A Study of the Introduction of "Foundation of Information" and Individuality - Based Instructions

[Key words: computer literacy, Individuality-based learning,BPI(BrainPredominant Index), IQ(Intelligent Quotient), teaching aids / materials.]

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Abstract

In Japan, the Ministry of Education introduced "Foundation of Information" as a part of the required learning contents. Computer learning has often been the cause of dropout. Concerning individuality-based learning, the main issue is how to cope with dropouts in computer learning. In order to achieve "computer literacy for all", we tried to research the actual condition in computer learning. We investigated students from the viewpoint of individuality: three groups of IQ and Predominant Laterality of Brain (BPI = Brain Predominant Index) and identified a relationship between individuality and test scores in computer learning. As a result, we found that the higher IQ group and the left brain predominant group students tended to get better scores, while the lower IQ group and the right brain predominant group tended to get worse scores. The higher IQ group, and the left brain predominant group are good at theory; the lower IQ group and the right brain predominant students didn't show any interest in theory.

The lower IQ group and the right brain predominant group students didn't achieve good scores; they were, however, interested in practice-oriented learning by the use of home-made teaching aids / materials. In order to achieve the goal of "computer literacy for all", practice-oriented instruction is the relevant way for beginners in computer learning.

1 Introduction

Now is the time of the information oriented society.[1] Developed countries have already introduced an information-related subject as the core of school education.[2,3] In 1989, the Ministry of Education, Science and Culture (*MESC: Monbusho*) revised the Course of Study (*Shidoyoryo*) and introduced "Foundation of Information (*Johokiso*)" as required contents of "Industrial Arts and Home Making (*Gijutu-kateika*)" in Japan.[4]

Foundation of Information is composed of four main components: 1)construction and function of the computer, 2) fundamental

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operation of the computer and basic programming, 3) use and application of the computer and 4) the roles of the computer and information in industry and daily life. This is a course of study carried out from 1993.

In the term of transition from the old course of study to the new one, the MESC has been preparing teachers and computers. During that time, Masao MURATA et al (1987-), Shoji MURATA et al (1989-)tried to research the relationship between individuality and achievement test scores of newly introduced contents concerning computer literacy. Masao Murata et al adovocated IQ-BPI battery examination improves the validity of the examination of individuality by investigating over 3000 students. [5,6]

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2 Procedure of Research

(1) After the student learnt the content : 1) roles of computer and information in industry and daily life, 2) construction and function of computer, 3) fundamental operation of computer and basic programming, 4) use / application of computer such as word processor, graphics and automachine control etc, (2) we investigated the students' test scores in computer learning, and also (3) investigated the relationship between the results of required subjects such as English, mathematics, science, Japanese and so on, and test scores in computer learning. (4) We examined IQ and BPI (Brain Predominant Index) of students and (5) investigated the relationship between the results of the three groups of IQ and test their scores in computer learning, and also (6) investigated the relationship between the results of the three groups by BPI and their test scores in computer learning, and furthermore, (7) We compared the results of using homemade teaching aids and those of not using homemade teaching aids.

Finally, we tried to identify the relationship between test scores in computer learning and individuality.

Table 1 Grouping of IQ(SD)

Higher group	higher	than	61
Middle group	51	-	60
Lower group	lower	than	50

Table 2 Grouping of BPI

Left brain predominant	lower	than	4.4
Both brain	4.5	-	5.4
Right brain predominant	higher	than	5.5

3 Result of Investigation and Discussion

(1) There is a relationship between the result of required subjects and test scores in computer learning in lower secondary schools. Table 3 shows a relationship between the results of subjects and test scores in computer learning. Through investigation, we found that the result of technology, science and mathematics is highly related to the test scores in computer learning. In order to identify the significance, authors examined by T-score and χ^2 Chi-square and we found a strong relationship between technology, science and mathematics and computer learning.

Table 3 Relationship between the result of other subjects and test scores in computer learning

	higher IQ group		middle IQ group9		T-score	χ^2 Chi-square
	av. score	SD	av. score	SD		
Japanese	71.8	11.3	69.1	14.4	0.805	9.3
Social St.	77.8	15.7	68.5	20.3	$^{+}$1.978	14.5
Mathematics	72.9	14.8	55.3	26.3	*3.214	$^{+}$19.4
Science	88.9	7.0	80.0	9.7	*4.069	*23.3
English	93.0	8.8	77.8	22.1	*3.532	13.8
Technology	83.0	13.6	66.2	11.7	*5.197	*70.3

level of significance $^{+}$ 0.05 * 0.01

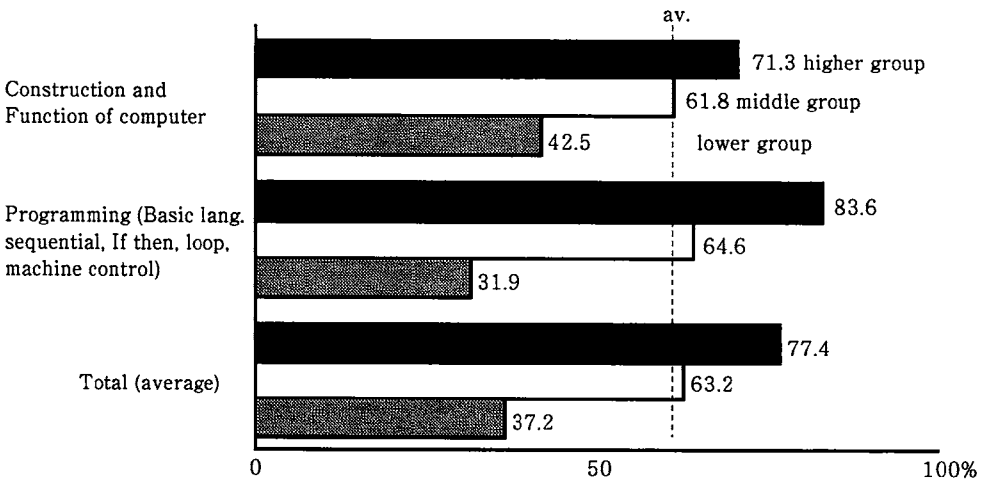

Fig 1 Relationship between IQ and test scores in computer learning

(2) The relationship between IQ and test scores in computer learning:

Fig 1 shows a relationship between IQ and test scores in computer learning. The lower IQ group is largely behind the higher and middle IQ groups in both the understanding mechanism and the construction of computer and fundamental programming.

(3) Relationship between the BPI and test score in computer learning:

Fig 2 shows a relationship between the BPI and test scores in computer learning. The left brain predominant group students got better results, while the lower IQ group and the right brain predominant group got lesser scores. Comparing the relationship between IQ and test scores in computer learning, we found no significant difference between the left brain predominant group and both brain group except that the right brain is the predominant group.

(4) Relationship between the result of subjects: mathematics, science, and technology and test scores in computer learning.

1) Result of mathematics and test scores of

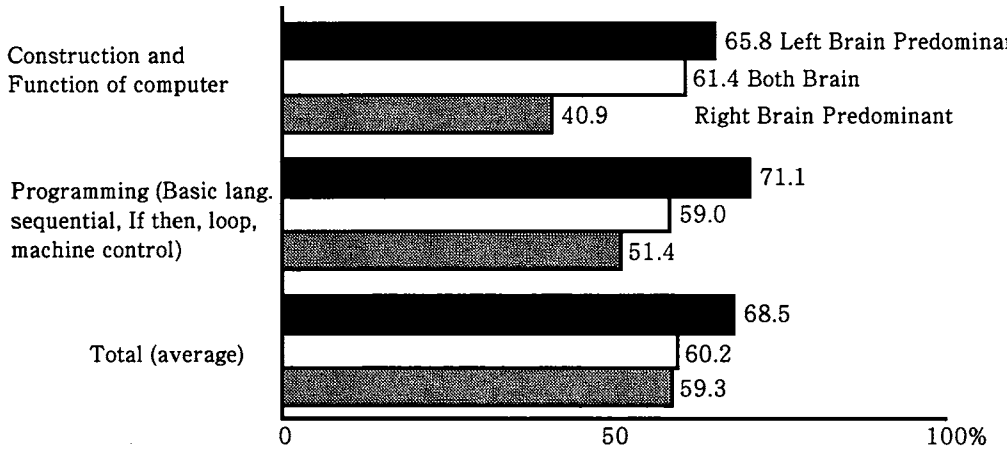

Fig 2 Relationship between BPI and test scores in computer learning

computer learning :

Fig 3 and Fig 4 show a relationship between the result of mathematics and science, and test scores in computer learning. The three student groups were divided by the result of the subjects largely differing in test scores in computer learning.

2) Result of Science and test scores in computer learning

(5) Relationship between test scores and teaching aids used in computer learning:

As mentioned above, the lower IQ group students and the right brain predominant group students got worse test scores in computer learning. In order to cope with this problem, teachers developed teaching aids / materials. Fig 5 shows a relationship between using teaching aids and test scores in computer learning. The group using teaching aids got better test scores in almost all contents. Teaching aids / materials is particularly effective concerning theoretical contents in computer learning for beginners.

4 Conclusion

In order to achieve the goal of "computer literacy for all", we investigated a relationship between test scores and individuality: result of required subjects, IQ and BPI. The result of required subjects, such as technology, science and mathematics are strongly related with test scores in computer learning. The higher IQ group students and the left brain predominant group students got better test scores in computer learning. The lower IQ and the right brain predominant group got worse test scores. The right brain predominant group students who are fond of practice and practice oriented instruction together with teaching aids are most effective in computer learning.

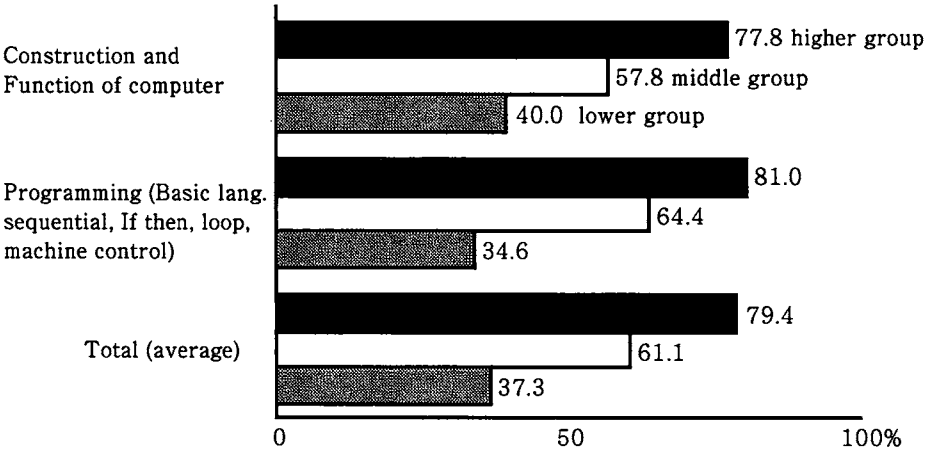

Fig 3 Relationship between the results of mathematics and test scores in computer learning

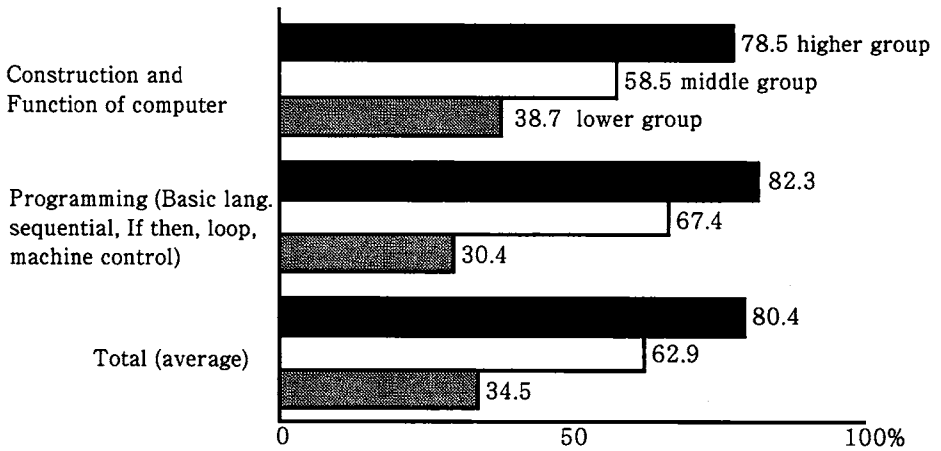

Fig 4 Relationship between the results of science and test scores in computer learning

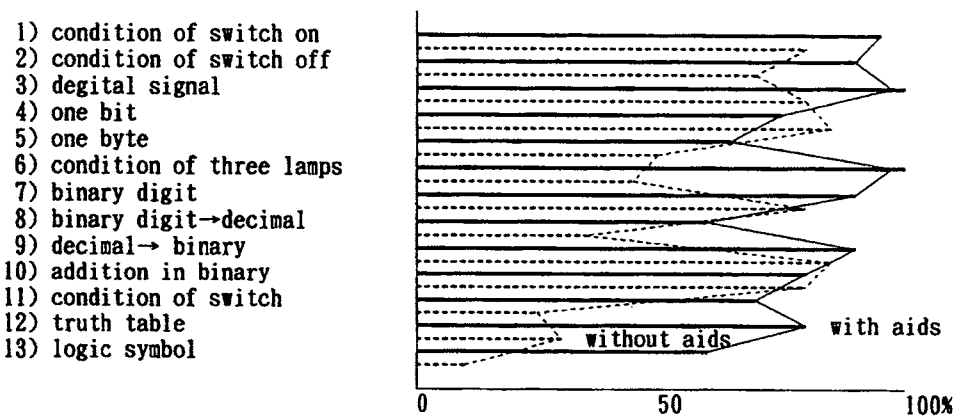

Fig 5 Relationship between using teaching aids and test scores in computer learning

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