PROGRAMMED LEARNING MOVEMENT IN JAPAN

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It is difficult to point out the exact date of the beginning of the so-called teaching machine movement in the United States and in Japan, too. Although in Japan, a similar mode of instruction had already been developed in various special laboratory schools and private schools, this method should not be called the modern programmed learning in the strict sense. It seems that the Japanese psychologists had little interest in a mode of instruction such as programmed learning or programmed instruction. Moreover, at that time, even B.F. Skinner's article of 1954(29) was given little attention by Japanese psychologists.

1959—1960

On the other hand, the leaders of audio visual instruction have shown much concern over this field since 1959. M. Nishimoto, professor of education and director of the Audio-Visual Center at International Christian University, has believed that the teaching machine and automated instruction will become a new educational media in audio-visual instruction.

At the close of 1959, Ben C. Duke, who has studied audio visual instruction at Pennsylvania State University and is now an assistant professor at International Christian University, joined the Audio-Visual Center of ICU. He presented the current position of the teaching machine field in the United States and tried to obtain various kinds of materials on teaching machines and automated learning.

At the same time, Lumsdaine's article (14) in the AudioVisual Communication Review, 1959, which was also described in "Teaching machines and programmed learning: a source book" (15) under the title of "An introductory overview," was very influential to audio visual instruction in Japan. Of course, the first publication in this field, which was edited by E. Galanter (5), stimulated Japanese educators and audio-visual instructors, even though most of the articles pertained to psychological research, but Lumsdaine's article (13) especially inspired educators connected with the audio-visual field.

Japanese Psychologists and educational psychologists did not show explicit interest in this book(5), but Hively's article "Implications for the class room of B.F. Skinner's analysis of behavior"(7) which was described in Harvard Educational Review 1959, was read by many educators and educational psychologists in Japan, and was immediately introduced in *Americana*, in November, 1959, by S. Nagashima, assistant professor of psychology at the Tokyo University of Education (17). Also, in 1960, he described "Skinner's teaching machine" (18) which served as an introduction for Japanese teachers.

The Audio-Visual Center of ICU has continued, since the end of 1959, to arrange data and materials from the United States. At the beginning of the seventh National Conference on Audio-Visual Education, which was held at ICU in July, 1960, Duke (4) lectured on "teaching machines." He referred to some basic principles, and spoke on historical back-

grounds and developments for the future. Nishimoto(19) suggested that television education and audio-visual education should be compensated for by teaching machines and programmed learning, and that mass instruction via television, and individual instruction by teaching machines be coordinated as are both wheels of a train. There was no doubt as to the importance of this moment in this field in Japan. Thereafter, similar articles were written by K. Inagaki (10) and J. Oishi(27) from the educational field.

In December, 1960, the AV Center of ICU decided to translate into Japanese "a source book"(15), published by NEA and dedicated to Maurice E. Troyer, one of the contributors to the source book and a professor of educational psychology at ICU. Thus, the AV Center of ICU has studied widely the theoretical and practical aspects of this problem.

1961—

On the other hand, H. Yaguchi and his collaborators at the National Institute for Educational Research have presented a method of instruction to improve the present situation in the field of Japanese education. This movement was treated a little sensationally, but it was highly significant in that this effort dealt with a practical field in the instructional process. In February, 1961, the first "research meeting of automated learning" was started under the leadership of Yaguchi to embody the idea of automated learning. The research members of this group insisted upon the importance of adapting program suitable to the Japanese situation. In May, 1961, a monthly magazine of educational technique, *Learning Psychology*, No. 6, was published as a special edition devoted to the teaching machine. Contributors and their themes were as follows;

M. Kaigo(11), Professor of Education, Tokyo University, "Automated learning from the standpoint of educational history."

T. Horiuchi(8), Professor of Psychology, Tokyo Gakugei University, "Psychology of automated learning."

M. Nishimoto(20), Professor of Education, International Christian University, "Past, present and future of the teaching machine —the development in U.S.A."

K. Hatano(6), Professor of Psychology, Ochanomizu University, "Automation of learning and the role of the teacher."

Next three are staff of National Institute for Educational Research.

K. Miyazaki, "What is teaching machine plus to education."

T. Yamaguchi, "How to use effectively the principles of the teaching machine in the class room."

M. Nushihara, "Materials in audio-visual instruction and teaching machine."

It was interesting that the first machine in branching system was constructed by S. Tanaka, assistant professor of psychology at Osaka University. This machine, a further development of a similar type of so-called intrinsic programming by Crouder(2), was made by Tanaka in April, 1961. He named it the V434NA Type, meaning (V) visual, 4: referring to the number of choices, 3: number of correction frames, 4: four choices of correcting the problem, (N) with electric counter and (A) anticipation to be improved, e.g. B,C—etc. Tanaka is to develop the effective machine for group instruction with group-choice keys.

The eighth National Conference on Audio Visual Education was held at International Christian University during July 24-26, 1961. The main theme was "Teaching machines and programmed learning and their role." Duke(3) reported on recent developments in the American teaching machine field, and pointed out that the machine had been given too

much emphasis and dramatic publicity horrifying many parents and teachers, while in Japan, there has been time to develop a favorable attitude toward programmed instruction. He emphasized that if we continue to use the label of teaching machine for this entire movement, organized opposition would most certainly arise; therefore, such a mode of instruction should be referred to as "programmed instruction."

Troyer(30) presented the next problem: what are some of the basic psychological considerations in the use of teaching machines and in the nature of an effective learning situation. He referred to some experimental works at Ohio State University by Pressey and his students. Troyer commented on Little's experiment(12) which was conducted during the course of teaching educational psychology at Ohio State University with four groups of students in 1933 and 1934. He emphasized the next points: the control and experimental groups were equated at the beginning on the basis of psychological examinations and a pre-test in educational psychology. The class met for five, fifty-minute periods per week for twelve weeks. Each control group took a thirty-item true-false test at the end of each week and the papers were graded during the evening following the test. Item analyses were made of the tests and the most frequently missed items were discussed at the meeting of the class the next day. This point was important and Porter(28) missed it in his critique of Little's experiment.

He referred also to the experiment of Angell and Troyer(1) with freshmen students in chemistry at Syracuse University using Angell-Troyer punch boards. The results were similar to those found in the Little-Pressey experiment.

In another experiment, Yamawaki(32) reported the effect of using a representative Japanese machine, Ricoh synchrofax, in Mathematics. This device has a magnetic recording function upon a paper sheet, making auditory and visual programming possible. This may not be classified as a so-called teaching machine in a strict sense, but it has a flexibility of programming for effective instruction. Yamawaki has used the machine in mathematics since September, 1960, and the average scores of the 120-160 students participating in the experiment have risen to 83.6 from 70-75, and have been maintained at the same high levels while the machine has been used.

It is very important to note that the attitudes of students became positive and that the content of their questions were highly improved. Students who had never received over 50 points, had, on the average, scored more than 80. Students improved their attitudes spontaneously and effectively. When they were third year students in junior high school, those who preferred mathematics were 18.8%, but at the end of the first term, the number had increased to 78.2%.

In Japan, more than 1000 schools have already used such methods of instruction in various courses, and similar positive effects have been reported. This machine will be generally utilized in Japan because its possibility for improving instruction has been confirmed and its cost is relatively low (about ¥30000). The programmed sheets are easily and immediately copied by duplicators, and it is easy to make standardizations, improvements and editing of programs.

Nishimoto(21) discussed the matter from the standpoint of educational policy, psychology, and education. He emphasized the improvement of education and educational

technology as being very important if we are to use these machines for this new educational innovation. He demonstrated American teaching machines and punch boards, programmed texts, tutor texts and other programming materials. These machines were Didac 501, Minimax, Foringer, Star punch board, Angell-Troyer punch board and Ferster Tutor, etc. In symposium "Teaching machines and automated learning"(23) was discussed by Nishimoto, Hatano, Tanaka, Ono, and Yamawaki. Hatano described the characteristics and limitations of the teaching machine, and suggested that another model in psychology was needed. He also suggested that AV instructional methods should absorb the teaching machine. Ono described practical programming with 5 main courses of teaching which was presented at the National Institute for Educational Research.

The Japanese version of "a source book" from NEA(15), was published under the direction of Nishimoto(22) and the Audio Visual Center of International Christian University in October, 1961.

For practical publication, "Theory and application of automated learning" (31) was published by contributions from the staff of the National Institute for Educational Research.

Another introductory book is by the educational philosopher, M. Murai(16), professor of education at Keio University, who had studied at Harvard, visited B.F. Skinner's Laboratory, and brought back to Japan in March, 1960, a Porter's Machine, which D. Porter presented to him.

Concerning other accounts by psychologists, S. Oba(24) reported on the psychological foundation and model of the teaching machine at the Annual Meeting of the Japanese Educational Association in 1961. Horiuchi and others(9) reported on the experimental research studies of programming at the Annual Meeting of the Japanese Educational Psychology Association in 1961. Oba(25) reviewed the theoretical and experimental backgrounds of the teaching machine and programmed learning in relation to *Zeitgeist* in education and psychology, and he(26) also described the terms and main topics of this field.

In Japan, today programmed instruction may be in the experimental stage, but many programmers are attempting to test and prepare the course programs. This method of instruction should certainly be developed in Japan.

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