

1927

Psychology of Drill Organization in Arithmetic Textbooks

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Recommended Citation

Lutes, O. S. (1927) "Psychology of Drill Organization in Arithmetic Textbooks," *Proceedings of the Iowa Academy of Science*, 34(1), 299-300.

Available at: <https://scholarworks.uni.edu/pias/vol34/iss1/94>

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PSYCHOLOGY OF DRILL ORGANIZATION IN
ARITHMETIC TEXTBOOKS

O. S. LUTES

Six arithmetic textbook series have been analyzed with respect to the following eight fundamental aspects of their drill provisions:

1. The Distribution of Practice on the Primary Combinations. It is held that drill should come often and in small amounts, rather than be bunched up in two or three places in a text. Furthermore drill on a given process should come at increasing intervals and in decreasing amounts after the process has been learned. Most texts seem to violate these principles. Gaps as long as 90 pages are found in texts with no drill on the basic operations identifiable as such.

2. The Bulk of Practice on the Primary Combinations. Considerable evidence exists to show that some combinations at least are under practiced, while others are over practiced. Our analysis shows that some texts contain more drill than can ever be taught within the time allotted to arithmetic in most schools. Likewise some texts do not contain sufficient practice to assure mastery of the skills needed.

3. Relative Practice on Hard and Easy Combinations. Experimentation by Holloway, Smith, Heilman and Shultis, Clapp and others, seems to agree pretty well in establishing some combinations as being more difficult than others. Roughly it may be said that in addition those combinations above 5 plus 5 are harder than those below these figures. In subtraction those combinations involving "unseen" numbers, and those involving upper decades as minuends are the most difficult. In multiplication those combinations above 5 times 5 are most difficult. Little experimentation has been done on this phase of division, but in the multiplication involved in division the same difference in difficulty would hold as in multiplication proper. Our analysis shows that many texts give more practice on the easy combinations than on the hard ones. For example one text gives more than one thousand practices to combinations involving the digit 2, as compared with about 500 practices on combinations involving 7.

4. Amount of Carrying Practice. Some texts give nearly all

the practice on carrying the digit 1, so that a preferred response of carrying one is apt to be established in such a way as to interfere with the carrying of other digits.

5. The Placement of Drill Units in the Text. It has been common practice for texts to give all their drill in about three places in the book, bunching it up especially in the beginning and the end of the books. This violates the principle given under number one above, and tends to tire the pupils beyond measure when any attempt is made to use the drill as given. This custom accounts for the 90-page gaps with no drill mentioned above. This means that as much as half the year may lapse with no drill on the basic combinations.

6. Arrangement of Examples within Drill Units in Order of Difficulty. Arranging examples in order of difficulty is a principle now well established in text construction, and probably applies as well to review drills for maintaining skills. None of the six texts analysed contained this feature.

7. The Use of Standards With Drill Work. Awareness of success and failure at the time of learning is probably the greatest single motivator which can at the present time be used on a wide scale. Several texts now contain drills which have been standardized, but most of them are of the single standard type, such as "Get 10 examples right in six minutes." This sort of standard is apt to work harm because bright pupils may come up to it without any effort while it may be too high for dull pupils. A varied standard with six to ten different ratings according to different ranges of accomplishment is to be preferred to the single standard type.

8. Use of Mixed versus Isolated Drills. The tendency still prevails to give isolated drills on one function separately from all other functions. This is not the way the functions occur either in verbal problems or in actual life situations.

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THE MODE OF VIBRATION OF THE HUMAN VOCAL CORDS

WOLFGANG METZGER

Observation: Some of the models of the larynx used since the experiments of Johannes Mueller (when observed through the stroboscope) show transverse and alternate vibration.

The question arises as to whether this is the mode of vibration