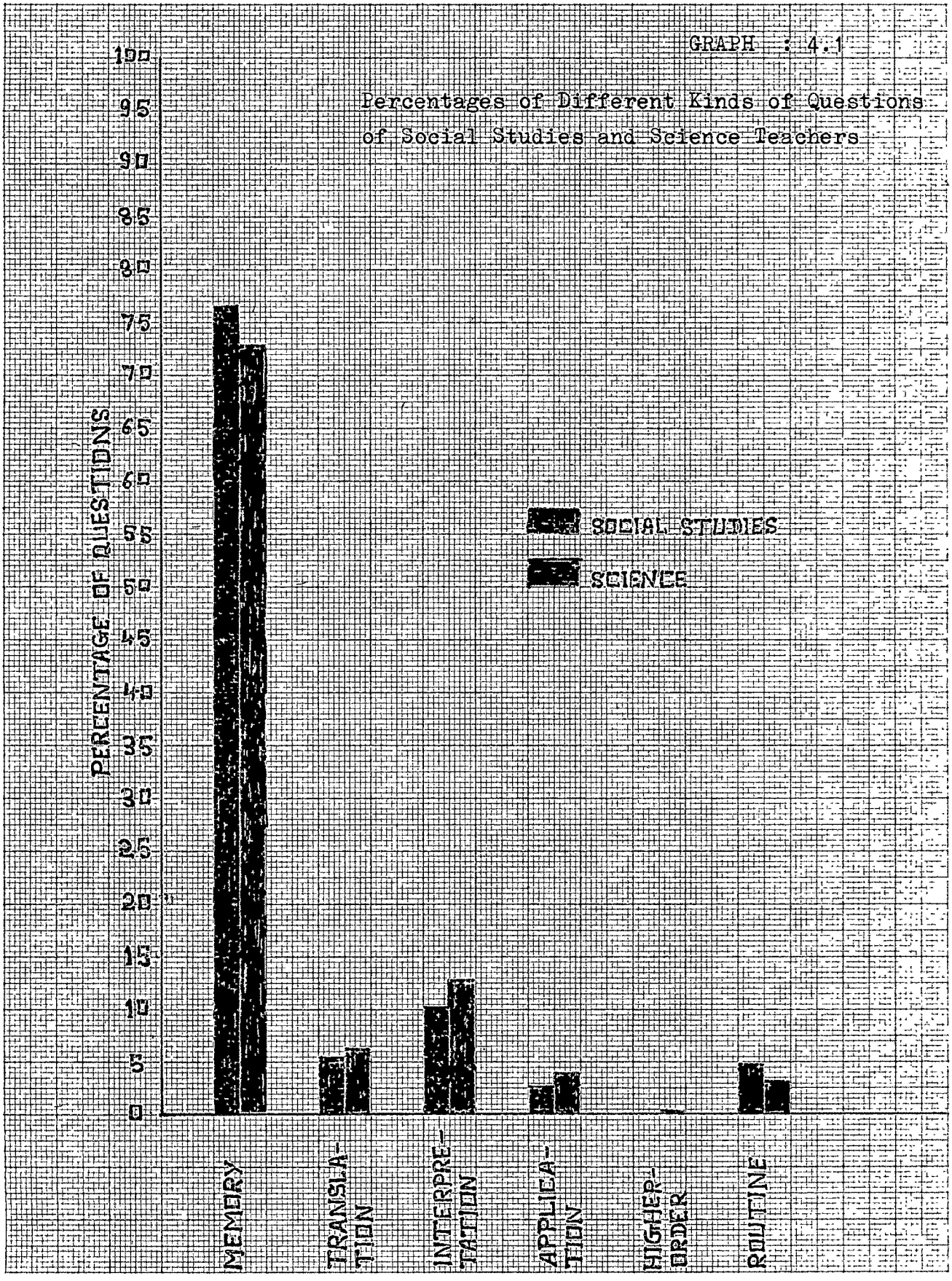
Table 4.9 : Percentages of Different Kinds of Questions of Social Studies and Science Teachers

Questioning Categories	2a	2b	2c	2d	2e	2f	Total
% of questions of :							
Social Studies Teachers	76.636	5.559	10.307	2.548	00.00	4.951	100
Science Teachers	72.894	6.366	12.90	4.17	0.445	3.225	100

From Table 4.9, it can be observed that out of the total time devoted for questioning, the maximum time is devoted for memory type of questions by Social Studies teachers as well as by Science teachers. With respect to Social Studies teachers it was found that out of their total time devoted for questioning 76.636 per cent is for memory questions, 5.559 percent for translation questions, 10.307 per cent for interpretation questions, 2.548 per cent for application questions and 4.951

GRAPH : 4.1

Percentages of Different Kinds of Questions of Social Studies and Science Teachers



per cent for routine type of questions. With regard to Science teachers it was found that out of their total time devoted for questioning 72.894 per cent is for memory questions, 6.366 per cent for translation questions, 12.90 per cent for interpretation questions, 4.17 per cent for application questions, 0.445 per cent for higher order questions and 3.225 per cent for routine type of questions. The figures of Table 4.9 are represented graphically in Graph No.4.1.

From the above results it can be said in brief that both Social Studies teachers and Science teachers used memory questions to very large extent. These questions were followed by interpretation, translation, routine, application and higher order questions respectively. The higher order questions were neglected by both the categories of teachers. In case of Social Studies teachers they were not used at all. The use of application questions was also to a very small extent. Another significant point which can be noted is that Science teachers have used relatively less memory and routine type of questions and more translation, interpretation, application and higher order questions.

IV.6.1 RELATIONSHIP OF MEMORY QUESTIONS WITH OTHER BEHAVIOURS

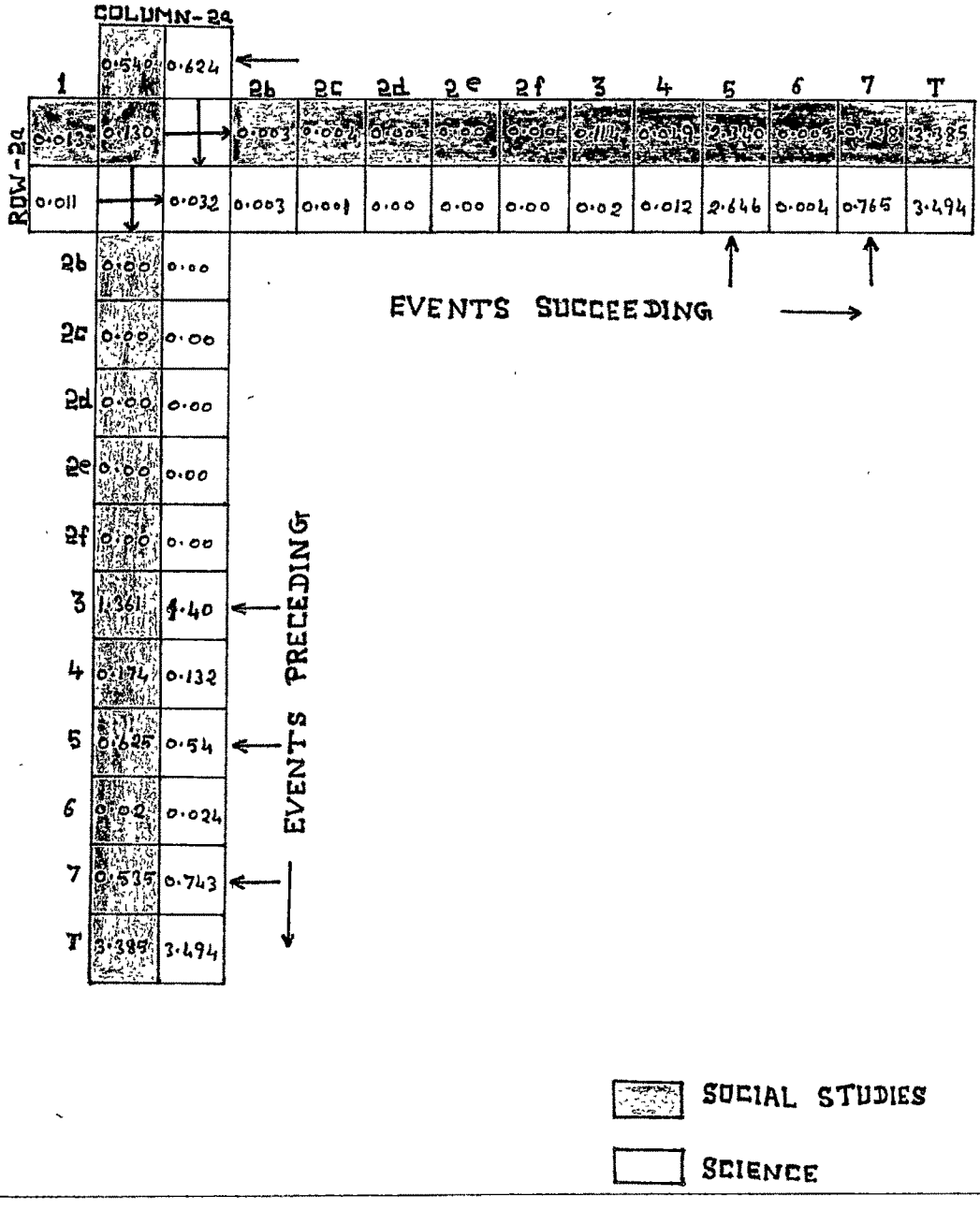
The relationship of memory type of questions of Social Studies and Science teachers can be observed by studying column - 2a and row - 2a in the master matrices of Social

Studies and Science teachers. This column and the row present the sequence of behaviours related to memory type of questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the memory type of questions. For convenience, column 2a and row 2a have been taken out from the master matrices of Social Studies and Science teachers presented in Tables 4.2 and 4.3. The figures of the column 2a and row 2a have been converted into percentages to bring them on a common scale. These are represented in Table 4.10.

What events precede category 2a ? From Table 4.10, it can be noted that category 2a succeeded categories 1, 3, 5 and 7. This means that memory questions were used by the teachers after motivating the students, after lecturing, after getting students' response and also after giving some pause. In case of Social Studies teachers, memory questions succeeded 0.540 per cent of the time motivational behaviour, 1.361 per cent of the time lecturing, 0.625 per cent of the time students' response and 0.535 per cent of the time silence. In case of science teachers, memory questions succeeded 0.624 per cent of the time motivational behaviour, 1.40 per cent of the time lecturing, 0.54 per cent of the time students' response and 0.743 per cent of the time silence.

What happended when teachers used memory type of questions ? From Table 4.10, it can be noted that category 2a preceded categories 5 and 7. This means that memory type of questions

Table 4.10 : Category - 2a (Memory Type of Questions) Percentages of Preceding and Succeeding Events of Category - 2a of Social Studies and Science Teachers



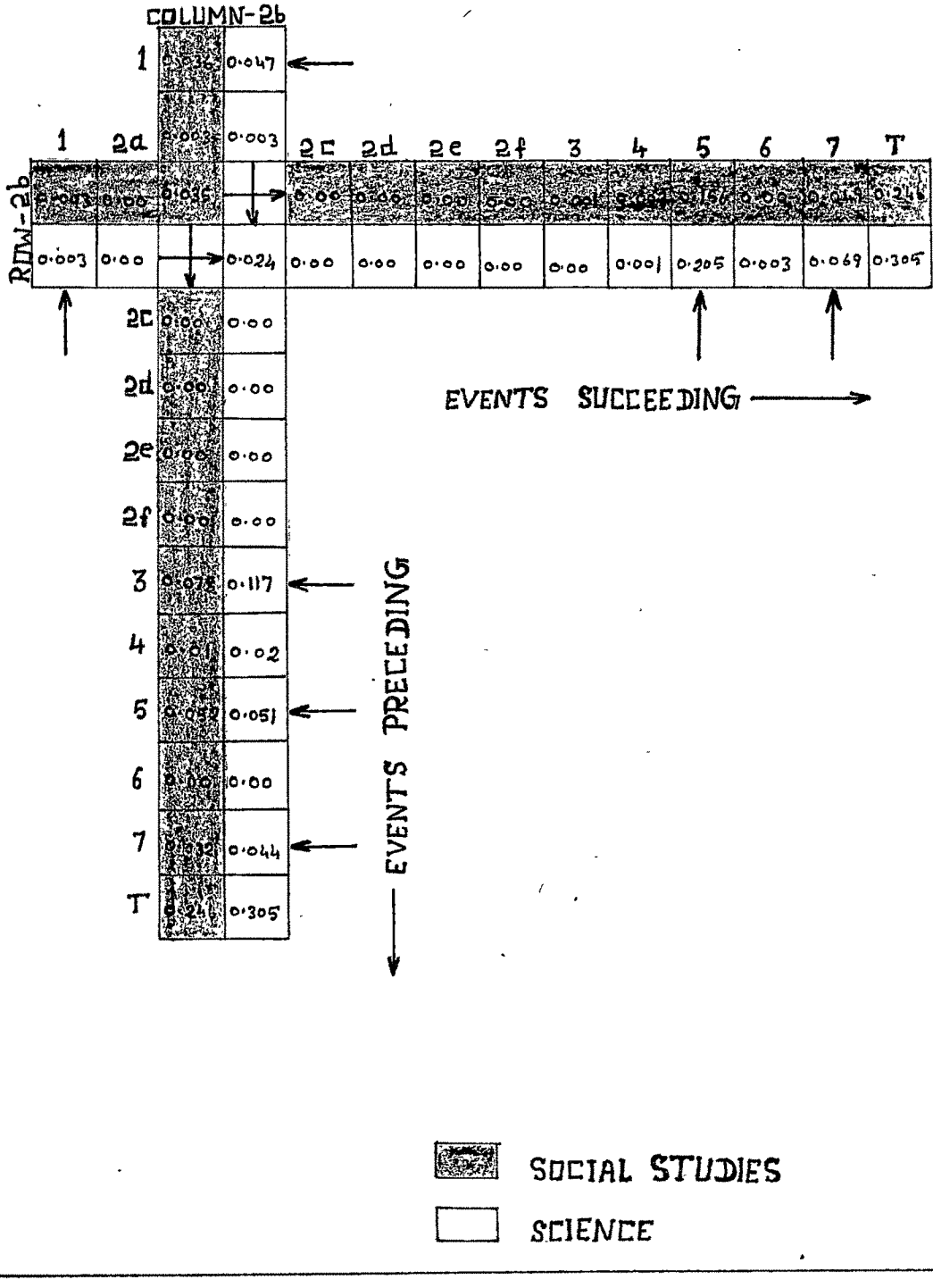
generated students' response to a large extent. In case of social Studies teachers 2.34 per cent of the time they preceded students' response whereas in case of Science teachers 2.646 per cent of the time they preceded students' response. Along with students' response they have generated silence and confusion too. It may be noted here that whenever a question is asked by the teacher it requires some time to think, on the part of the students to elicit the response, therefore, it is natural that memory questions are succeeded by silence too.

IV. 6.2 RELATIONSHIP OF TRANSLATION QUESTIONS WITH OTHER BEHAVIOURS

The relationship of translation type of questions of Social Studies and Science teachers can be observed by studying column 2b and row 2b in the master matrices of Social Studies and Science teachers. This column and the row present the sequence of behaviours related to translation questions as it occurs in the classroom situation. This means that they present the behaviours which precede and succeed the translation questions. For convenience, column 2b and row 2b have been taken out from the master matrices of Social Studies and Science teachers presented in Tables 4.2 and 4.3. The figures of the column 2b and row 2b have been converted into percentages to bring them on a common scale. These are represented in Table 4.11.

What events preceded translation type of questions ? It can be observed from Table 4.11, that, category 2b succeeded categories 1, 3, 5, and 7. This means, that, translation

Table 4.11 : Category - 2b (Translation Questions) Percentages of Preceding and Succeeding Events of Category - 2b of Social Studies and Science Teachers



questions succeeded motivational behaviour, lecture and students' response. Translation questions were also used after giving a pause. In case of social studies teachers translation questions succeeded 0.036 per cent of the time motivational behaviour, 0.078 per cent of the time lecturing, 0.052 per cent of the time students response, and 0.032 per cent of the time they were used after giving a pause whereas in case of science teachers translation questions succeeded these categories to the extent of 0.47 percent, 0.117 percent, 0.051 percent and 0.044 percent respectively.

What happened when teachers used translation questions ? From Table 4.11, it can be noted that category 2b preceded categories 1, 5, and 7. This indicates that translation questions generated motivational behaviour, students' response and silence. A closer examination of Table 4.11 indicates, that, the behaviour generated to the greatest extent was students' response. In case of social studies teachers 0.156 percent of the time translation questions preceded students response whereas in case of science teachers 0.205 per cent of the time they preceded students' response. Alongwith students' response they could generate motivational behaviour in both the types of teachers and students' initiation in case of science teachers. They also generated silence and confusion, which in relation to questioning indicates the time required to think in order to give the correct response.

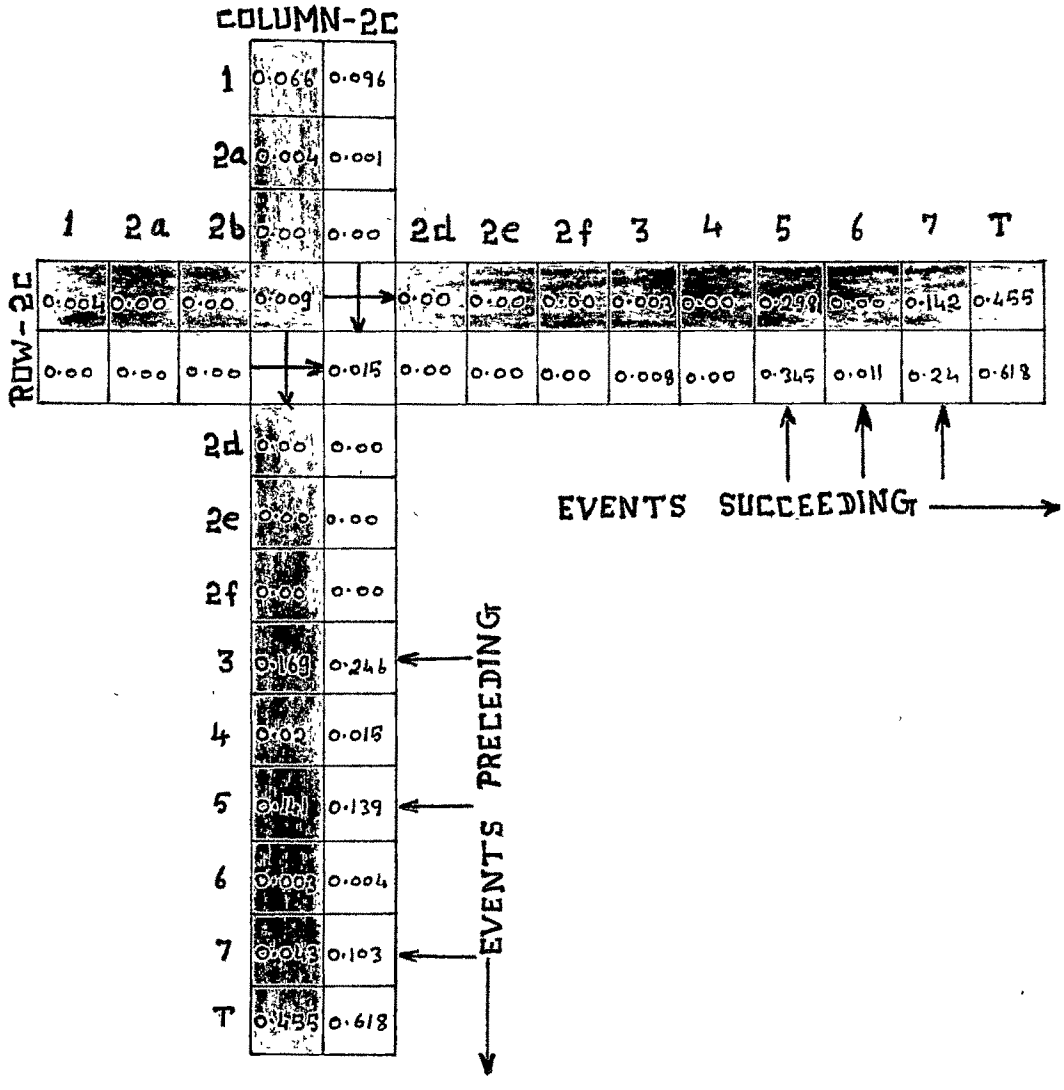
IV. 6.3 RELATIONSHIP OF INTERPRETATION QUESTIONS WITH OTHER BEHAVIOURS

The relationship of interpretation type of questions of social studies and science teachers can be observed by studying column 2c and row 2c in the master matrices of social studies

and Science teachers. This column and the row present the sequences of behaviours related to interpretation questions as it occurs in the classroom situation. This means that they present the behaviours which precede and succeed the interpretation questions. For convenience, column 2c and row 2c have been taken out from the master matrices of Social Studies and Science teachers presented in Tables 4.2 and 4.3. The figures in the column 2c and row 2c have been converted into percentages to bring them on a common scale. These are represented in Table 4.12.

What events preceded category 2c ? From the Table 4.12, it is obvious that category 2c succeeded categories 3, 5, 7 and 1 respectively in case of Social Studies teachers as well as in case of Science teachers. This means that interpretation questions were asked by the teachers after lecturing, response, silence and confusion, and after motivating the students. In case of Social Studies teachers 0.169 per cent of the time interpretation questions succeeded category 3 whereas in case of Science teachers 0.246 per cent of the time interpretation type questions succeeded category 3. 0.141 per cent of the time interpretation questions of Social Studies teachers' and 0.139 per cent of the time interpretation questions of Science teachers' succeeded students response. 0.043 per cent of the time Social Studies teachers' questions and 0.103 per cent of the time Science teachers' questions succeeded silence and confusion. The motivational behaviour also generated interpretation type

Table 4.12 : Category - 2C (Interpretation Questions) Percentages of Preceding and Succeeding Events of Social Studies and Science Teachers.



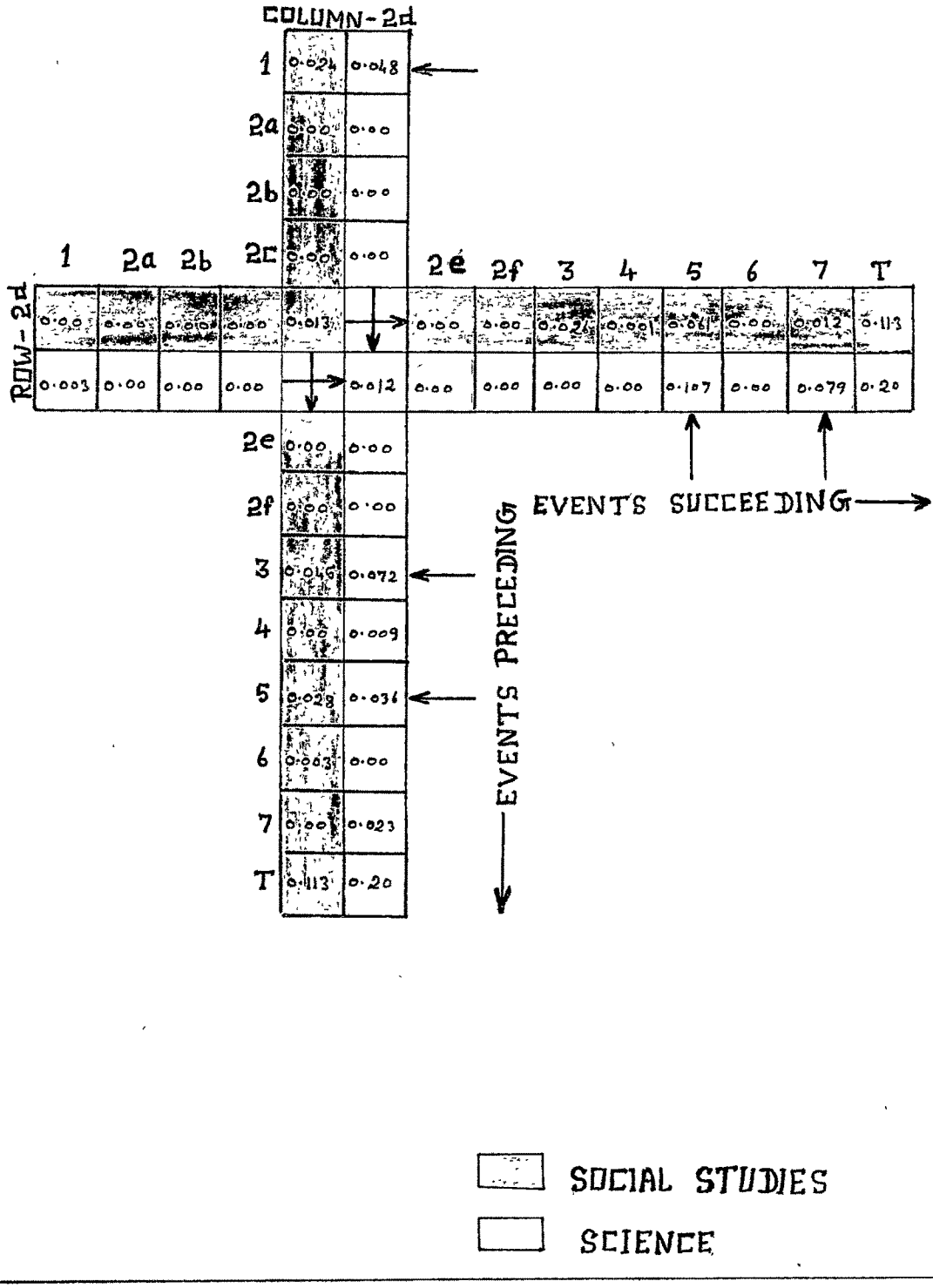
of questions that was to the extent of 0.066 per cent for Social Studies teachers and 0.096 per cent for Science teachers.

What happened when teachers used interpretation type of questions ? From Table 4.12, it can be noted that interpretation questions were followed by students' response, students' initiation, and silence and confusion and to some extent by lecture.0.298 per cent in case of Social Studies teachers and 0.345 per cent in case of Science teachers these questions were followed by response. In case of Social Studies teachers interpretation questions did not follow students' initiation but could generate the motivational behaviour.

IV. 6.4 RELATIONSHIP OF APPLICATION QUESTIONS WITH OTHER BEHAVIOURS

The relationship of application type of questions of Social Studies and Science teachers can be seen by studying column 2d and rwo 2d in the master matrices of Social Studies and Science teachers. This column and the row present the sewquence of behaviours related to application questions as it occurs in the classroom situation. This means, that, they present the behaviours which precede and succeed the application questions. For convenience, column 2d and row rd have been taken out from the master matrices of Social Studies and Science teachers presented in Tables 4.2 and 4.3. The figures of the column 2d and rwo 2d have been converted into percentages to bring them on a common scale. These are represented in Table 4.13.

Table 4.13 : Category - 2d (Application Questions) Percentages of Preceding and Succeeding Events of Social Studies and Science Teachers



What events preceded application questions ? From Table 4.13, it can be seen that category 2d succeeded categories 3, 5 and 1 in both the cases Social Studies as well as Science teachers. This means that application questions were used by the teachers after explanation to the extent of 0.045 percent in case of Social Studies teachers and 0.072 per cent in case of Science teachers. These questions were used after motivating the students to the extent of 0.024 per cent in case of Social Studies teachers and to the extent of 0.048 per cent in case of Science teachers. These questions were also used after students' response to the extent of 0.028 per cent in case of social studies teachers and to the extent of 0.036 per cent in case of science teachers.

What happened when teachers used application questions ? From Table 4.13, it can be observed that category 2d preceded categories 5 and 7. This indicates that application questions have generated students' response. The social studies teachers succeeded students' response to the extent of 0.061 per cent whereas science teachers succeeded students' response to the extent of 0.107 per cent. These questions also have generated silence and confusion. This is to the extent of 0.012 per cent in case of social studies teachers and to the extent of 0.079 per cent in case of science teachers. It may be noted here that when an application question is asked certainly it would require some time to think on the part of students in order to elicit

the response, therefore, application questions succeed silence and confusion too, is natural. They generated motivational behaviour also in case of science teachers.

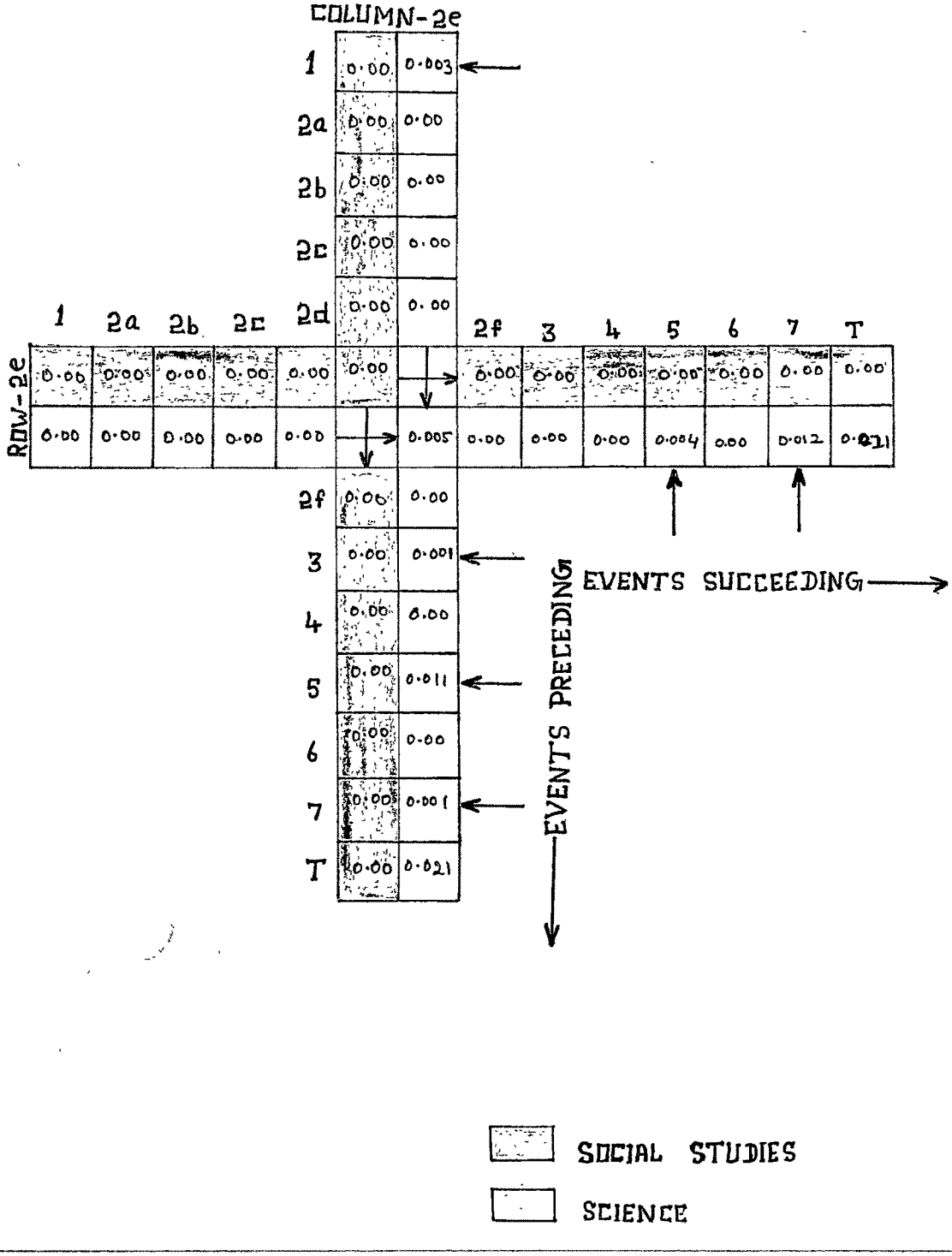
In brief it can be said that application questions were used after giving lecture or students' response or after motivating the students. When application questions were used they generated students' response, motivational behaviour and silence and confusion.

IV. 6.5 RELATIONSHIP OF HIGHER ORDER QUESTIONS WITH OTHER BEHAVIOURS

The relationship of higher order questions of social studies and science teachers can be seen by studying the column 2e and row 2e in the master matrices of social studies and science teachers. The column 2e and row 2e present the sequence of behaviours related to higher order questions as it occurs in the classroom situation. This means that they present the behaviours which precede and succeed the higher order questions. For convenience column 2e and row 2e have been taken out from the master matrices and represented in Table 4.14.

What events preceded higher order questions ? From Table 4.14, it can be observed that social studies teachers did not use the higher order questions at all whereas science teachers used them, but, to a very meagre extent. In case of science teachers, higher order questions succeeded categories 5, 3 and 7. This means that higher order questions succeeded students' response,

Table 4.14 : (Category - 2e (Higher Order Questions) Percentages of Preceding and Succeeding Events of Social Studies and Science Teachers



lecture, motivational behaviour and silence and confusion. The higher order questions succeeded 0.011 per cent students' response, 0.003 per cent motivational behaviour, 0.001 per cent lecture and 0.001 per cent silence and confusion.

What happened when teachers used higher order questions ? From Table 4.14, it can be observed that in case of science teachers higher order questions preceded categories 5 and 7. This means that higher order questions generated students' response and silence and confusion. The students' response was generated to the extent of 0.004 per cent and silence and confusion was generated to the extent of 0.012 per cent. It may be noted here that in this situation silence represents the time required for thinking in order to respond to a higher order question.

In brief, it can be said that higher order questions were used after lecturing or after motivating the students or after students' response or after giving a pause. These questions generated the behaviours like students' response and silence and confusion.

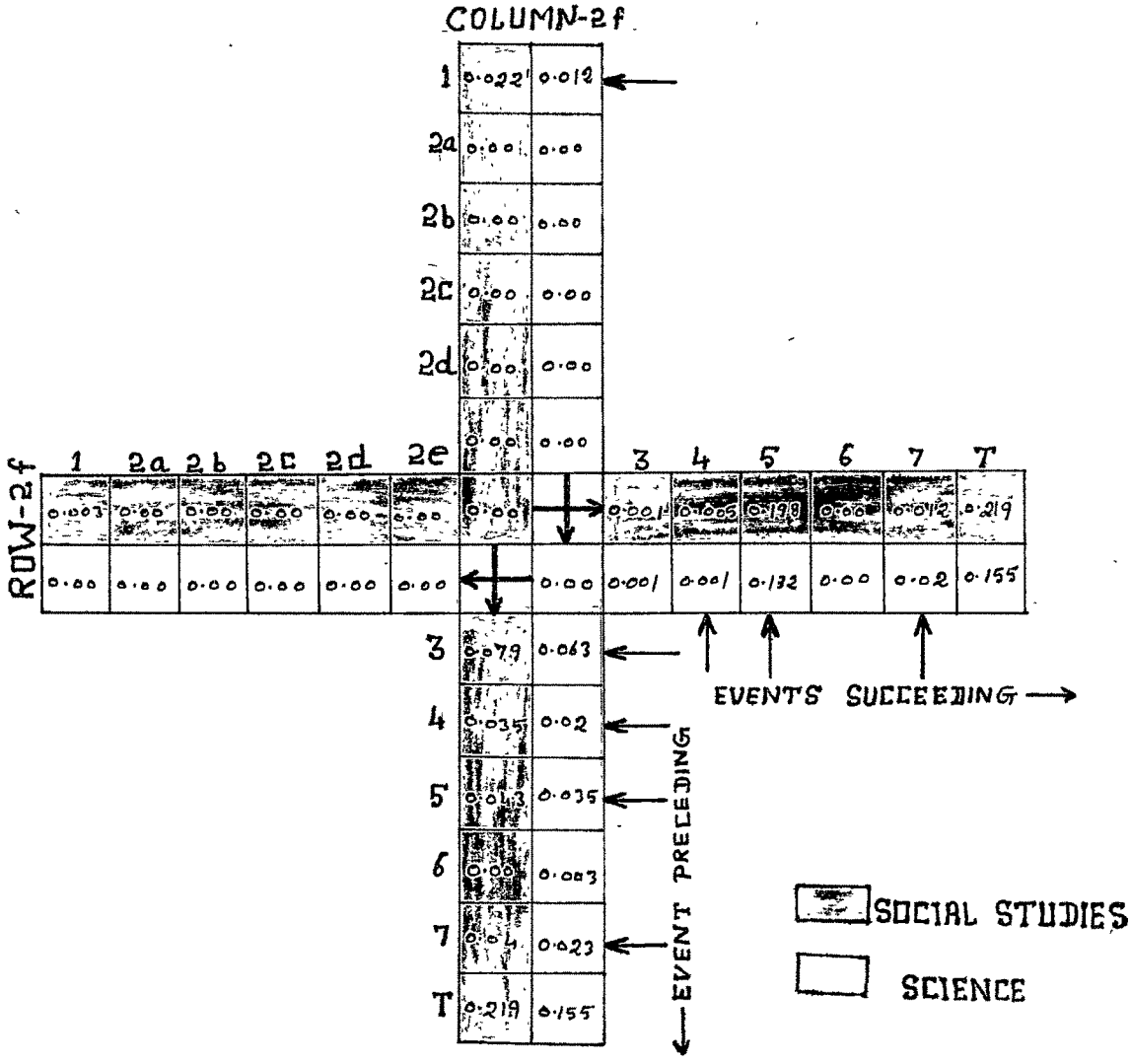
IV. 6.6 RELATIONSHIP OF ROUTINE TYPE OF QUESTIONS WITH OTHER BEHAVIOURS

The relationship of routine type of questions of social studies and science teachers can be observed by studying the column 2f and row 2f in the master matrices of social studies and science teachers. The column 2f and row 2f present the

sequence of behaviours related to routine type of questions as it occurs in the classroom situation. This means that they represent the behaviours which precede and succeed the routine type of questions. For convenience column 2f and row 2f have been taken out of the master matrices of social studies and science teachers and represented in Table 4.15.

What events preceded routine type of questions ? It can be observed from Table 4.15, that, category 2f succeeded categories 1, 3, 4, 5 and 7. This means that routine type of questions were used by the teachers after motivating the students, after lecturing, after giving directions, after getting students response and after giving a pause. In case of social studies teachers, 0.022 per cent of the time routine type of questions succeeded motivational behaviour whereas in case of science teachers they succeeded 0.012 per cent of the time. Routine type of questions succeeded lecturing to the extent of 0.079 percent in case of social studies teachers and 0.063 per cent in case of science teachers. They succeeded authoritarian behaviour to the extent of 0.035 per cent in case of social studies teachers and 0.02 per cent in case of science teachers. Students' response preceded 0.043 per cent of the time in case of social studies teachers and 0.035 per cent of the time in case of science teachers. Silence and confusion preceded 0.04 per cent of the time in case of social studies teachers and 0.023 per cent of the time in case of science teachers.

Table 4.15 : Category - 2f (Routine Type of Questions) Percentages of Preceding and Succeeding Events of Social Studies and Science Teachers



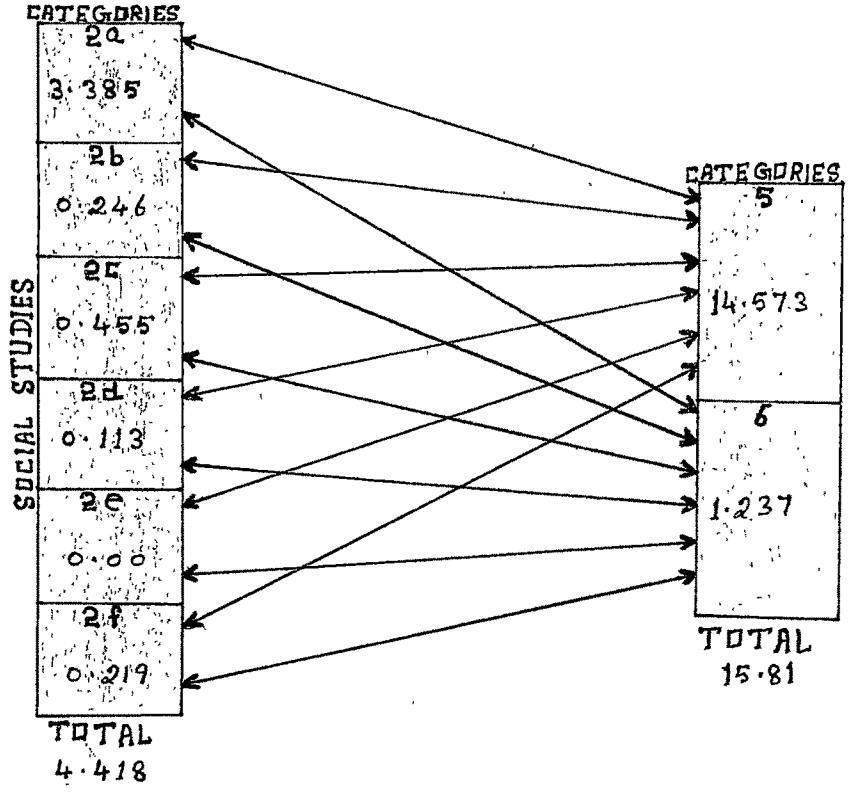
What happened when teachers used routine type of questions ? From Table 4.15, it can be observed that category 2f preceded categories 5 and 7. This means that routine type of questions have generated students response and silence and confusion. The behaviour generated to greater extent was students' response. In case of social studies teachers it was to the extent of 0.198 percent whereas in case of science teachers it was to the extent of 0.132 per cent. It may be noted here, that, when a question is asked it requires sometime to think on the part of a student in order to elicit the answer, therefore, it is natural that silence is generated by routine type of questions.

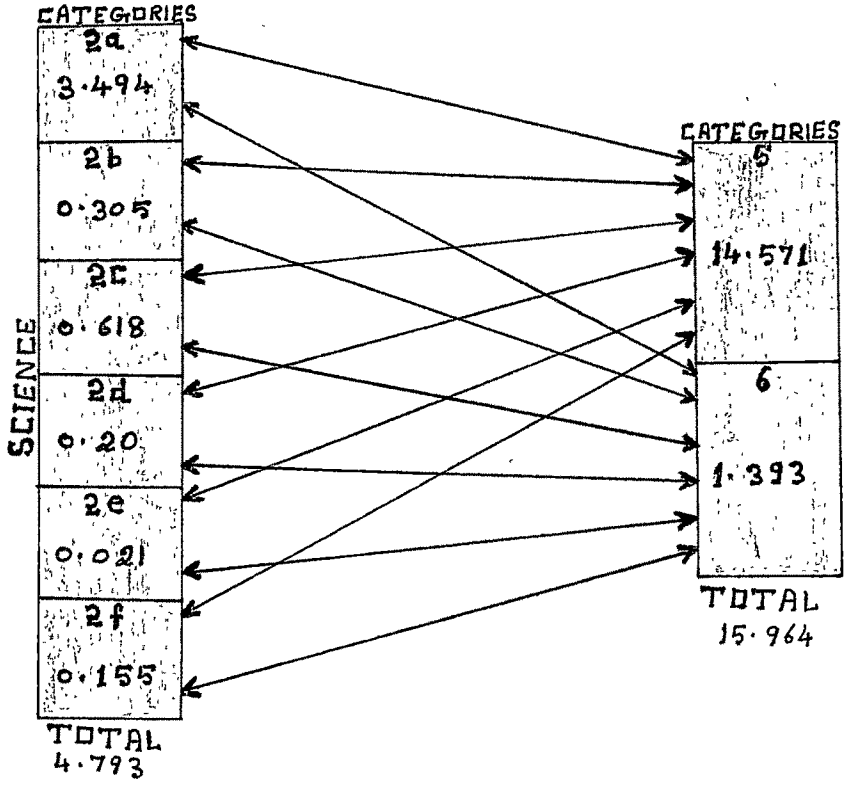
In brief it can be said that routine type of questions succeeded motivational behaviour, directions, students' response and silence and confusion. These questions generated students' response and silence and confusion.

IV.7 RELATIONSHIP OF DIFFERENT KINDS OF QUESTIONS WITH STUDENTS' RESPONSE AND INITIATION

In order to study the relationship of different kinds of questions, viz., memory, translation, interpretation, application, higher order and routine type of questions with that of students' response and students' initiation the totals of categories 2a to 2f, and 5 and 6 have been taken out from the master matrices of social studies and science teachers given in Tables 4.2 and 4.3. The totals of all these categories have been converted into percentages to rbing them on a common scale. They have been represented in Table 4.16.

Table 4.16 : Categories - 2a, 2b, 2c, 2d, 2e, 2f - 5, 6
Percentages of Categories - 2a, 2b, 2c, 2d, 2e, 2f in Relation to Categories 5 and 6 of Social Studies and Science Teachers





From Table 4.16 it can be observed that different kinds of questions of social studies teachers and science teachers have generated students' response to an equal extent. It was found to be 14.573 per cent in case of social studies teachers and 14.571 per cent in case of science teachers. But, when one considers students' initiation in relation to different kinds of questions, it is observed that the questions of science teachers have been able to generate more initiative behaviour than social studies teachers. From Table 4.16, it is also obvious that science teachers used higher order questions to the extent of 0.021 per cent whereas social studies teachers did not use them at all. It may be noted here that higher order questions (analysis, synthesis and evaluation) have the potential to generate initiative behaviour as they require original thinking on the part of the students. This is one possibility that, as science teachers used higher order questions their pupils have been able to develop initiative ability.

IV. 8 COMPARISON OF THE QUESTIONING BEHAVIOUR OF TRAINED NAND UNTRAINED TEACHERS

In order to compare the questioning behaviour of trained and untrained teachers, the total observations made on different kinds of questions have been taken into consideration. For this purpose, the totals of the different questioning categories viz., 2a, 2b, 2c, 2d, 2e and 2f have been taken out from the master matrices of trained and untrained teachers, which were presented in Tables 4.4 and 4.5. For studying the significance of difference in the questioning behaviour of trained and untrained teachers

the chi-square value was calculated. The total observations of different kinds of questions of trained and untrained teachers and the chi-square value are presented in Table 4.17.

Table 4.17 : Total Observations of Different Kinds of Questions and the Chi-square Value of Trained and Untrained Teachers

Questioning Categories	2a	2b	2c	2d	2e	2f	Total	X^2	Level of Sig.
Trained Teachers	1860	129	243	54	1	94	2381		
Untrained Teachers	1353	104	183	6	1	56	1703	27.359	.01
Total	3213	233	426	60	2	150	4084		

From Table 4.17, it can be noted that out of the total 4084 observations made for questioning, 2381 were for trained teachers and 1703 were for untrained teachers. Reading down the first row one finds that out of the 2381 observations of trained teachers, 1860 are for memory questions, 129 for translation questions, 243 for interpretation questions, 54 for application questions, 1 for higher order questions and 94 for routine type of questions. Reading down the second row one finds that out of the 1703 observations of untrained teachers, 1353 are for memory questions, 104 for translation questions, 183 for interpretation questions, and 6 for application questions, 1 for higher order questions and 56 for routine type of questions. The chi-square value of these two groups, viz., trained and untrained teachers is found to be 27.359 at df = 5. This value is significant

at .01 level of significance. This means that trained teachers differ significantly in their questioning behaviour than that of untrained teachers. A closer examination of Table 4.17, indicates that observations are higher for trained teachers than that of untrained teachers. Therefore, the hypothesis that, the trained teachers will use questioning to a greater extent than untrained teachers' is retained. It may be due to the reason that during the training period, the teacher trainees might have been made aware of questioning technique and different kinds of questions. May be that at the time of teaching practice they will have prepared and used different kinds of questions. This possibly may be one reason due to which the use of questioning is higher in case of trained teachers than that of untrained teachers.

IV.9 THE EXTENT OF DIFFERENT KINDS OF QUESTIONS IN THE TOTAL QUESTIONING FOR TRAINED AND UNTRAINED TEACHERS

The observations of different kinds of questions for trained and untrained teachers which were represented in Table 4.17 have been converted into percentages for different kinds of questions for both the groups of teachers, viz., trained and untrained. This is done to study the extent to which a particular type of question is used in the total questioning. The results are presented in Table 4.18.

Table 4.18 : Percentages of Different Kinds of Questions of Trained and Untrained Teachers

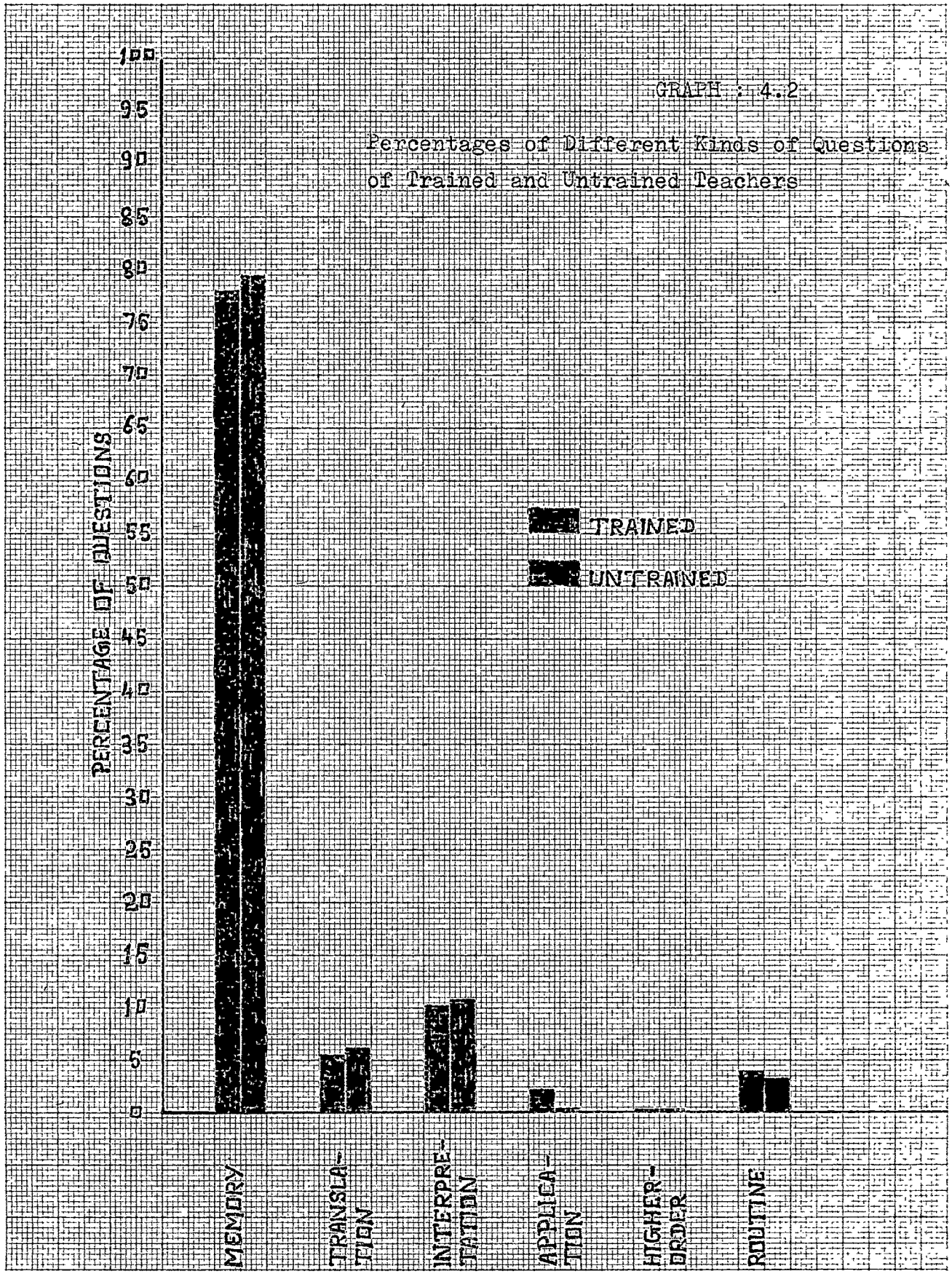
Questioning Categories	2a	2b	2c	2d	2e	2f	Total
Trained Teachers	78.118	5.418	10.206	2.268	0.042	3.948	100
Untrained Teachers	79.448	6.107	10.746	0.352	0.058	3.288	100

From Table 4.18, it can be observed that out of the total time devoted for questioning the maximum time is devoted for memory type of questions by trained as well as by untrained teachers. With respect to trained teachers it was found that out of their total time devoted for questioning 78.118 per cent is for memory questions, 5.418 per cent for translation questions, 10.206 per cent for interpretation questions, 2.268 per cent for application questions, 0.042 per cent for higher order questions and 3.948 per cent for routine type of questions. With regard to untrained teachers it was found that out of their total time devoted for questioning, 79.448 per cent is for memory questions, 6.107 per cent for translation questions 10.746 per cent for interpretation questions, 0.352 per cent for application questions, 0.058 per cent for higher order questions, and 3.288 per cent for routine type of questions. The figures of Table 4.18 are represented graphically in Graph No. 4.2.

From the above results, it can be said in brief that both trained and untrained teachers used memory questions to a very

GRAPH : 4.2

Percentages of Different Kinds of Questions of Trained and Untrained Teachers



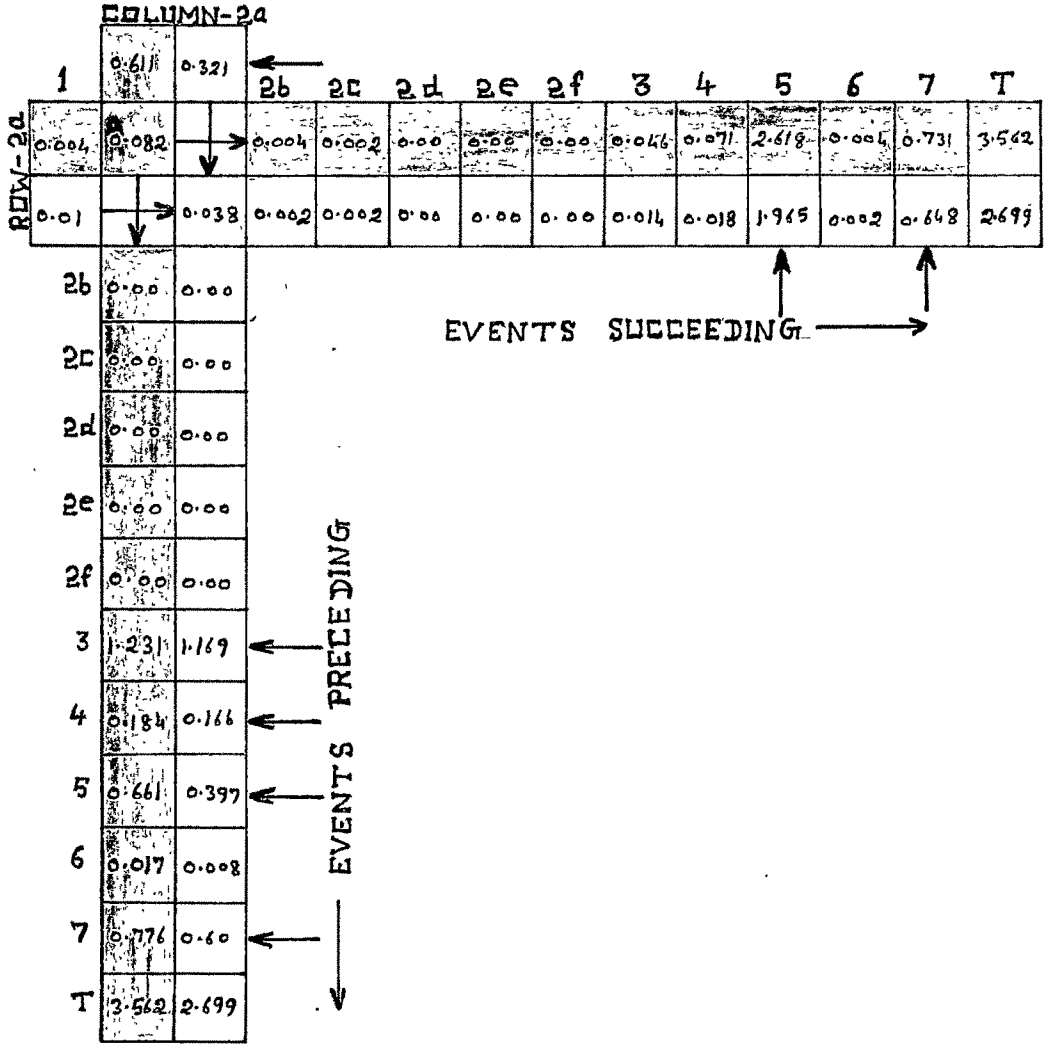
large extent. These questions were followed by interpretation, translation, routine, application and higher order questions respectively. The higher order questions were neglected by both the categories of teachers. Another significant point which can be noted is that trained teachers used relatively less memory questions and more application questions.

IV.10.1 RELATIONSHIP OF MEMORY QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of memory type of questions of trained and untrained teachers can be observed by studying column 2a and row 2a in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to memory type of questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the memory type of questions. For convenience, column 2a and row 2a have been taken out from the master matrices of trained and untrained teachers presented in Tables 4.4 and 4.5. The figures of the column 2a and row 2a have been converted into percentages to bring them on a common scale. These are represented in Table 4.19.

What events preceded category 2a ? From Table 4.19 it is obvious, that, category 2a succeeded categories 1, 3, 4, 5 and 7. This means that memory questions were used by the teachers after motivating the students, after lecturing, after giving directions, after students' response and after giving a pause

Table 4.19 : Category - 2a (Memory Type of Questions) Percentages of Preceding and Succeeding Events of Category - 2a of Trained and Untrained Teachers



too. In case of trained teachers memory questions succeeded 0.611 per cent of the time motivational behaviour, 1.231 per cent of the time lecturing, 0.184 per cent of the time authoritarian behaviour, 0.661 per cent of the time students' response and 0.776 per cent of the time silence. In case of untrained teachers memory questions succeeded 0.321 per cent of time motivational behaviour, 1.169 per cent of the time lecturing, 0.166 per cent of the time authoritarian behaviour, 0.397 per cent of the time students' response, and 0.60 per cent of the time silence.

What happened when teachers used memory type of questions ? From Table 4.19, it can be observed that category 2a preceded categories 5 and 7. This means that memory questions have generated students response, and silence and confusion. The most frequent succeeding category has been students' response. In case of trained teachers 2.618 per cent of the time memory questions preceded students' response whereas in case of untrained teachers it was to the extent of 1.965 per cent of the time. It may be noted here that after a question is asked, usually it is followed by silence as it requires some time to think in order to elicit response.

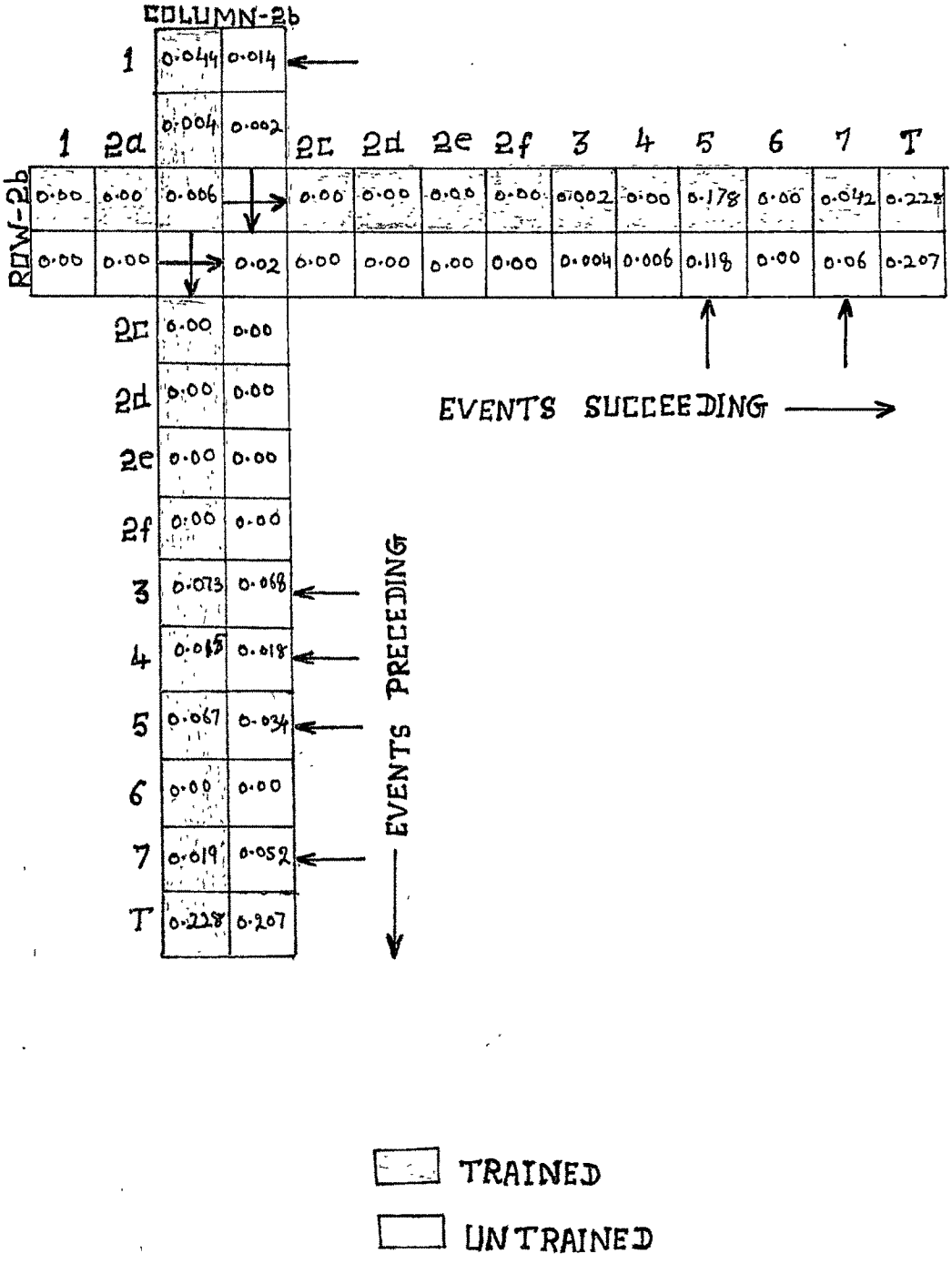
In brief it can be said that memory questions succeeded motivational behaviour, lecturing, students response and silence and confusion. These questions generated to a very large extent students' response and silence.

IV.10.2 RELATIONSHIP OF TRANSLATION QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of translation type of questions of trained and untrained teachers can be observed by studying column 2b and row 2b in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to translation questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the translation type of questions. For this purpose, column 2b and row 2b have been taken out from the master matrices of trained and untrained teachers presented in Tables 4.4 and 4.5. The figures of the column 2b and row 2b have been converted into percentages to bring them on a common scale. These are represented in Table 4.20.

What events preceded category 2b ? From Table 4.20, it can be noted, that, category 2b succeeded categories 1, 3, 4, 5 and 7. This means that translation questions were used by the teachers after motivating the students, after lecturing, after students' response and after giving a pause too. In case of trained teachers translation questions succeeded 0.044 per cent of the time motivational behaviour, 0.073 per cent of the time lecturing, 0.015 per cent of the time directions, 0.067 per cent of the time students' response and 0.019 per cent of the time

Table 4.20 : Category - 2b (Translation Type of Questions) Percentages of Preceding and Succeeding Events of Category 2b of Trained and Untrained Teachers



silence. In case of untrained teachers translation questions succeeded 0.014 per cent of the time motivational behaviour, 0.068 per cent of the time lecturing, 0.018 per cent of the time directions, 0.034 per cent of the time students' response and 0.052 per cent of the time silence.

What happened when teachers used translation questions ? From Table 4.20, it can be noted that category 2b preceded categories 5 and 7. This means that translation questions generated students' responses and silence. The most frequent succeeding category has been students' response. In case of trained teachers 0.178 per cent of the time translation questions preceded students' response, whereas, in case of untrained teachers it was to the extent of 0.118 per cent of the time. It may be noted here that when a question is asked, it requires some time to think to be responded. Therefore, silence also is generated by translation questions.

In brief, it can be said that translation questions succeeded motivational behaviour, lecturing, students' response and silence. These questions generated students' response and silence. The trained teachers could generate more students' response when compared to untrained teachers.

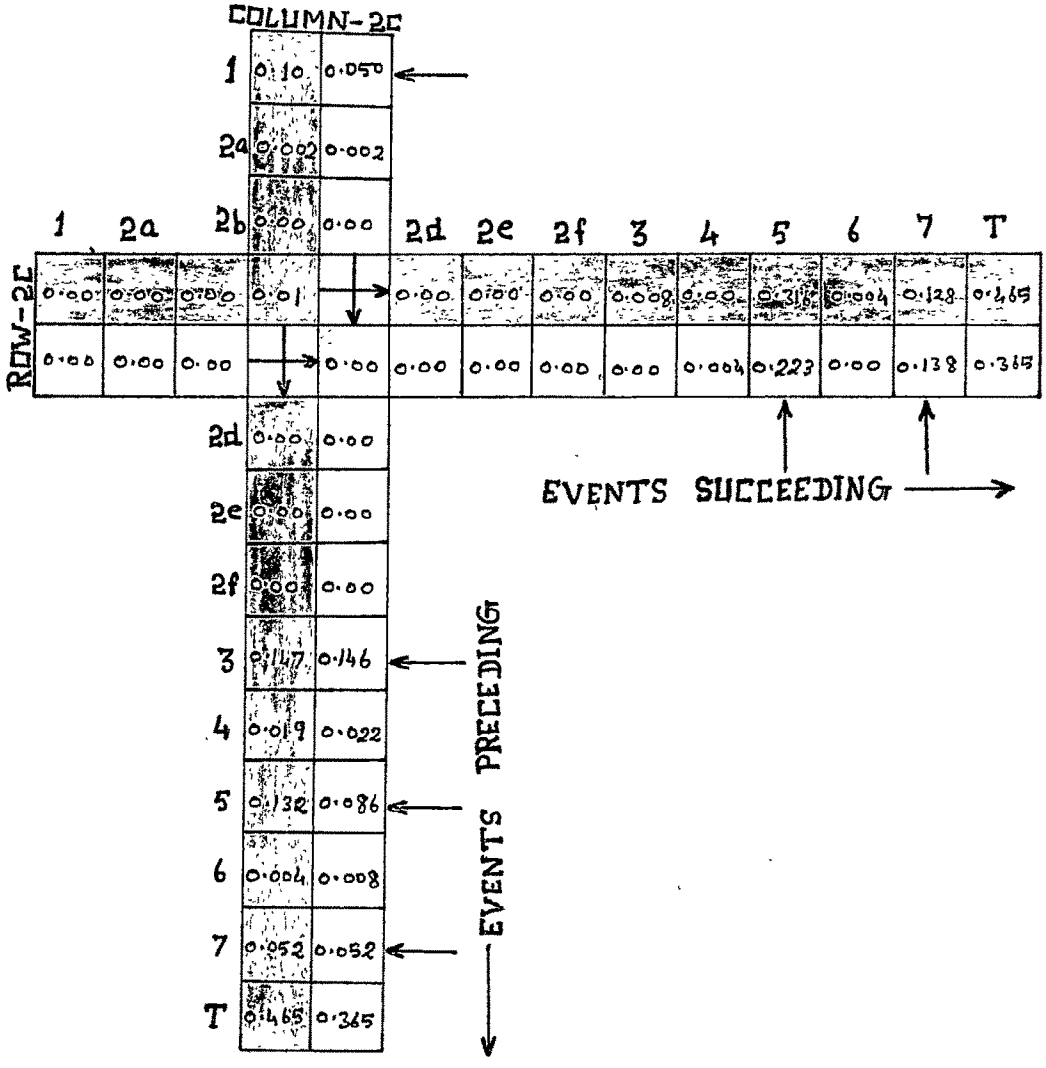
IV. 10.3 RELATIONSHIP OF INTERPRETATION QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of interpretation type of questions of trained and untrained teachers with other behaviours can be

observed by studying column 2c and row 2c in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to interpretation questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the interpretation type of questions. For this purpose, column 2c and row 2c have been taken out from the master matrices of trained and untrained teachers presented in Tables 4.4 and 4.5. The figures of the column 2c and row 2c have been converted into percentages to bring them on a common scale. These are represented in Table 4.21.

What events preceded category 2c ? From Table 4.21, it can be observed, that category 2c succeeded categories 1, 3, 5 and 7. This means that interpretation questions were used by the trained and untrained teachers after motivating the students, after giving the lecture, after students' response and after giving a pause. In case of trained teachers interpretation type of questions succeeded 0.10 per cent of the time motivational behaviour, 0.147 per cent of the time lecturing, 0.132 per cent of the time students' response and 0.052 per cent of the time silence. With regard to interpretation questions of untrained teachers it was found that these questions succeeded 0.050 per cent of the time motivational behaviour, 0.146 per cent of the time lecturing, 0.086 per cent of the time students' response and 0.052 per cent of the time silence.

Table 4.21 : Category - 2c (Interpretation Type of Questions) Percentages of Preceding and Succeeding Events of Category 2c of Trained and Untrained Teachers



What happened when teachers used interpretation type of questions ? From Table 4.21, it can be noted that category 2c preceded categories 5 and 7. This means that interpretation questions generated students' response and silence. The most frequent behaviour which was generated by interpretation questions was students' response. In case of trained teachers it was to the extent of 0.316 per cent of the time, whereas, in case of untrained teachers it was to the extent of 0.223 per cent of the time.

It can be said in brief that interpretation type of questions succeeded motivational behaviour, lecturing, students' response and silence. These questions generated students' response and silence. The interpretation questions of trained teachers could generate more students' response when compared to untrained teachers.

IV. 10.4 RELATIONSHIP OF APPLICATION QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of application questions of trained and untrained teachers with other behaviours can be observed by studying column 2d and row 2d in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to application questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the application type of questions. For this purpose, column 2d and row 2d have been taken out from the master matrices of trained and untrained teachers presented in

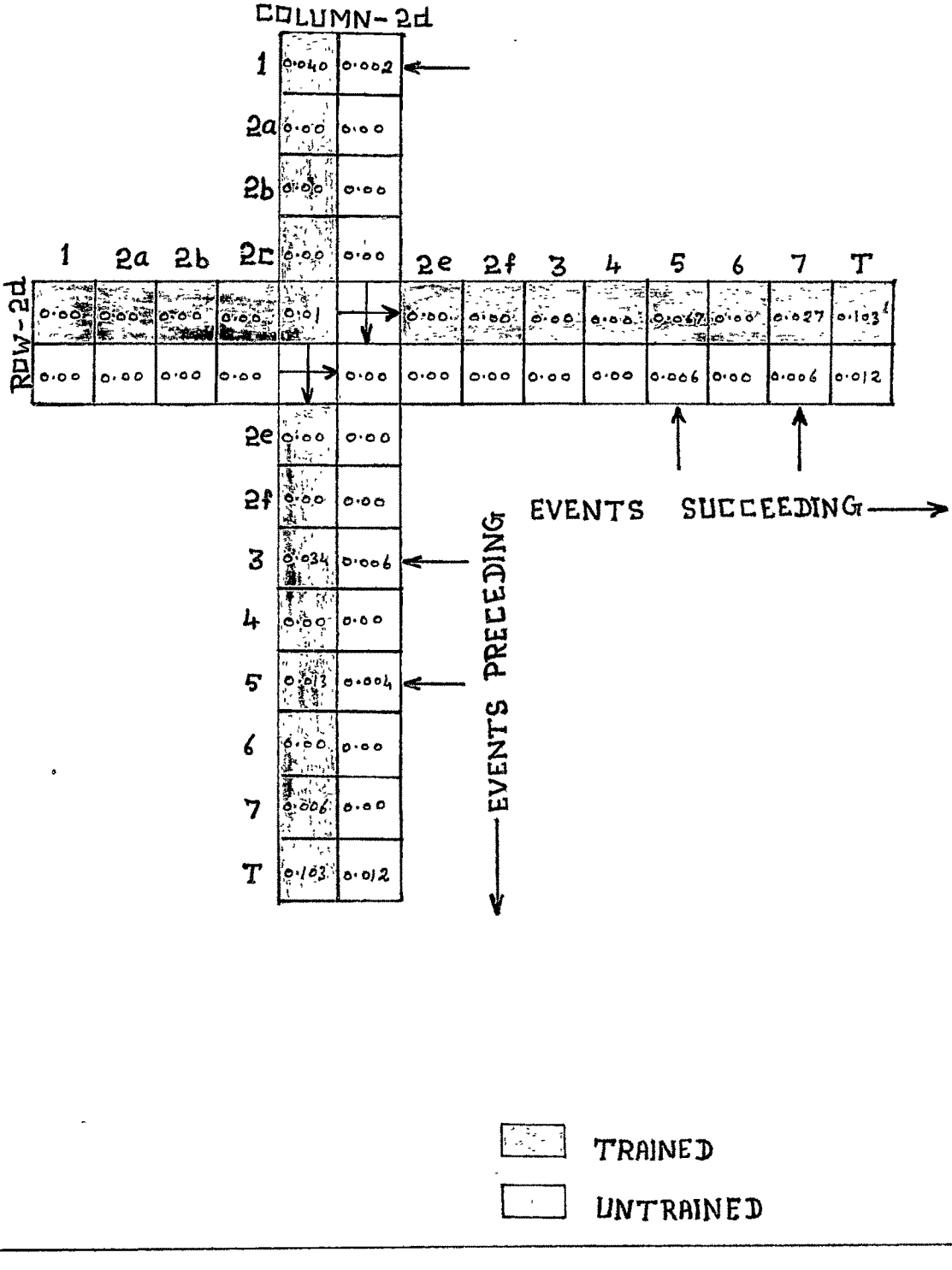
Tables 4.4 and 4.5. The figures in the column 2d and ∠ row 2d have been converted into percentages to bring them on a common scale. These are represented in Table 4.22.

What events precededcategory 2d ? From Table 4.22, it can be noted that category 2d succeeded categories 1, 3 and 5. This means that application questions were used by the trained and untrained teachers after motivating the students, after lecturing and after getting students' response. In case of trained teachers 0.040 per cent of the time they were used after motivational behaviours, 0.034 per cent of the time after lecturing and 0.013 per cent of the time after students response. In case of untrained teachers, they succeeded 0.002 per cent of the time motivational behaviour, 0.006 per cent of the time lecturing and 0.004 per cent of the time students' response.

What happened when teachers used application type of questions ? From Table 4.22, it can be noted that category 2d preceded categories 5 and 7. This means that application type of questions generated students' response and silence. In case of trained teachers they generated students' response to the extent of 0.067 per cent of the time whereas in case of untrained teachers it was to the extent of 0.006 per cent of the time.

In brief it can be said that application questions succeeded motivational behaviour, lecturing and students' response. They could generate students' response and silence. The generation of

Table 4.22 : Category - 2d (Application Type of Questions) Percentages of Preceding and Succeeding Events of Category - 2d of Trained and Untrained Teachers



students' response was higher in case of trained teachers.

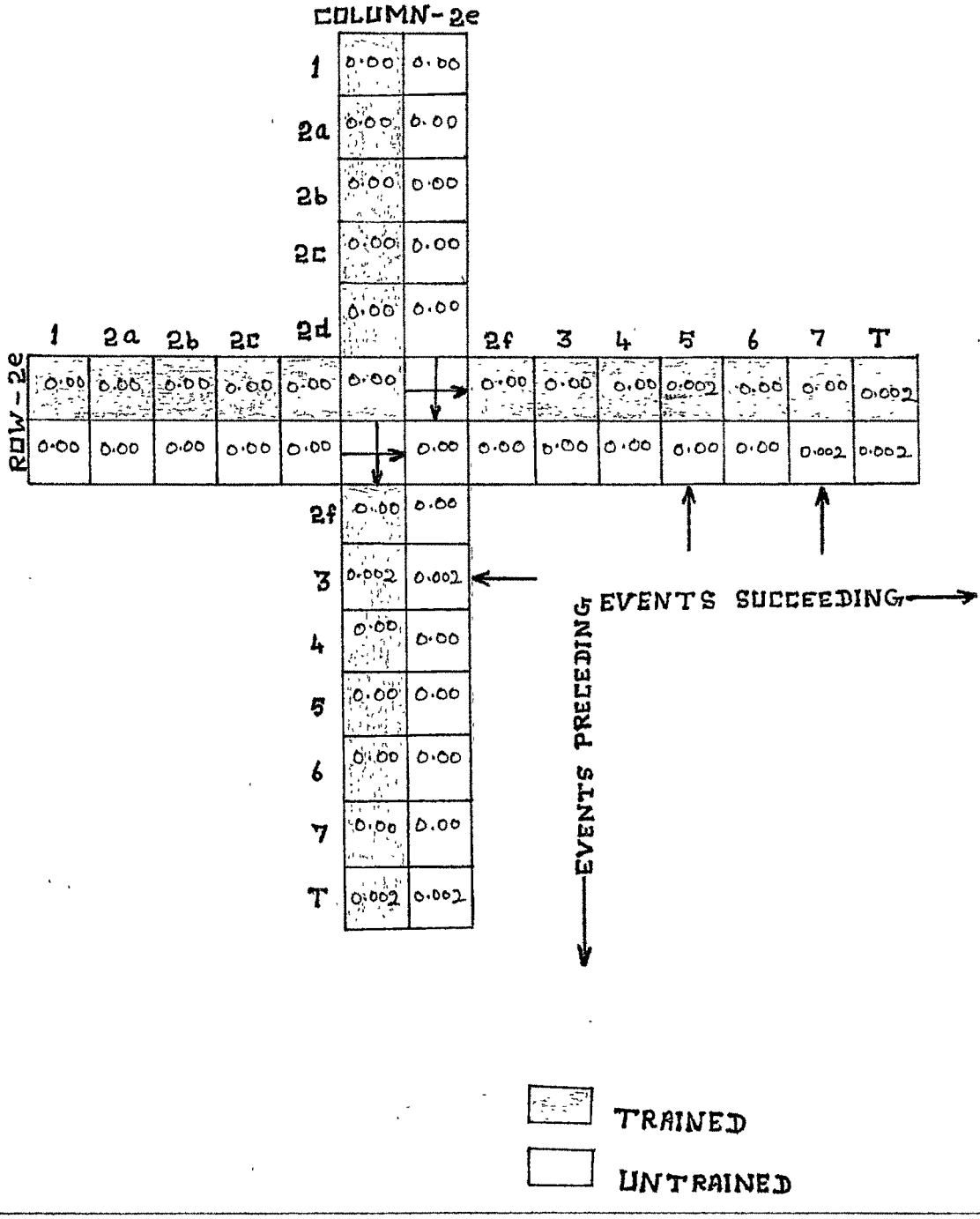
IV.10.5 RELATIONSHIP OF HIGHER ORDER QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of higher order questions of trained and untrained teachers with other behaviours can be observed by studying column 2e and row 2e in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to higher order questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the higher order questions. For this purpose, column 2e and row 2e have been taken out from the master matrices of trained and untrained teachers presented in Tables 4.4 and 4.5. The figures in the column 2e and row 2e have been converted into percentages to bring them on a common scale. These are represented in Table 4.23.

What events preceded category 2e ? From Table 4.23, it can be noted that the higher order questions were used to a negligible extent by trained as well as by untrained teachers. Whatever questions were used they succeeded lecturing.

What happened when teachers used higher order questions ? From Table 4.23, it is obvious that category 2e preceded category 5 in case of trained teachers and category 7 in case of untrained teachers. This means that higher order questions of trained teachers generated students' response whereas higher

Table 4.23 : Category - 2c (Higher Order Questions) Percentages of Preceding and Succeeding Events of Category - 2c Trained and Untrained Teachers



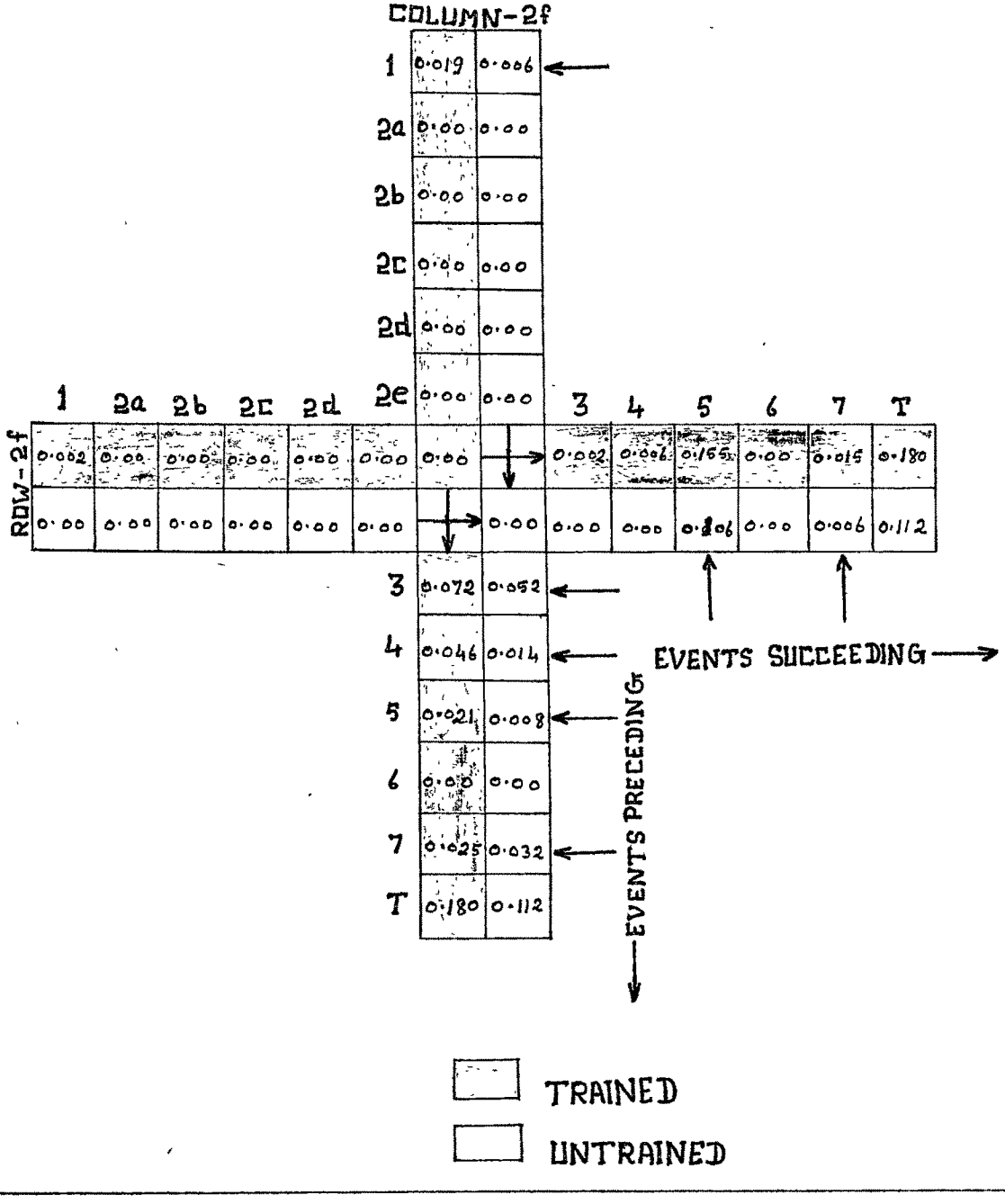
order questions of untrained teachers generated silence.

IV.10.6 RELATIONSHIP OF ROUTINE TYPE OF QUESTIONS OF TRAINED AND UNTRAINED TEACHERS WITH OTHER BEHAVIOURS

The relationship of routine type of questions of trained and untrained teachers with other behaviours can be observed by studying column 2f and row 2f in the master matrices of trained and untrained teachers. This column and the row present the sequence of behaviours related to routine type of questions as it occurs in the classroom situation. This means that they provide an insight into the behaviours which precede and succeed the routine type of questions. For this purpose column 2f and row 2f have been taken out from the master matrices of trained and untrained teachers presented in Tables 4.4 and 4.5. The figures in the column 2f and row 2f have been converted into percentages to bring them on a common scale. These are represented in Table 4.24.

What events preceded category 2f ? From Table 4.24, it can be noted that category 2f succeeded categories 1, 3, 4, 5 and 7. This means that routine type of questions succeeded motivational behaviour, lecturing, authoriterian behaviour, students response and silence. In case of trained teachers routine type of questions succeeded 0.019 per cent of the time motivational behaviour, 0.072 per cent of the time lecturing, 0.046 per cent of the time directions, 0.021 per cent of the time students' response and 0.025 per cent of the time silence. In case of untrained teachers

Table 4.24 : Category - 2f (Routine Type of Questions) Percentages of Preceding and Succeeding Events of Category - 2f of Trained and Untrained Teachers



these percentages were 0.006 percent, 0.052 per cent, 0.014 per cent, 0.008 per cent and 0.032 per cent respectively.

What happened when teachers used routine type of questions ? From Table 4.24, it can be noted that category 2f preceded categories 5 and 7. This means that routine type of questions could generate students' response and silence.

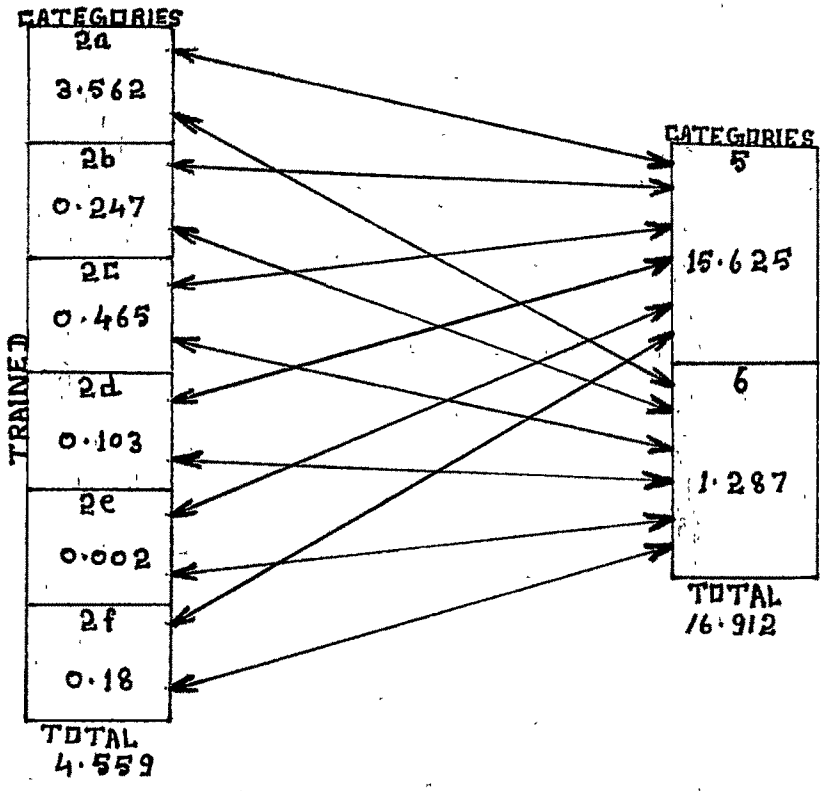
It can be said in brief that routine type of questions succeeded motivational behaviour lecturing, directions, students' response and silence and they could generate students' response and silence. The students' response was generated by trained teachers to a greater extent than that of untrained teachers.

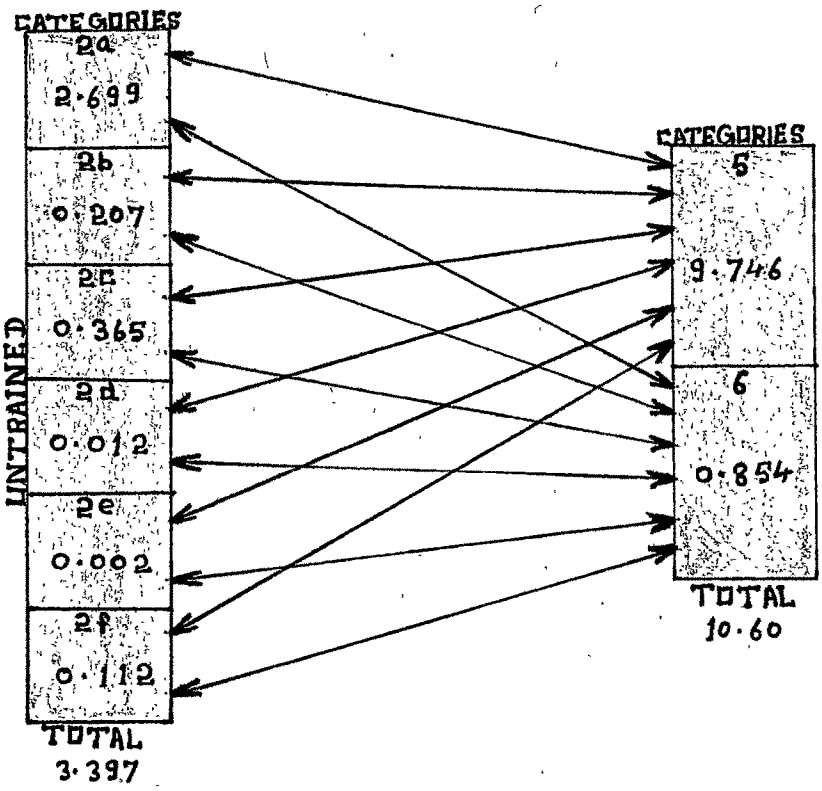
IV.11 RELATIONSHIP OF DIFFERENT KINDS OF QUESTIONS WITH STUDENTS' RESPONSE AND INITIATION

In order to study the relationship of different kinds of questions, viz. memory, translation, interpretation, application, higher order and routine type of questions with students' response and initiation the totals of categories 2a to 2f, and 5 and 6 have been taken out from the master matrices of trained and untrained teachers given in Tables 4.4 and 4.5. The totals of all these categories have been converted into percentages to bring them on a common scale. They have been represented in Table 4.25.

From Table 4.25, it can be observed that total questioning is greater in case of trained teachers than untrained teachers.

Table 4.25 : Categories - 2a, 2b, 2c, 2d, 2e, 2f - 5,6
Percentages of Categories 2a, 2b, 2c, 2d, 2e, 2f in Relation to Categories 5 and 6 of Trained and Untrained Teachers





In case of trained teachers, out of the total time 4.559% of the time was devoted for questioning whereas in case of untrained teachers out of the total time 3.397% of the time was devoted for questioning. This means that trained teachers used different kinds of questions to a greater extent than untrained teachers. Except the higher order questions which have been neglected by both the groups equally all other percentages are higher for trained teachers.

With regard to students' response and initiation it is found, that, trained teachers have generated these two important behaviours to a greater extent than that of untrained teachers. In case of the trained teachers, 16.912 per cent of the time was devoted for students' response and initiation. Out of 16.912 per cent of the time, 15.625 per cent of the time was for students' response and 1.287 per cent of the time was for initiation. In case of untrained teachers 10.60 per cent of the time was devoted for students' response and initiation. Out of this time, 9.746 per cent of the time was devoted for students' response and 0.854 per cent of the time was devoted for initiation.

In brief it can be said that trained teachers used different kinds of questions to a greater extent and their questions also generated students' response and initiation to a greater extent. From these results it appears that when the

use of different kinds of questions is increased, it influences students' response and initiation in a positive direction. Therefore, the higher use of different kinds of questions by trained teachers increased students' response and initiation.

IV.12 COMPARISON OF THE QUESTIONING BEHAVIOUR OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS

In order to compare the questioning behaviour of the teachers having experience upto 5 years and the teachers having experience above 10 years, the total observations made on different kinds of questions have been taken into consideration. For this purpose, the totals of the different questioning categories, viz., 2a, 2b, 2c, 2d, 2e and 2f have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years, which were presented in Tables 4.6 and 4.7. In order to study the significance of difference in the questioning behaviour of these two groups of teachers, the chi-square value was calculated. The total observations of different kinds of questions for the teachers having experience upto 5 years and the teachers having experience above 10 years and the chi-square value are presented in Table 4.26.

Table 4.26 : The Chi-square Value of the Teachers having Experience upto 5 Years and having Experience above 10 Years

Questioning Categories	2a	2b	2c	2d	2e	2f	Total	X^2	Level of Significance
Teachers having Experience upto 5 years	1441	112	201	24	3	49	1830		
Teachers having Experience above 10 Years	1783	139	408	130	12	93	2565	80.883	.01
Total	3224	251	609	154	15	142	4395		

From Table 4.26, it can be noted that out of the total 4395 observations made for questioning, 1830 were for the teachers having experience upto 5 years and 2565 were for the teachers having experience above 10 years. Reading down the first row one finds that out of the 1830 observations of the teachers having experience upto 5 years, 1441 are for memory questions, 112 for translation questions, 201 for interpretation questions, 24 for application questions, 3 for higher order questions and 49 for routine type of questions. Reading down the second row one finds that out of the 2565 observations of the teachers having experience above 10 years, 1783 are for memory questions, 139 for translation questions, 408 for interpretation questions, 130 for application questions, 12 for higher order questions and 93 for routine type of questions. The chi-square value of these two groups, viz., the teachers having experience upto 5 years and

the teachers having experience above 10 years was found to be 80.883 at df = 5. This value is significant at .01 level of significance. This indicates that the teachers having experience upto 5 years differ significantly in their questioning behaviour than those teachers having experience above 10 years. Therefore, the hypothesis that, 'there is no significant difference in the questioning behaviour of the teachers having experience upto 5 years and the teachers having experience above 10 years is rejected.

A closer examination of Table 4.26, indicates that the teachers having experience above 10 years have used total questioning and different kinds of questions to a greater extent. It may be due to the reason that during the period of experience these teachers might have got better understanding of the content and might have developed mastery over it. This mastery over the content is one possibility which might have facilitated the use of different kinds of questions. Another thing is that during the period of teaching one gets several opportunities to construct and use different kinds of questions. This also might have facilitated the use of questioning for the teachers having experience above 10 years.

IV.13 THE EXTENT OF DIFFERENT KINDS OF QUESTIONS IN THE TOTAL QUESTIONING OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS

The observations of different kinds of questions of the teachers having experience upto 5 years and the teachers having

experience above 10 years, which were presented in Table 4.26, have been converted into percentages in order to study the extent to which different kinds of questions were used by these two groups. The results are presented in Table 4.27.

Table 4.27 : Percentages of Different Kinds of Questions of the Teachers Having Experience upto 5 Years and Having Experience Above 10 Years

Questioning Categories	2a	2b	2c	2d	2e	2f	Total
Percentage of Questions of the Teachers having Experience upto 5 Years	78.743	6.12	10.984	1.311	0.164	2.678	100
Percentage of the Questions of the Teachers having Experience above 10 Years	69.513	5.419	15.906	5.068	0.468	3.626	100

From Table 4.27, it can be noted that out of the total time devoted for questioning, the maximum time is devoted for memory type of questions by the teachers having experience upto 5 years as well as the teachers having experience above 10 years. With respect to the teachers having experience upto 5 years, it was found that out of their total time devoted for questioning, 78.743 per cent is for memory questions, 6.12 per cent for translation questions, 10.984 per cent for interpretation questions, 1.311 per cent for application questions, 0.164 per cent for higher order questions and 2.678 per cent for routine type of questions. With respect to the teachers having experience above 10 years it was found that out of their total time devoted

for questioning, 69.513 per cent is for memory questions, 5.419 per cent for translation questions, 15.906 per cent for interpretation, 5.068 per cent for application questions, 0.468 per cent for higher order questions and 3.626 per cent for routine type of questions. The figures of Table 4.27 are represented graphically in Graph No. 4.3.

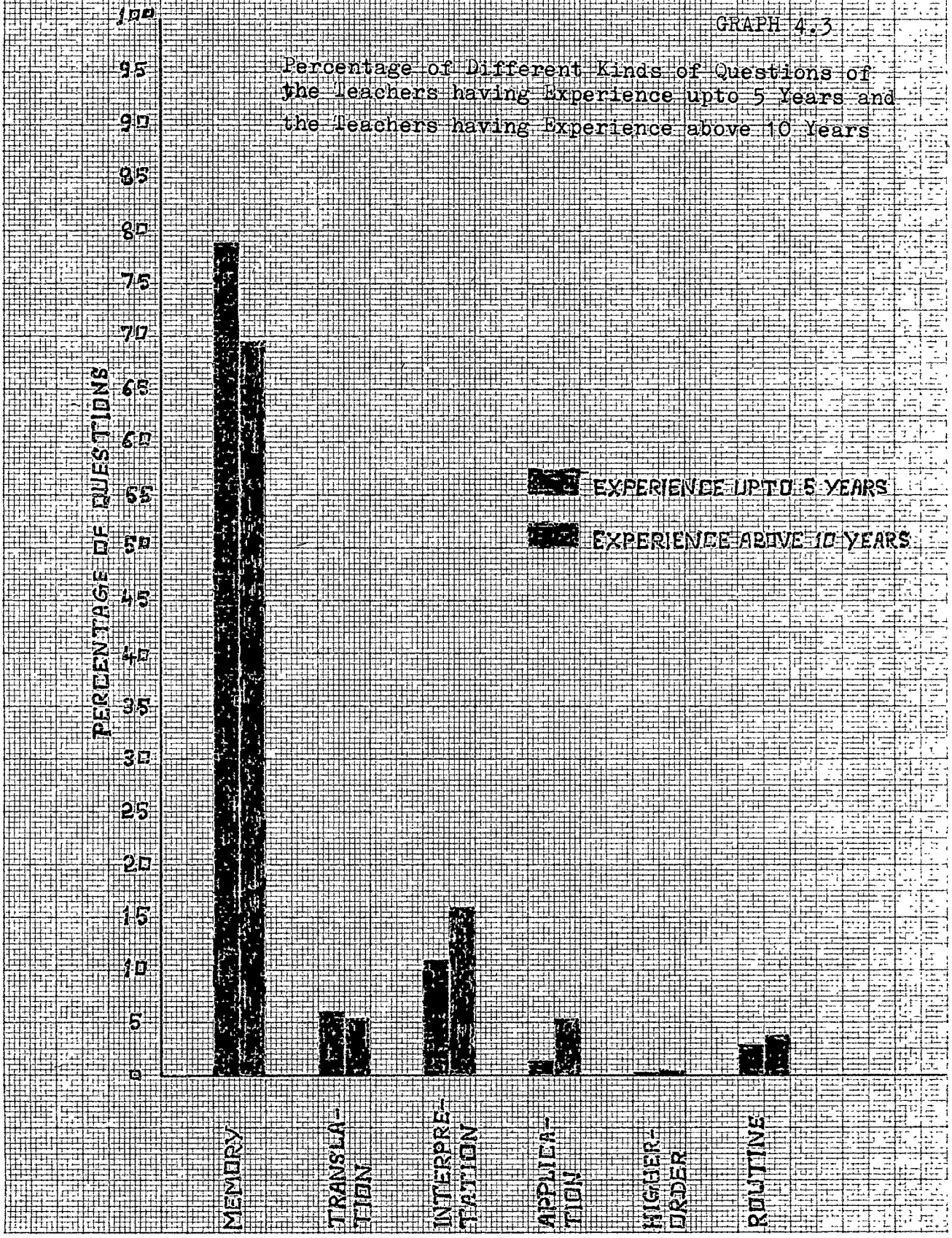
From the earlier results, it can be said in brief that both the groups of teachers used memory questions to a very large extent. Memory questions are followed by interpretation and translation questions respectively. The application questions are used to a very small extent whereas higher order questions are used to a negligible extent. Routine type of questions are also used by both the groups although to a small extent. Results also indicate that the teachers having experience above 10 years have tendency towards higher order questions than their counterparts.

IV.14.1 RELATIONSHIP OF MEMORY QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND ABOVE 10 YEARS WITH OTHER BEHAVIOURS

The relationship of memory type of questions of the teachers having experience upto 5 years and those having experience above 10 years with other behaviours can be observed by studying column 2a and row 2a in the master matrices of the respective groups. This column and the row present the sequence of behaviours related to memory type of questions as it occurs in the class-room situation. This means that they provide an insight into

GRAPH 4.3

Percentage of Different Kinds of Questions of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years

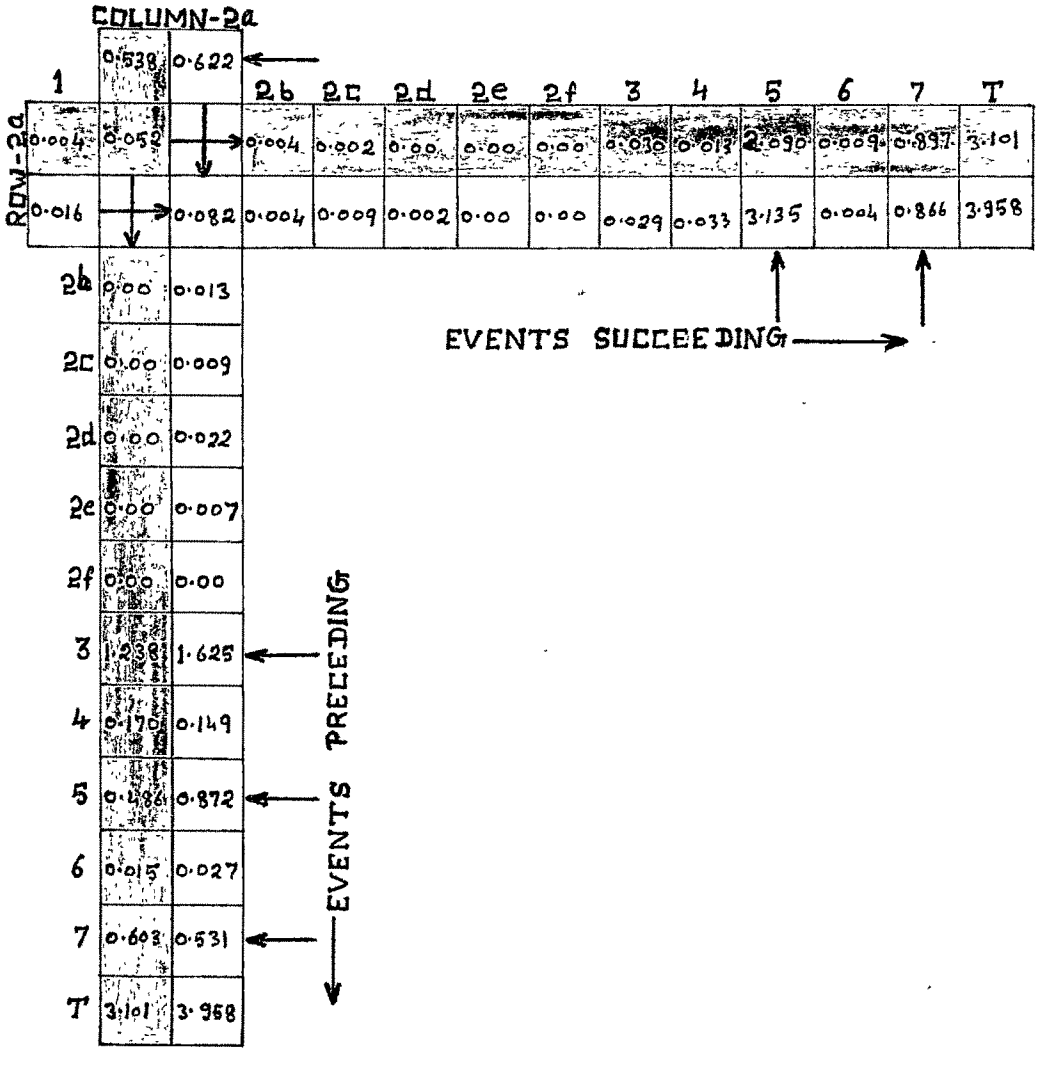


the behaviours which procede and succeed the memory type of questions. For convenience column 2a and row 2a have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures of column 2a and row 2a have been converted into percentages to bring them on a common scale. These are represented in Table 4.28.

What events precededcategory 2a ? From Table 4.28, it can be noted that category 2a succeeded categories 1, 3, 5 and 7. This means that memory questions were used by the teachers after motivating the students, after lecturing, after getting students response and also after giving some pause. In case of the teachers having experience upto 5 years, memory questions succeeded 0.538 per cent of the time motivational behaviour, 1.238 per cent of the time lecturing, 0.486 per cent of the time students' response and 0.603 per cent of the time silence. In case of the teachers having experience above 10 years, memory questions succeeded 0.622 per cent of the time motivational behaviour, 1.625 per cent of the time lecturing, 0.872 per cent of the time students' response and 0.531 per cent of the time silence.

What happened when teachers used memory type of questions ? From Table 4.28, it can be observed that category 2a preceded categories 5 and 7. This means that memory questions generated students response and silence. In case of the teachers having experience upto 5 years, 2.09 per cent of the time memory questions preceded students' response whereas in case of the teachers having experience above 10 years it was to the extent of 3.135 per cent

Table 4.28 : Category - 2a (Memory Type of Questions) Percentages of Preceding and Succeeding Events of Category 2a of the Teachers Having Experience upto 5 years and the Teachers having Experience above 10 years



of the time. It may be noted that whenever a question is asked, it is usually followed by silence as it requires some time to think in order to elicit response, therefore, the memory questions followed silence too.

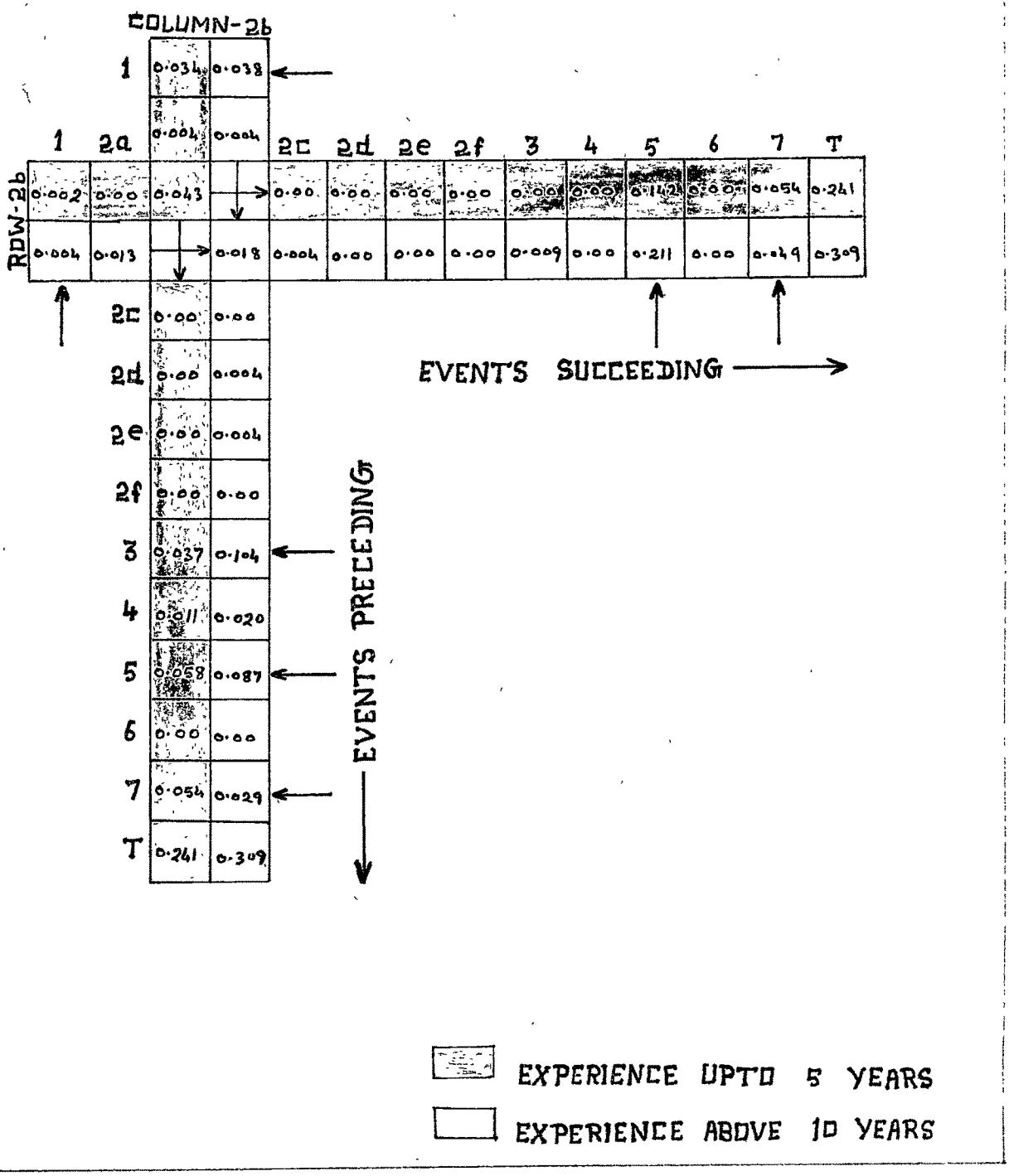
In brief it can be said that memory questions succeeded motivational behaviour, lecturing, students' response, and silence. These questions generated students' response and silence. Memory questions of the teachers having experience above 10 years generated students' response to a greater extent than the teachers having experience upto 5 years.

IV. 14.2 RELATIONSHIP OF TRANSLATION QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH OTHER BEHAVIOURS

The relationship of translation questions with other behaviours of these two groups of teachers can be observed by studying column 2b and row 2b in the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years. This column and the row present the sequence of behaviours related to translation questions as it occurs in the classroom situation. Thus, it provides an insight into the behaviours which precede and succeed the translation questions. For this purpose, column 2b and row 2b have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures of the column 2b and row 2b have been converted into percentages to bring them on common scale. These are represented in Table 4.29.

What events preceded category 2b ? From Table 4.29, it can be noted, that, category 2b succeeded categories 1, 3, 5 and 7.

Table 4.29 : Category - 2b (Translation Type of Questions) Percentages of Preceding and Succeeding Events of Category 2b of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years



This means that translation questions were used by the teachers after motivating the students, after lecturing, after getting students' response and after giving some pause. In case of the teachers having experience upto 5 years, translation questions succeeded 0.034 per cent of the time motivational behaviour, 0.037 per cent of the time lecturing, 0.058 per cent of the time students' response and 0.054 per cent of the time silence. In case of the teachers having experience above 10 years, translation questions succeeded 0.038 per cent of the time motivational behaviour, 0.104 per cent of the time lecturing, 0.087 per cent of the time students' response and 0.029 per cent of the time silence.

What happened when teachers used translation type of questions ? From Table 4.29, it can be observed, that, category 2b preceded categories 1, 5 and 7. This means, that, translation questions could generate motivational behaviour, students' response and silence. In case of the teachers having experience upto 5 years, translation questions preceded 0.002 per cent of the time motivational behaviour, 0.142 per cent of the time students' response and 0.054 per cent of the time silence. In case of the teachers having experience above 10 years, translation questions preceded 0.004 per cent of the time motivational behaviour, 0.211 per cent of the time students' response and 0.049 per cent of the time silence.

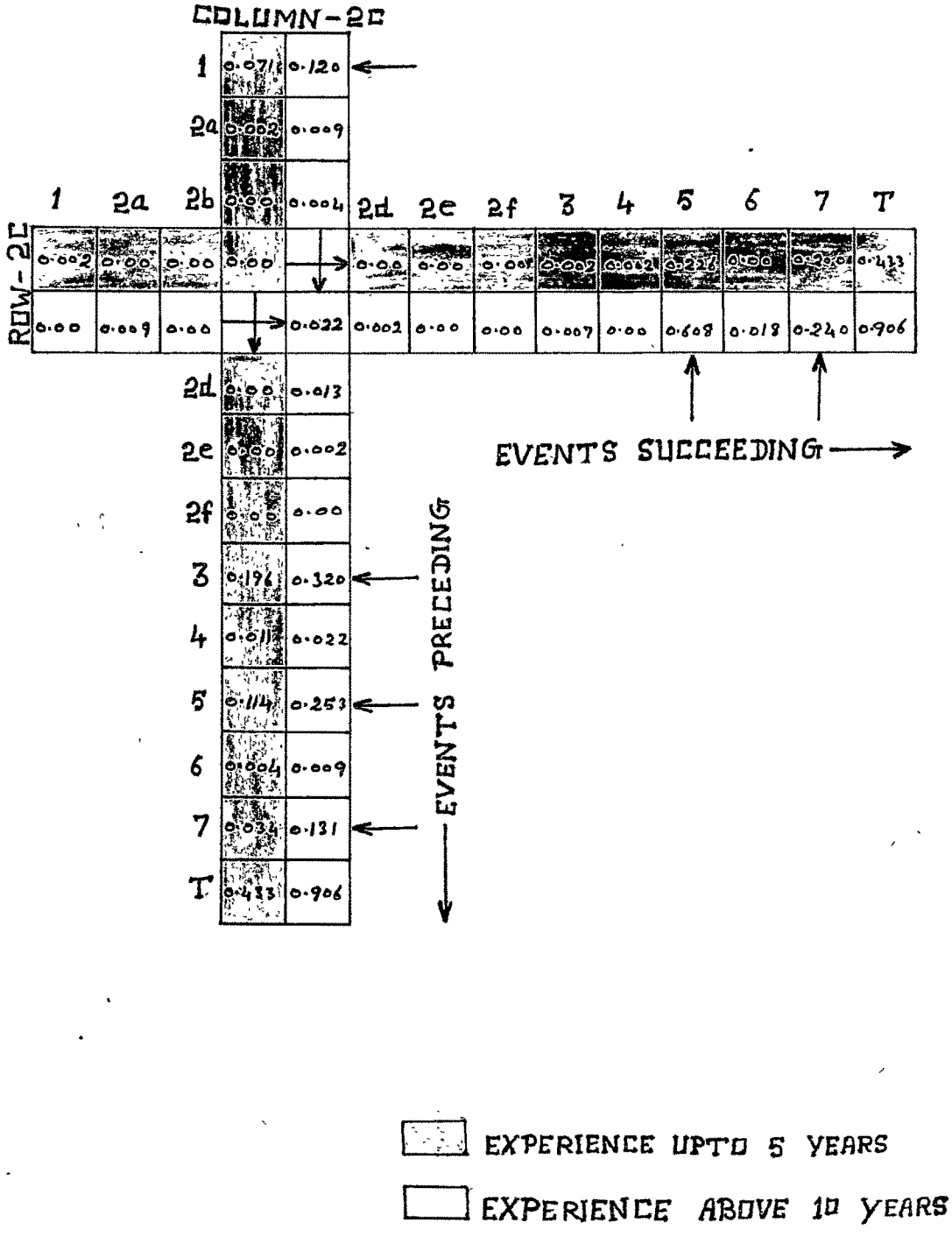
In brief it can be said, that, translation questions succeeded

motivational behaviour, lecturing, students' response and silence. These questions generated motivational behaviour, students' response and silence. The teachers having experience above 10 years could generate more motivational behaviour and students' response than the teachers having experience upto 5 years.

IV. 14.3 RELATIONSHIP OF INTERPRETATION QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH OTHER BEHAVIOURS

The relationship of interpretation questions with other behaviours of these two groups of teachers can be observed by studying column 2c and row 2c in the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years. This column and the row present the sequence of behaviours related to interpretation questions as it occurs in the classroom situation. This means, that, it provides an insight into the behaviours which precede and succeed the interpretation questions. For this purpose, column 2c and row 2c have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures of the column 2c and row 2c have been converted into percentages to bring them on a common scale. These are represented in Table 4.30.

Table 4.30 : Category - 2c (Interpretation Type of Questions) Percentages of Preceding and Succeeding Events of Category 2c of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 years



What events precededcategory 2c ? From Table 4.30, it can be noted that category 2c succeeded categories 1, 3, 5 and 7. This means, that, interpretation questions were used by these two groups of teachers after motivating the students after lecturing, after getting students' response and after giving some pause. In case of the teachers having experience upto 5 years, interpretation questions succeeded 0.071 per cent of the time motivational behaviour, 0.196 per cent of the time lecturing, 0.114 per cent of the time students' response and 0.034 per cent of the time silence. In case of the teachers having experience above 10 years, interpretation questions succeeded 0.12 per cent of the motivational behaviour, 0.32 per cent of the time lecturing, 0.253 per cent of the time students' response and 0.131 per cent of the time silence.

What happened when teachers used interpretation type of questions ? From Table 4.30, it can be noted, that, category 2c preceded categories 5 and 7. This means, that, interpretation questions generated students' response and silence. The questions of the teachers having experience above 10 years could generate initiation too. The most frequent behaviour was students' response. In case of the teachers having experience upto 5 years it was to the extent of 0.226 per cent of the time whereas in case of the teachers having experience above 10 years it was to the extent of 0.608 per cent of the time.

It can be said in brief, that, interpretation questions succeeded motivational behaviour, lecturing, students' response and silence. These questions generated students' response, initiation and silence. The questions of the teachers having experience above 10 years generated more students' response than their counter parts. The teachers having experience above 10 years could generate initiation also whereas their counter parts could not.

IV. 14.4 RELATIONSHIP OF APPLICATION TYPE OF QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH OTHER BEHAVIOURS

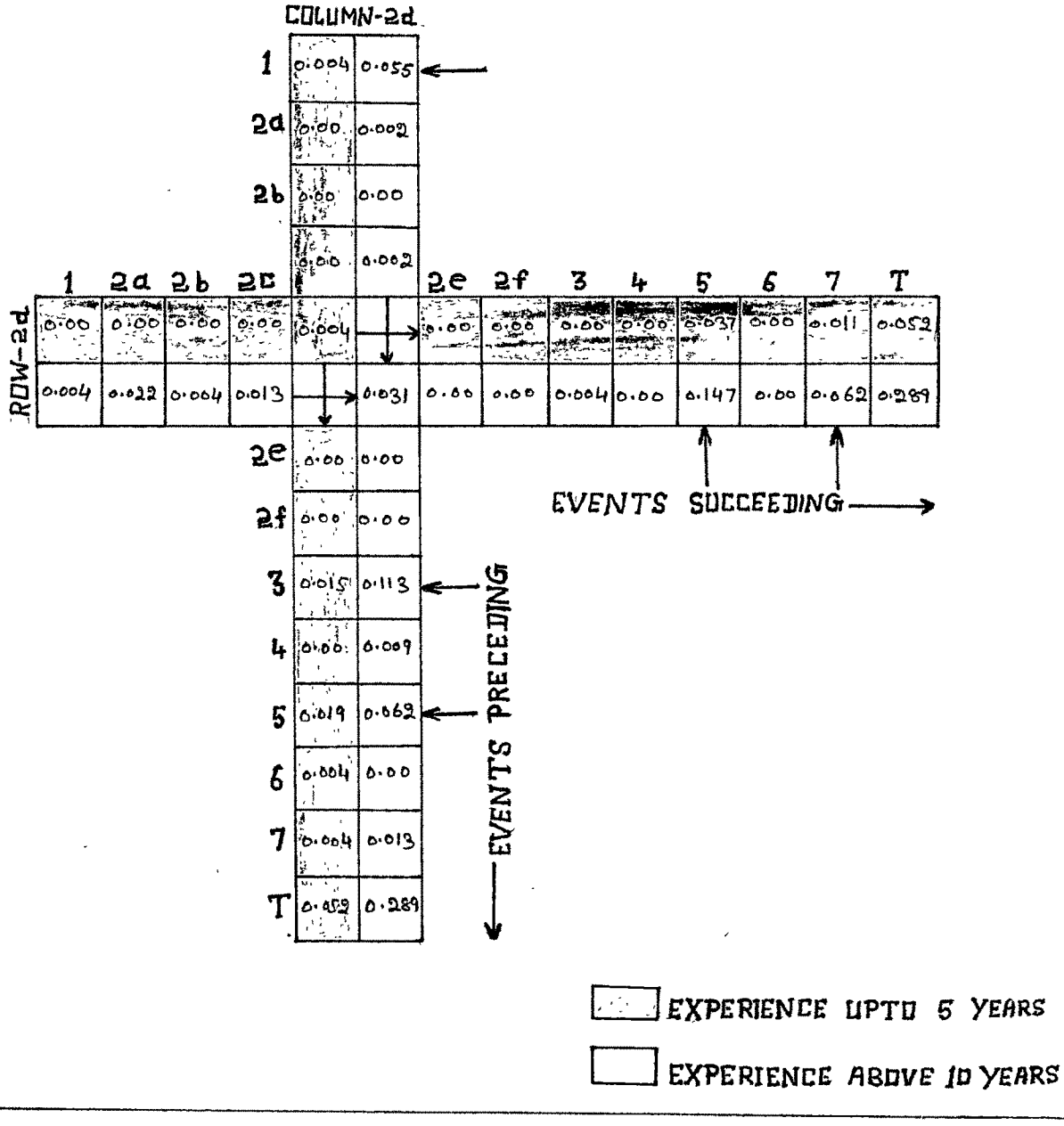
The relationship of application questions with other behaviours of the teachers having experience upto 5 years and the teachers having experience above 10 years can be observed by studying column 2d and row 2d in the master matrices of the respective groups. This column and the row present the sequence of behaviours related to application questions as it occurs in the classroom situation. This means, that, they provide an insight into the behaviours which precede and succeed application questions. For this purpose, column 2d and row 2d have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures in the column 2d and row 2d have been converted into

percentages to bring them on a common scale. These are represented in Table 4.31.

What events preceded category 2d ? From Table 4.31, it can be observed that category 2d succeeded categories 1, 3, and 5. This means, that, application questions were used by these two groups of teachers after motivating the students, after lecturing and after getting students' response. In case of the teachers having experience upto 5 years, application questions succeeded 0.004 per cent of the time motivational behaviour, 0.015 per cent of the time lecturing and 0.019 per cent of the time students' response. In case of the teachers having experience above 10 years, application questions succeeded 0.055 per cent of the time motivational behaviour, 0.113 per cent of the time lecturing and 0.062 per cent of the time students' response.

What happened when teachers used application questions ? From Table 4.31, it can be noted, that, category 2d preceded categories 5 and 7. This means that application questions generated students' response and silence. The most frequent generated behaviour was students' response. In case of the teachers having experience upto 5 years it was to the extent of 0.037 per cent of the time whereas in case of the teachers having experience above 10 years it was to the extent of 0.147 per cent of the time. Silence here indicates the time required

Table 4.31 : Category - 2d (Application Type of Questions) Percentages of Preceding and Succeeding Events of Category 2d of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years



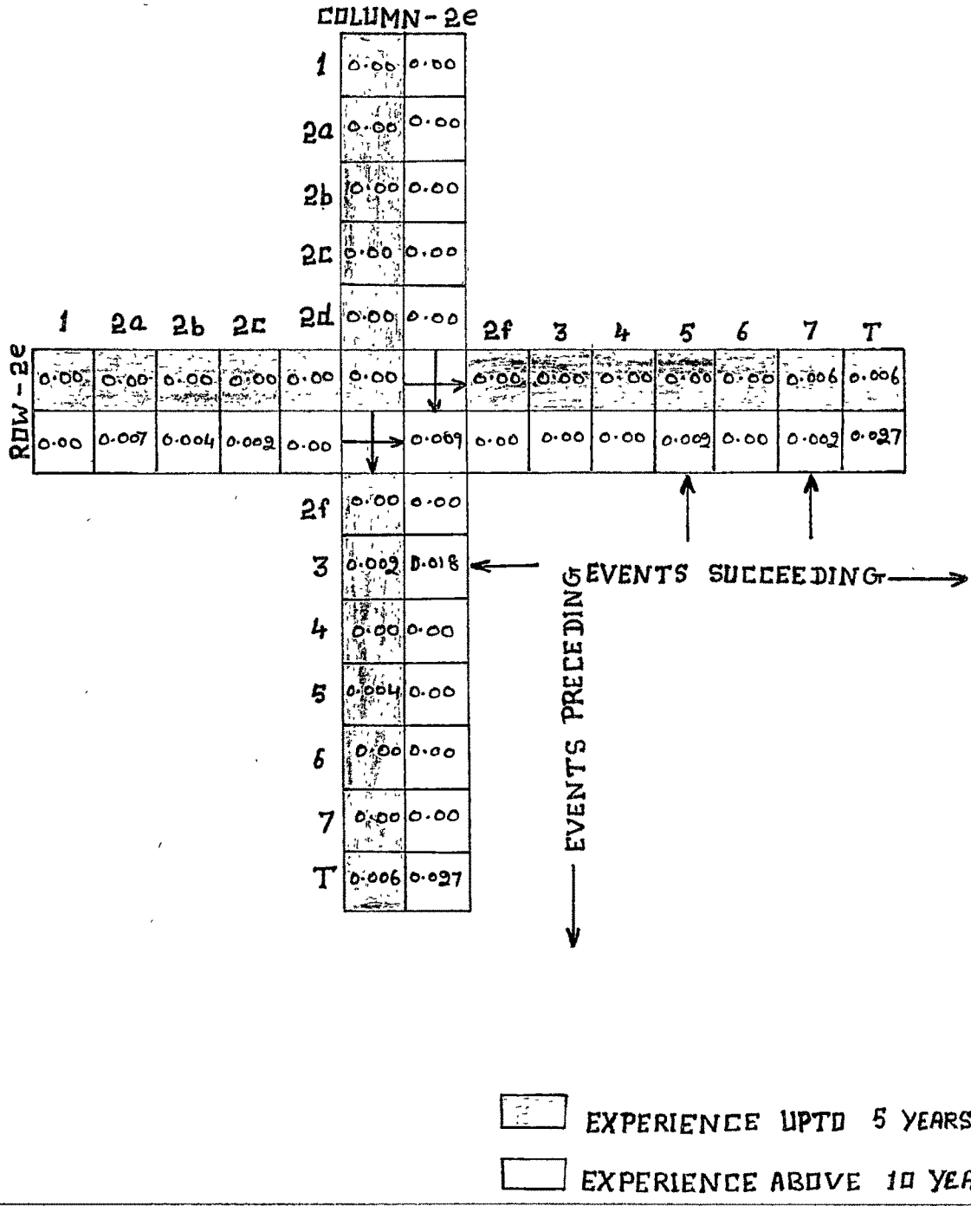
for thinking in order to respond a question.

In brief it can be said, that, application questions succeeded motivational behaviour, lecturing and students' response and they generated students' response. The generation of students' response was greater in case of the teachers having experience above 10 years.

IV. 14.5 RELATIONSHIP OF HIGHER ORDER QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH OTHER BEHAVIOURS

The relationship of higher order questions with other behaviours of these two groups of teachers can be observed by studying the column 2e and row 2e in the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years. This column and the row present the sequence of behaviours related to higher order questions as it occurs in the classroom situation. This means that it provides an insight into the behaviours which precede and succeed the higher order questions. For this purpose, the column 2e and the row 2e have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures of the column 2e and row 2e have been converted into percentages to bring them on a common scale. These are represented in Table 4.32.

Table 4.32 : Category - 2e (Higher Order Questions)
Percentages of Preceding and Succeeding Events of Category 2e of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years



What events preceded category 2e ? From Table 4.32 it can be observed that, category 2e succeeded category 3. This means, that, higher order questions were used by these two groups of teachers after lecturing. In case of the teachers having experience upto 5 years 0.002 per cent of the time higher order question succeeded lecture whereas in case of the teachers having experience above 10 years 0.018 per cent of the time higher order questions succeeded lecture.

What happened when teachers used higher order questions ? From Table 4.32, it is obvious, that category 2e succeeded categories 5 and 7. This means, that, higher order questions generated students' response and silence. In case of the teachers having experience above 10 years, higher order questions preceded 0.002 per cent of the time students' response and 0.002 per cent of the time silence. In case of the teachers having experience upto 5 years, higher order questions could not generate students' response, but, they generated silence to the extent of 0.006 per cent of the time.

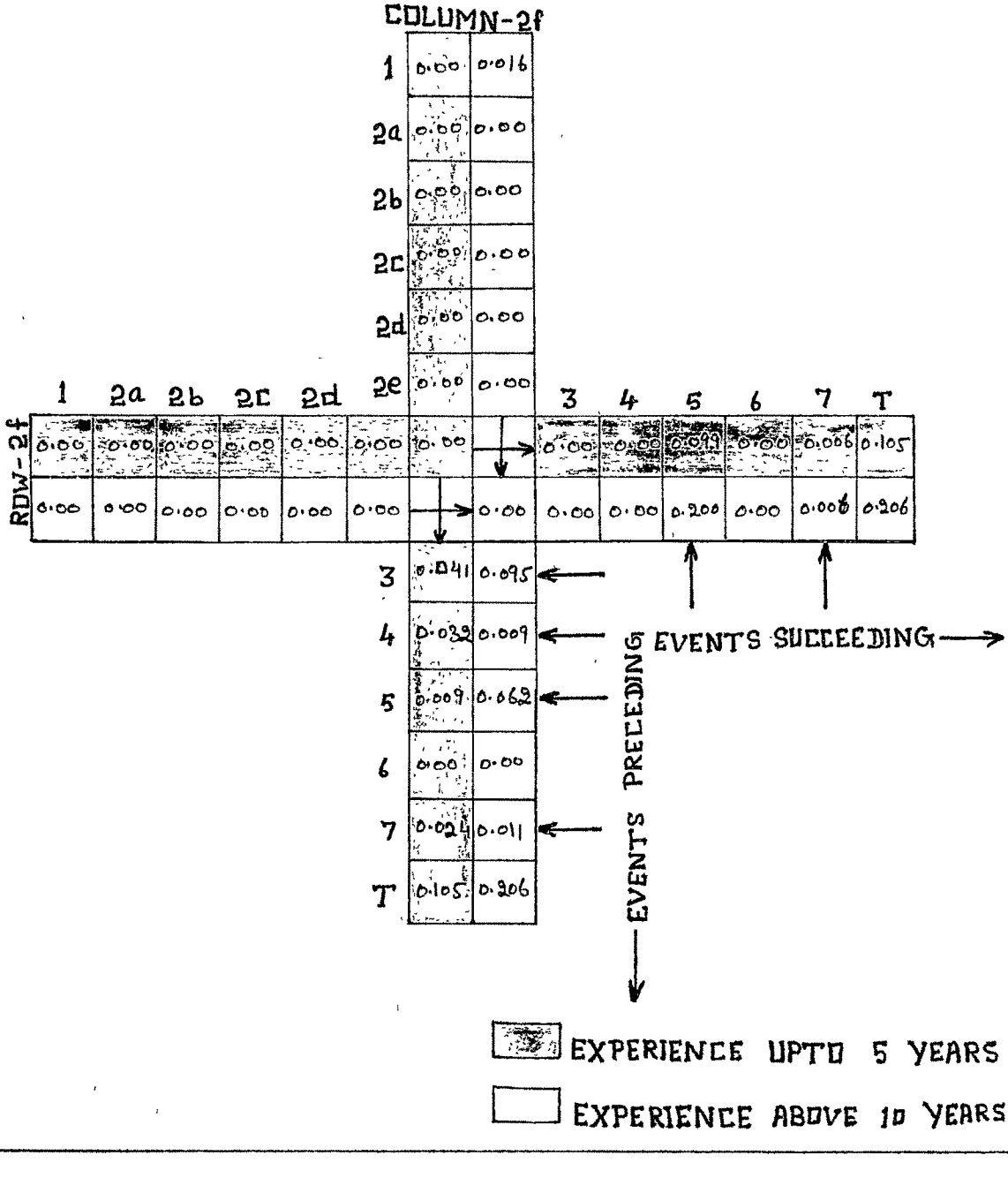
IV. 14.6 RELATIONSHIP OF ROUTINE TYPE OF QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH OTHER BEHAVIOURS

The relationship of routine type of questions with other behaviours of these two groups of teachers can be observed by studying column 2f and row 2f in the master matrices of the

teachers having experience upto 5 years and the teachers having experience above 10 years. This column and the row present the sequence of behaviours related to routine type of questions as it occurs in the classroom situation. This means that, it provides an insight into the behaviours which precede and succeed the routine type of questions. For this purpose, the column 2f and the row 2f have been taken out from the master matrices of the teachers having experience upto 5 years and the teachers having experience above 10 years presented in Tables 4.6 and 4.7. The figures of the column 2f and row 2f have been converted into percentages to bring them on a common scale. These are represented in Table 4.33.

What events preceded category 2f ? From Table 4.33, it can be observed that, category 2f succeeded categories 3, 5 and 7. This means that, routine type of questions were used by these teachers after lecturing, after getting students' responses and after giving some pause. In case of the teachers having experience upto 5 years, routine type of questions succeeded 0.041 per cent of the time lecturing, 0.009 per cent of the time students' response and 0.024 per cent of the time silence. In case of the teachers having experience above 10 years, routine type of questions succeeded 0.095 per cent of the time lecturing 0.062 per cent of the time students' response and 0.011 per cent of the time silence.

Table 4.33 : Category - 2f (Routine Type of Questions Percentages of Preceding and Succeeding Events of Category 2f of the Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years



What happened when teachers used routine type of questions ? From Table 4.33, it can be noted, that, category 2f preceded categories 5 and 7. This means, that, routine type of questions generated students' response and silence. In case of the teachers having experience upto 5 years, routine type of questions generated students' response to the extent of 0.099 per cent of the time and silence to the extent of 0.006 per cent of the time. In case of the teachers having experience above 10 years, routine type of questions generated students' response to the extent of 0.20 per cent of the time and silence to the extent of 0.006 per cent of the time.

In brief it can be said, that, routine type of questions succeeded, lecturing, students' response and silence, and generated students' response and silence. The questions of the teachers having experience above 10 years could generate more students' response comparatively.

IV.15 RELATIONSHIP OF DIFFERENT KINDS OF QUESTIONS OF THE TEACHERS HAVING EXPERIENCE UPTO 5 YEARS AND THE TEACHERS HAVING EXPERIENCE ABOVE 10 YEARS WITH STUDENTS' RESPONSE AND INITIATION

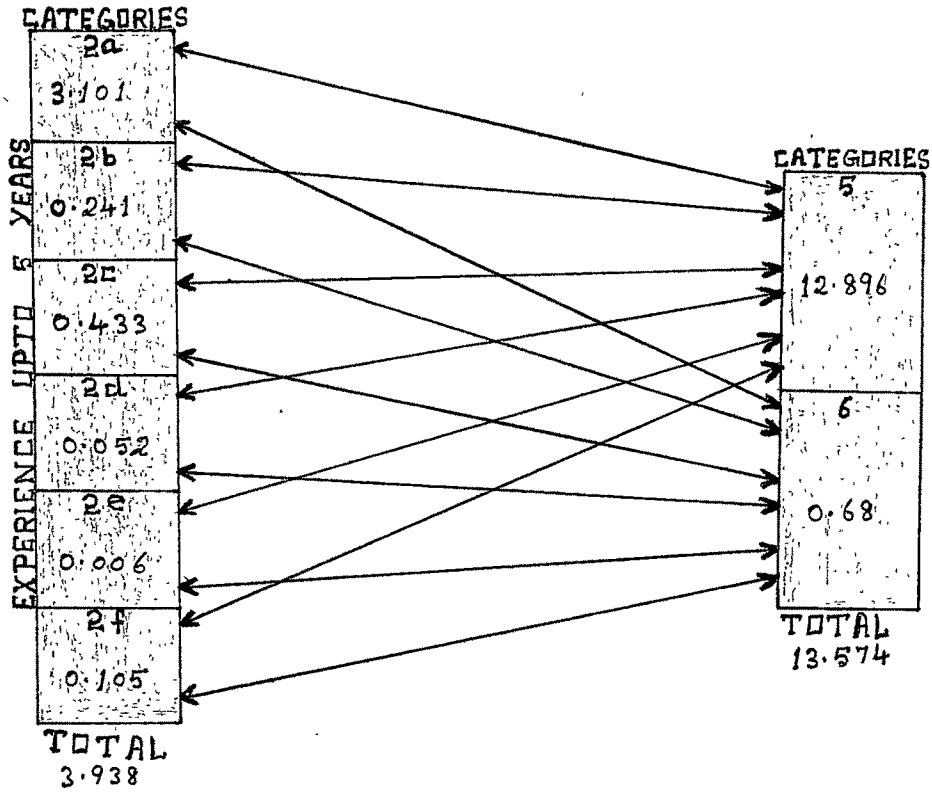
In order to study the relationship of different kinds of questions, viz., memory, translation, interpretation, application, higher order and routine type of questions of the teachers having experience upto 5 years and the teachers having experience above 10 years with students' response and initiation the totals of categories 2a to 2f, and 5 and 6 have been taken out from the

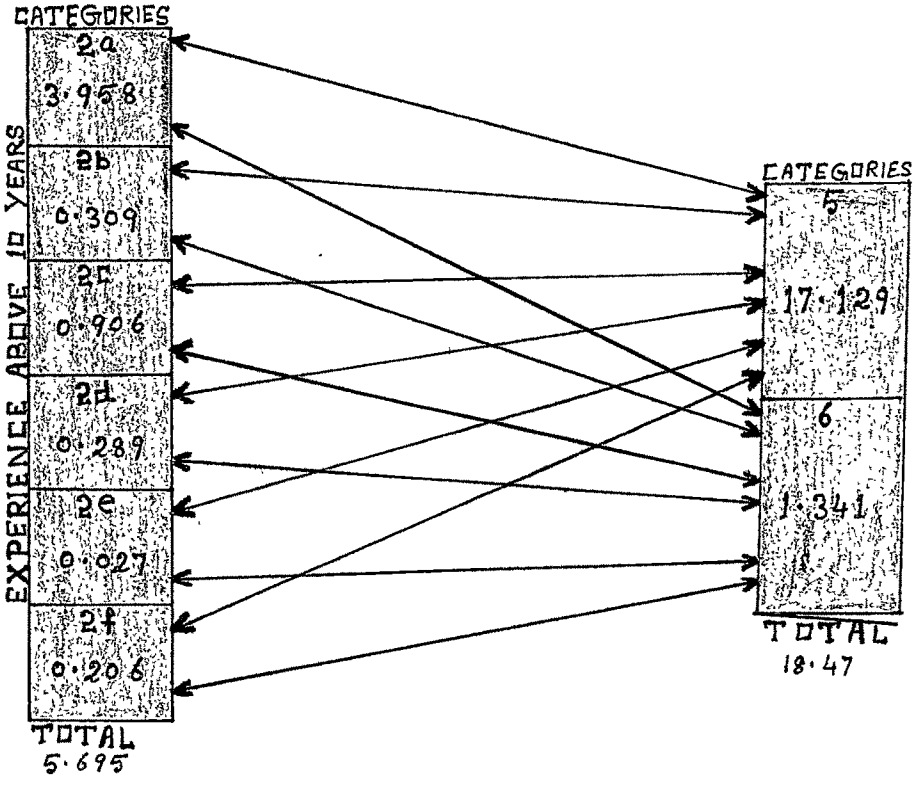
master matrices of the respective groups which were given in Tables 4.6 and 4.7. The totals of these categories have been converted into percentages to bring them on a common scale. They have been represented in Table 4.34.

From Table 4.34, it can be observed, that, the teachers having experience above 10 years used total questioning to a greater extent than the teachers having experience upto 5 years. In case of the teachers having experience upto 5 years 3.938 per cent of the time was devoted for questioning whereas in case of the teachers having experience above 10 years 5.695 per cent of the time was devoted for questioning. For different kinds of questions percentages are higher in case of the teachers having experience above 10 years.

With regard to students' response and initiation it is found, that, percentages are far greater in case of the teachers having experience above 10 years. In case of the teachers having experience upto 5 years, 13.574 per cent of the time was devoted for students' response and initiation whereas in case of the teachers having experience above 10 years, 18.47 per cent of the time was devoted for students' response and initiation. In case of the teachers having experience upto 5 years, the students' response and initiation were to the extent of 12.894 per cent and 0.68 per cent respectively whereas in case of the teachers having experience above 10 years, it was to the extent of 17.129 per cent and 1.341 per cent respectively.

Table 4.34 : Categories - 2a, 2b, 2c, 2e, 2f - 5, 6
Percentages of Categories - 2a, 2b, 2c, 2d and 2e, 2f in Relation to Categories 5 and 6 of Teachers having Experience upto 5 Years and the Teachers having Experience above 10 Years.





In brief it can be said, that, the teachers having experience above 10 years used different kinds of questions to a greater extent. This higher use of different kinds of questions has generated students' response and initiation to a large extent. The results indicate that use of different kinds of questions is positively related with the students' response and initiative.

IV.16 CONCLUSIONS

The present study reveals that :

1. The teacher dominates the classroom interaction and about 71.37 percent of the total time is used by the teacher. Of this teacher talk questioning forms only 6.09 per cent.
2. The teacher question ratio is found to be 6.69.
3. The different kinds of questions, viz., memory, translation, interpretation, application, higher order and routine contribute only 4.60, 0.34, 0.72, 0.16, 0.01, and 0.26 per cent respectively towards the teacher talk.
4. The extension of questions gets increased with the increase of the level of questions.
5. The possibility of a question to be followed by response gets decreased with an increase in the level of questions.
6. The time required to think in order to respond a question gets increased with the increase in the level of questions.
7. The questioning behaviour of social studies and science teachers differs significantly. The science teachers used total questioning, translation, interpretation, application and higher order questions to a greater extent and memory and routine type of questions to a lesser extent than social studies teachers.

8. The questioning behaviour of trained and untrained teachers differs significantly. The trained teachers used total questioning and different kinds of questions to a greater extent than untrained teachers.

9. The questioning behaviour of the teachers having experience upto 5 years and the teachers having experience above 10 years differs significantly. The teachers having experience above 10 years used total questioning and different kinds of questions to a greater extent than that of their counterparts.

10. The extent of memory, translation, interpretation, application, higher order and routine type of questions of social studies teachers in the total questioning wwas found to be 76.636 per cent, 5.559 per cent, 10.307 per cent, 2.548 per cent, 0.00 per cent, and 4.951 per cent respectively.

11. The extent of memory, translation, interpretation, application, higher order and routine type of questions of science teachers in the total questioning was found to be 72.894 per cent, 6.366 per cent, 12.90 per cent, 4.17 per cent, and 3.225 per cent respectively.

12. The extent of memory, translation, interpretation, application, higher order and routine type of questions of trained teachers in the total questioning was found to be 78.118 per cent, 5.418 per cent, 10.206 per cent, 2.268 per cent, 0.042 per cent, and 3.948 per cent respectively.

13. The extent of memory, translation, interpretation, application, higher order and routine type of questions of untrained teachers in the total questioning was found to be 79.448 per cent, 6.107 per cent, 10.746 per cent, 0.352 per cent, 0.058 per cent, and 3.288 per cent respectively.

14. The extent of memory, translation,, interpretation, application, higher order and routine type of questions of the teachers having experience upto 5 years in the total questioning was found to be 78.743 per cent, 6.12 per cent, 10.984 per cent, 1.311 per cent, 0.164 per cent, and 2.678 per cent respectively.

15. The extent of memory, translation, interpretation, application, higher order and routine type of questions of the teachers having experience above 10 years in the total questioning was found to be 69.513 per cent, 5.419 per cent, 15.906 per cent, 5.068 per cent, 0.468 per cent, and 3.626 per cent respectively.

16. Different kinds of questions succeeded mostly lecturing, students' response and motivational behaviour. The questions were also used after giving pauses. The behaviour generated by questioning to the greatest extent was found to be the students' response. The questions also made students think about the solutions of the problems and the correctness of the responses.

17. The questions of the science teachers, trained teachers and the teachers having experience above 10 years in certain situations could generate students' initiative too.

18. Different kinds of questions bear relationship with students' response and initiation. The increase in the use of questioning increases the students' responses and initiation.

IV. 17 GENERAL DISCUSSION

In the present section, the results have been discussed in general in the light of the related studies.

From the interpretation and discussion of the results and testing of the hypotheses, it can be seen that the extent of questioning in the verbal teacher talk is negligible and whatever time is devoted for questioning is used mainly for memory type of questions and other types of questions are just ignored. It is not certainly a happy state of affairs because questioning guarantees a clear involvement of the students in the teaching-learning process. It is reiterated that pupils' participation in the teaching-learning process facilitates their learning. The second aspect of the problem, viz., the over-emphasis on memory type of questions is still hazardous because the questions like, interpretation, application and higher order which have been neglected are pregnant with potential to generate indirect influence in the teachers. It goes without saying that the interaction which is going on in these classrooms cannot be productive as the indirect influence in the teachers' behaviour has been ignored. But, on closer examination of the teaching-learning situation of the classrooms these findings although pretty shocking do not contradict our experience. The medium of instruction is a foreign language in these schools and it restricts their questioning ease. They do not have the facility of communication in this language as they could have in the mother tongue. In most of the classrooms for most of the time the teacher lectures and the pupil listens and receives knowledge. The teachers and the pupils both are so

much conditioned in this learning style that both the parties aim at memorising and reproducing the same in the examination. The development of other abilities as application, analysis, creativity, evaluation and the like have been avoided which no programme of teacher education can afford.

With regard to extension and follow up of different kinds of questions by response and silence, the findings of the present study reveal that the extension and the possibility of questions being followed by silence are increased and the possibility of questions being followed by response is decreased as the level of questions is raised. But, it is natural, because the mental process which is involved in understanding and responding to interpretation, application and higher order questions is of high level. Now, the critical issue arises whether one should avoid the use of above mentioned questions or one should tolerate the side effect which is caused by these types of questions. Anyone who is interested in the teaching-learning process and is analytical regarding the classroom interaction would certainly like to develop higher abilities in the pupils, but will not tolerate these ingredients which create silence in the classroom. It would be possible only in that situation when, interpretation, application and higher order questions are used continuously. This will facilitate and develop the different frontiers of their mental faculties, viz., the abilities to apply, analyse, synthesize and evaluate

the knowledge they have gained, Therefore, when pupils are trained in this kind of thinking process they will take less time to understand and solve the problems and hence, it will cause the indirect influence in the teacher behaviour.

As regards the association of questioning behaviour with variables like subject, training and experience, it was found that all the three variables bear relationship with the questioning behaviour. Searching for research evidence in the research literature, it is found that, studies which are directly related to questioning behaviour and its association with other variables under the present study are very few. The findings of the present study are supported by Kaul (1975), who studied the questioning behaviour of science and humanities teachers, direct and indirect teachers of science and direct and indirect teachers of humanities. This study also reveals, that, subject as a variable is associated with the questioning behaviour. In this study science teachers used questioning to a greater extent than humanity teachers. The study conducted by Malhotra (1976) also supports the findings of the present study. It indicates that science teachers were more indirect in their classroom behaviour than arts teachers. Questioning was a main component in the indirectness of the teachers in this study. Anne (1977) also supported the results of this study partially. The results of this study indicated that the two groups of teachers differed significantly in two of the five content categories. Physical

World, and Human Actions and Intentions. There were no significant differences in the three content categories : Reality and History, Rules and Usage, and calculations. But, the findings of the present study contradicts with Kumar (1976). In that study questioning behaviour of social studies teachers did not differ significantly than that of humanities teachers.

With regard to the association of questioning behaviour with training, the results of the present study are partially supported by Thakor (1973). In Thakors study, it was observed that the use of application and higher order questions was significantly higher in the case of trained teachers than untrained teachers. The present study also reveals that the trained teachers used significantly more different kinds of questions. In the case of interpretation questions, it is found that the results of this study contradicts with that of Thakor's study. Thakor (1973) observed that untrained teachers used more interpretation type of questions whereas in the present study trained teachers used more interpretation questions. But, both the studies reveal that, trained teachers show a trend to go towards higher order questions. There are a number of studies which are not completely on questioning behaviour, but, the questioning has been studied as one of the important aspects of teacher behaviour. These studies indicate that training causes the indirect influence in the classroom where questioning is the main constituent of indirectness. The studies supported this view are by Amidon and Powell (1966),

Moskowitz (1967), Zahn (1967), Simon and others (1966), Lohman, Hough and Obser (1967), Hanny (1967), Davidson (1968), Wright, Nuthall and Lowrence (1969), Hotcomb (1970), Pareek and Rao (1971), Nath (1971), Jangira (1972), Lulla (1973), and Raijiwala (1975).

With regard to the association of questioning behaviour with experience no directly related research is available for comparison and to arrive at conclusions. But, Santhanam (1970) and Malhotra (1976) studied relationship between teacher influence and sex, training, experience etc. In both the studies questioning was one of the categories in teacher influence. The findings of the present study are supported by Santhanam's study as both the studies reveal that experience is associated with teacher influence.

With respect to the preceding and succeeding events of questions, the results of the present study are supported by Raijiwala (1975). Both the studies revealed that, the ques_tions mostly succeede lecturing, pauses and students' response and generate to the greatest extent students' response.

Moreover, the related research gives an evidence that most of the questions used by teachers were of memory type. Stevens (1912) reported that the major emphasis was placed upon memory questions in English and social studies classes. Gallagher (1965) found that most teachers' questions were at the lower cognitive level. Davis and Tinslay (1967) reached similar conclusions using Bloom's (1956) Taxonomy of Educational Objectives : Cognitive

Domain as the criterion measure. Their study revealed that teachers asked more memory questions than all other kinds of questions combined. Floyd (1960) reported that memory questions were asked most often by primary grade teachers. Guszak (1968) also conducted a study at primary level and found that recall questions were asked more than half of the time (57 per cent) by teachers in grades 2, 4 and 6. John (1970) studied oral questioning practices of teachers in social studies classes. The study revealed that at least 54 per cent of the questions asked by the teachers fell into the memory category. Brannen (1974) found that in 90 per cent of the secondary schools social studies classrooms, the teachers' questions were at the information level requiring pupils only to recall previously studied material rather than at the higher levels. Nicholson (1978), found that a majority of the discussion questions in the teachers manuals studied required an expected response on the literal level of thinking. Majority of questions emphasized the lower level thinking process. The present study fully supports the findings of the above studies. This study reveals that 75 per cent of the questions of the social studies and science teachers fall into the memory category.

It can be stated in the light of the discussion given above that most of the teachers over-emphasize memory type of questions and the questions of higher cognitive level are neglected. The extension of questions and the possibility of being followed by

silence gets increased with the complexity of questions. The possibility of questions being followed by response gets decreased as the level of questions is raised.

Another inference which could be inferred from the discussion of results is that the variables like subjects, training and experience are associated with the questioning behaviour. The science teachers, trained teachers and the teachers having experience above 10 years use total questioning and different kinds of questions to a greater extent.

Different kinds of questions mostly succeed motivational behaviour, lecturing, students' response and silence and have the potential to generate the students' response to the greatest extent.

What does research tell to the teacher and the teacher educator. Kaul (1975), Kumar (1976), Thakor (1973) and many other studies discussed above support the present study that most of the teachers over emphasize memory type of questions and avoid higher order questions. The teachers will certainly gain from this systematic and objective observation to have a further insight into their questioning behaviour. It provides an analytical picture of their questioning behaviour. If a teacher wants to be effective in the classroom he has to secure the involvement of the pupils in the teaching-learning process. The right type of questions used by the teacher can secure this

involvement. Memory and translation types of questions will provide information to the students. Interpretation type of questions will stimulate some thinking. But, application and higher order questions will generate powerful mental processes which would train the pupils in independent, original and creative application of knowledge. These higher order questions are the basis of divergent thinking so necessary for stimulating creativity. The findings of the present research will help not merely the teachers who would have a clear analytical picture of their questioning behaviour but also the teacher educators who would see in the results of this research the shortcomings of the teacher education programme. Teacher education programme in Gujarat universities is fairly of a superior type. Even then the products of this programme have not developed the ability of using application and higher order questions. One á implication of this study is for the trained teachers. It is needed on their part to make conscious efforts to use such types of questions which would stimulate originality and creativity. The second implication of this study is for the teacher educators. If the teacher educators would introspect they would find that they lecture on the need and importance of questioning. They, however, do not know how to train teachers in the use of application and higher order questions. The teacher educators use memory type of questions and naturally

teachers trained by them use the same type of question predominantly. The question arises, 'how can we train teachers in the use of different question types ?' The Baroda University has selected microteaching approach for developing questioning skills. The NCERT has taken this approach all over the country. Supported by the British Council a similar approach is being introduced in the training colleges of Maharashtra. A large number of other universities in India are using the classical or a modified version of microteaching to develop questioning skills. Periodic surveys of the questioning behaviour of teachers would reveal the effectiveness of the various training techniques in developing this important skills.
