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A STUDY OF THE DEVELOPMENT OF SKILL IN LEARNING TO OPERATE THE HOLLERITH CARD-PUNCHING MACHINE

W. LeRoy Cation

In this study the writer served as both subject and experimenter. Previous to this experiment the writer had had no experience in punching Hollerith cards. The data used for punching were coded prior to the actual punching of the cards. The 80-column card was used. There were sixteen 30-minute periods throughout a period of five weeks. With two unavoidable exceptions the practice periods were held each Monday, Wednesday, and Friday at 4:00 P.M.

(1) Striking the wrong key, (2) failing to punch entirely through the card, or (3) omitting an item, constituted an error.

RESULTS

Table I gives a summary of results.

Table I — Performance for Each Practice Period

Period No.	Total Cards Punched	Total Number Errors	Number Correct Cards	Per Cent of Total Cards Correct	Average Errors Per Card
1	18	15	9	50	0.83
2	23	23	9	39	1.00
3	26	28	11	42	1.08
4	24	19	12	50	0.79
5	27	19	14	52	0.70
6	32	31	22	69	0.97
7	30	31	15	50	1.03
8	35	32	21	60	0 91
9	35	24	20	57	0.68
10	39	28	18	46	0.72
11	40	26	21	53	0.65
12	31	29	14	45	0.94
13	38	35	17	45	0.92
14	41	20	28	68	0.49
15	40	20	28	70	0.50
16	41	33	20	49	0.80
Totals	520	413	279		

For each period the cards were assembled in order as punched. Each pile was then divided in the middle and the errors determined for each half. For example during the first period 18 cards were punched. Twelve errors were made on the first 9, and 3 on the second nine.
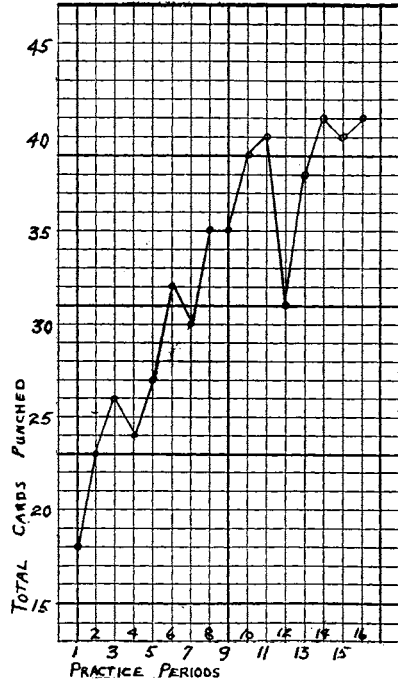
Fig. 1. Progress in Learning to Operate the Hollerith Card-Punching Machine.
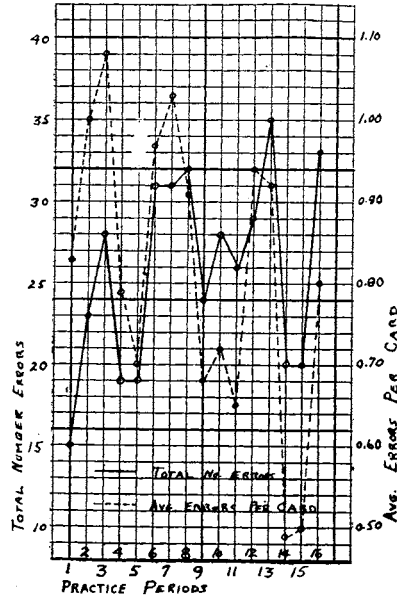

Fig. 2. Graphical Representation of Accuracy in Learning to Operate the Hollerith Card-Punching Machine.
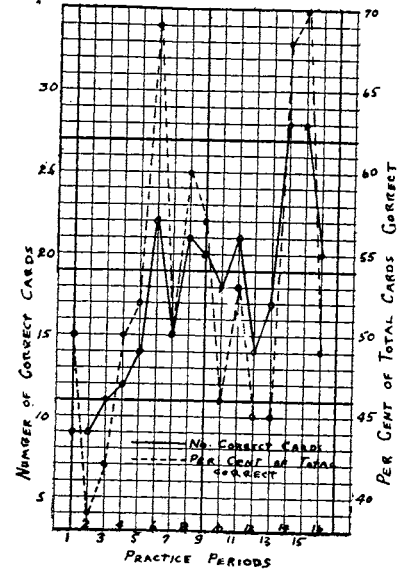

Fig. 3. Graphical Representation of Accuracy in Learning to Operate the Hollerith Card-Punching Machine.

A study of errors in the first half and the second half of each card was also made. For example, in the first period the total number of errors made on the first half of each of these 18 cards, or on the first 40 columns of each card, was 6, while 9 errors were made on the second half, or the remaining 40 columns of these 18 cards. A summary of these two analyses is given in Table II.

Table II — Study of Errors

Period No.	No. Cards Punched	Number of Errors		Number of Errors	
		1st Half of Cards	2nd Half of Cards	Total for 1st Halves of Cards	Total for 2nd Halves of Cards
1	18	12	3	6	9
2	23	10	13	7	16
3	26	18	10	9	19
4	24	12	7	4	15
5	27	10	9	8	11
6	32	24	7	19	12
7	30	16	15	9	22
8	35	18	14	16	16
9	35	16	8	6	18
10	39	17	11	9	19
11	40	15	11	10	16
12	31	20	9	9	20
13	38	24	11	16	19
14	41	9	11	3	17
15	40	12	8	11	9
16	41	21	12	14	19
Totals	520	254	159	156	257

These differences in number of errors were tested for significance by the chi-square method. The value for chi-square is 21.9 for the difference in errors between the first half of cards and the second half of cards. The value for chi-square is 24.8 for the difference in errors between the first halves of the cards, or first 40 columns, and the second halves, or last 40 columns. Both values are highly significant.

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