A Trial Course of Programming with Squeak

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The purpose of programming education is not only to memorize the knowledge of programming language but also to let the learners acquire useful concepts for realizing one's idea in the form of a program. It requires such activities as logical thinking, problem solving, modeling and abstraction. However, most of beginners are bothered to memorize a lot of knowledge of the programming language and to eliminate compile errors. It prevents learners from concentrating on their concept acquisition.

We think that Squeak proposed by Alan Kay has potential to solve this problem. However, if a teacher teaches only the knowledge of Squeak and its environment, the problem is not resolved. In this report, we propose a squeak based curriculum and its concept for education of programming.

The proposed curriculum based on programming process is shown in Fig.1. This process is composed of the following 4 phases;

1) To image a developing product (Imaging)

2) To describe it in natural language and some diagrams (Describing)

3) To develop it in programming language (Developing)

4) To evaluate his/her work and other's by using them so as to improve their works (Evaluation)

Describing phase is the most important one in our teaching process. In this phase, we let learners describe the product image, purposes and plans clearly in a natural language and by diagrams. Then we let them try to ask others whether it is described well for others understand. These activities help learners to find out their idea clearly and realize it smoothly even for beginners.

Pseudo language may be used together with a programming language for describing phase. However, it often does not work effectively because of the estrangement between pseudo programming languages. Squeak environment gives natural developing phase to the learners by its good interface and object-oriented approach.
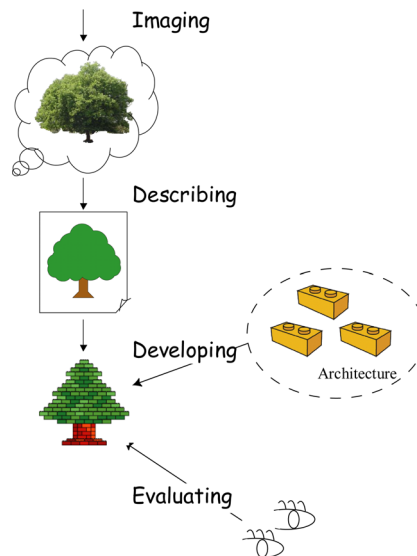
Fig.1. The image of programming process of our curriculum

Based on such a view, we developed a trial curriculum and tried it to high school and university students. It is composed of 4 projects: shooting star, driving a car, object sorting and destroying blocks. They are adopted from popular examples in Squeak community.

In our trial, some changes of the learners attitude are observed in the classroom. They asked how to realize their ideas instead of asking how to recover from syntax errors.

In constructing a program, tiles are used in Squeak (E-Toys) as a programming construct. We have found that some of tiles provided by Squeak environment are too powerful to the learner to use and they prevent the learners to think themselves.

There are some who try to memorize the sample program and apply it without their own idea. How to inhibit such way and force them to our approach must be further trial.