Influence of Verbal Subjoined Information on Cognitive Development

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Keywords: cognitive development; visual information; language processing.

Introduction

The aim of this study is to examine and discuss conceivable relationship between cognitive development and thinking. Thinking ability of learners has been a controversial point among educators in Japan. Facing against the criticism that education have not worked successfully to improve thinking of children, the ministry has made enormous effort to strongly invite teachers to devise teaching in class at school.

However, we have to understand that thinking is not severed from cognitive development, or is not fostered only in class at school, or is not taught only by teachers. Thinking development must be affected in daily life, wherever or whenever people are.

What is noticed conspicuously in Japan is the overuse of visual pictorial information, especially on TV programs. Nobody can help but surprise to find how often subtitles are used while watching TV in Japan. You can read what people are talking on the screen and even recognize how they are feeling, because the font styles or drawings express their emotional states, for example, anger, joy, sadness, happiness and so on. This phenomenon emerged more than a decade ago. Getting used to such information processing, children growing up in this decade might not have enough opportunities to train their skill of decoding complicated information, for burdens on thinking are abated a lot.

The hypothesis is that learners who have tendency to rely on pictorial information may have troubles in processing aural information or may have unskilled thinking.

Data Collection

In order to examine the relationship between cognitive preference and thinking, cognitive preference inquiries, working memory span tests and the following tests were given; five mathematics tests given only aurally, five tests given aurally with pictorial information as cues and five tests written on the paper. Participants were eighty 17-year-old students who majored in engineering. The level of problems was that of junior high school ages, which were expected to be feasible for the participants to solve easily.

Results

Table 1 shows average scores of each test. The students could answer mathematics problems easily when the written problems were given, however, they did have difficulty when those problems were given only aurally. This might be related with working memory span of the students.

Table 2 shows the correlation between mathematics test scores and working memory span test scores. We could find slight correlation between scores of aural tests and of working memory span tests.

Table 3 indicates how pictorial cues help students to think and answer the problems. We couldn't find a remarkable difference between the averages of two groups, but still slightly more increase may imply that pictorial cues could assist the students who prefer pictorial inputs better than those who prefer aural inputs. It might be concluded from this point that the students who prefer pictorial inputs rely much on pictorial information while thinking.

Table 1: Average Scores. (Full mark; 25)

Written test	Aural test with pictorial cues	Aural test
22	19	12

Table 2: Correlation between Scores of each Mathematics Test and of Working Memory Span Test

	Working memory span test
Written test	0.31
Aural test with pictorial cues	0.43
Aural test	0.44

Table 3. Average Difference between Scores of Aural Test with Pictorial Cues and Aural Test

Visual input preference	Aural input preference
7.3	6.7

Discussion

The findings in this study cannot support the hypothesis strongly, but may suggest that overuse of pictorial information at learning stages may result in learners' tendency to rely on pictorial information, which can lead to cognitive weakness or poor thinking, because the students who prefer visual inputs received slightly lower average scores in mathematics problems than the others.

With innovation of technology, it has been advocated and recommended to employ multimedia in educational circumstances so that learners can understand class easily. It is true that children with learning disabilities have less difficulty in learning with visual teaching aids, that is, picture, graphs, figures, and so on, but the overuse of them might make learning too easy, simple or effortless for normal children, and furthermore it might prevent their cognitive ability from developing.