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Scratch Educator Conversation 2: Programming Concepts in Scratch

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Question: How and when should programming concepts be explicitly taught when using Scratch in schools?

We started out by reading the "Scratch Programming Concepts" handout written by the MIT Scratch Team. Our conversation about how its contents should influence our teaching turned into a bit of a debate, with the same person often arguing for both sides. On one side, people felt that the benefit of Scratch is that students can explore and develop concepts on their own. Having the official name for a programming concept isn't as important as being able to use it. On the other side, there was the point that understanding about programming concepts takes children to deeper levels of thinking, and having the appropriate vocabulary will lead to better understanding in future programming work. Here are some points from the conversation. Most of us work with children ages 8-12.

I. Intuitive learning

a. On the one hand, learning Scratch is very intuitive and the children will gradually pick up the language if they go on to learn computer languages. Olga felt that it was easier to teach Scratch by not focusing on the programming language at all. As beginner Scratch students, the words had no meaning for them.

b. Karen once tried to tell the children the proper name for what they had done during one lesson and they weren't particularly interested—they just wanted to get back to actually doing the work.

c. Ai Boon felt that the kids will learn it intuitively and if they are really interested to know more, they would pursue computer programming at a later stage. She used the example of her son (10) who did not have computer background when he started learning Scratch but simply picked it up very quickly. When he joined his school's Robotics club, he learnt some programming and had no problem adapting to the language.

   She also shared her struggles with learning Scratch as she has no computer background. She spent many hours working on Scratch projects initially, looking at how other Scratchers did their projects, etc. before she was able to feel comfortable with the program. She still has problems understanding variables, conditional statements, sensing and some of the more advanced techniques required to do mathematical Scratch projects. Since she did not need to use those for her current work, she does not bother with them but should she require them at a later stage, she knows where to get help.

d. Materials and workshops by the Scratch team focus on a creative design process and don't really use the language of programming.

II. Teaching programming language directly

a. In the last educator conversation, Rana was firm in saying he thought using the vocabulary of programming is important. (He has a programming background.) Patrice agreed that it is important for the children to learn the language. By doing so, they will know that computer language is a Science and they will see Scratch as more than a place to play. She hopes that the children will view computer programming seriously and that some of them will want to go on to become computer programmers.

b. Karen feels that she should try to use the language more in her teaching. She shared the analogy of the teacher who teaches music to a class. The students learn how to play the piece of music but the teacher does not talk about rhythm and all the other important elements that make up the piece of music. In this way, the children will miss out on an important aspect of enjoying the music even though they may have mastered playing the piece of music.

Ai Boon and Patrice thought that the above was a beautiful analogy about teaching programming language as part of Scratch.

III. Deeper level thinking

a. Patrice felt that using the right language was very important as the kids would then know that Scratch involves computer programming. She felt that it was important that the kids regard computer programming as a Science. Patrice also felt that the children should do deeper thinking about what they are actually doing when they create Scratch projects.
b. Karen also compared teaching Scratch to her work with reading. Reading teaching is about figuring out the words and understanding their meaning. Her school has a new reading curriculum that also teaches students to think about the reading strategies they are using that help get at the meaning. She felt that this also applied to teaching Scratch. Teaching students to think about their thinking takes learning to a deeper level.

IV. When and how to introduce programming concepts

a. We talked about when introducing the language works best. Olga talked about how she teaches using stories. The stories give situations from life that follow the same processes as a Scratch program. "You are on a road and you come to a corner. If you turn left or turn right, different things happen" would be a way to help students understand conditional statements.

b. Karen thought that waiting until students have practice using a concept, then giving it a name works well. On one occasion, after the children had done a Scratch game project which involved keeping score, she told them that they had actually used *variables*. The light bulb lighted up - they were able to understand the idea that a *variable* is something that changes. If they had not completed the Scratch project, they would not have understood the concept. Thus, doing the Scratch project first enabled her students to better understand the underlying Scratch programming language when they were told about it.

c. Ai Boon shared that she hopes to be able to teach a thinking skills programme in a school. She is working on a curriculum which will encourage the children to think more deeply about different issues and the lessons will involve using Scratch as the medium of reflection. This means that discussion takes place in class after which the children have to submit their answers by creating a Scratch project. The idea behind it is to see if the children are able to

translate their thoughts through stories or designs or whatever they like to create using Scratch as their medium. A draft of the first lesson can be found at http://scratch.mit.edu/projects/aitan/857478

Note: We had some technical difficulties that resulted in capturing fewer of the comments made by Olga and Patrice. Apologies to them!