



TEACHING COMPUTER PROGRAMMING TO IPAD GENERATION

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ABSTRACT

Despite the advances in computer hardware and software, most of programming language introductory courses today still uses same old method to teach programming to the beginners. This made the acceptance towards the subject is quite slow and low where in most cases the concept only been grasped after the student had finished their study and started working. This paper presents available online modules that can be used to attract student interests towards the subject. There are many modules available that cover from basic programming up to the advanced apps development. We select three modules and conduct an introductory programming course to the primary school and diploma students. The result from the study shows that their perception about computer programming changed drastically when using these modules. They discover that computer programming is actually a fun and very interesting subject to be learned.

Keywords: code.org, programming, logic, loop.

INTRODUCTION

Teaching programming to the primary school students is definitely challenging as we need to convey them with concepts such as declaration, loops and conditions. Simple questions such as why we need to do declaration are common as they thought the computer knows everything. Current teaching methods are not suitable especially when we have to use back slash, asterisk and space to the beginners [1]. For many students interested in computer science, the first course in programming often stops them from staying in the field [2]. We do not want to lose the young talents because the inappropriate approaches used to teach the subject.

Luckily nowadays there are many tools available online that is ready to assist you in teaching computer programming for all ages. One of them can be reached at www.code.org. Here, they believe programming is exciting, stimulating, fun and develops new ways of thinking [3]. There are more than twenty games that teach a wide variety of programming styles including basic programming, JavaScript, graphics and mobile programming. For the courses that we organize, the first batch is twenty students from different primary schools in Kluang district, Johor. They have never been exposed to any programming lesson. For the second batch the students has a diploma from different discipline. Only twenty percent of them were from computer science major. Thus we need an entry level modules to make it easy for them understand the programming concept.

MODULES SELECTION

After browsing through the site, three modules were selected. This includes My Robotic Friends, Maze Puzzles and Robot Mover. These modules actually contain different level programming. The first one, My Robotic Friends needs the participants to manually program the movement of a cup to build a stack. From this module they will understand that in programming, each step must be clearly defined. By using their motor skills, concept of the programming can be easily adapted [4]. The second modules require the use of computer to complete all the

level. They need to drag the appropriate instructions into the space provided and run it. They also need to debug if there is an error in their instruction. The mission is to move an object to a required destination. For the third module, the Robot Mover has the same facilities like the previous; just here we can write the code ourselves like real programming. We will explain each module in details next.

My robotic friends

The first module is My Robotic Friends. In this module, students will work in group of size 3 to 4 people. One of the students will act as a robot, who will execute instruction based on a diagram draw by other members of the group. The example of the diagram is shown in Figure-1. To come out with the instructions, the members of the group will get a diagram as the example in Figure-2 from the trainer.

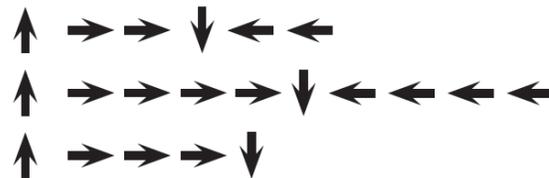


Figure-1. Set of instructions to build stack of cups.

Based on Figure-2, members of the group need to write instruction by using arrow notation only. The first arrow point to up mean that the robot will take the cup from it base, bringing it up from a stack. Figure- 3 shows how the cup moves. Each arrow that point to the left and right means that the cup will move in a range half of the cup only. Arrow down means the cup is put down at which point it has stops.



Figure-2. Stack of cups arranged using instructions.

The robot needs to stay away from the group while they are writing the instructions. After finished writing it, the robot come back to the group and try to build the structure based on the instruction and without help from any member of the group. The trainer will verify the correctness of the execution the instruction itself. If the instruction is incorrect, they need to debug it and made correction. The members of the group take turns to be a robot until all have taken their turns. To make the activity more interesting, we use cup that contains mango pudding where the student can have it after they complete this activity.

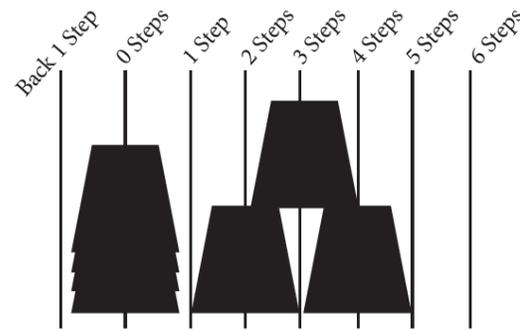


Figure-3. How the cup moves.

The maze puzzle

The second module is the Maze puzzle where the students need to move an object to its intended destination. In this video game like activity, the student needs to use programming concept including selection and loops to complete all levels. The programming logic becomes more complicated with the increase of the level. The game provide a broken piece of codes that need to be combine in order to complete each level. Figure-4 shows that level 3 in Maze Puzzle where student need to use if-else statement to get the object to its destination.



Figure-4. The interface of maze puzzle at level 15.

In Figure-4 it shows the student need to use the concepts of loops in order to move the object to go to the flower. The environment is like the real programming interface where we have Run button and when we made errors the code can be debugged. These are very essential skills to a beginner who want to learn computer programming.

Robot Mover

In the last module, students are encouraged to write the program to accomplish the mission given. This is because they still can use the code piece provided like the previous module. The structure of the codes is given and it is not dynamic where students need to write it exactly as stated. However it is enough for a beginner to understand what is real computer programming about. This activity can be accessed at <http://code.org/api/hour/begin/robomind>.

SURVEY AND OBSERVATIONS

The students were given questionnaires before and after the training to study on their perception towards computer programming. Figure-5 presents the results from the study. For primary schools students less than 25% were interested in programming while for diploma students less than 40% is interested. The later has more number because some of the students have Computer Science or at least programming background. After the training, both groups have changed their perception towards computer programming. Both group stating they are 100% interested towards the subject.

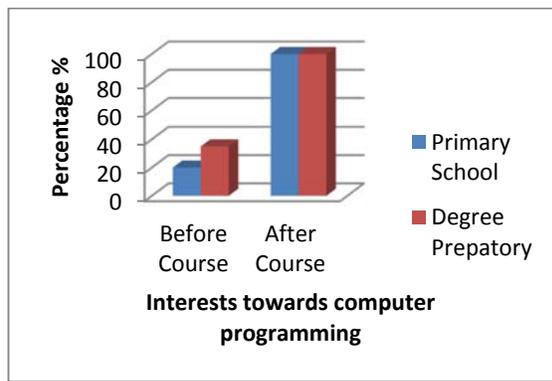


Figure-5. Interests towards computer programming.

ADVANCES MODULES

There are other advances modules such as MIT App Inventor developed by Massachusetts Institute of Technology [5] to give the potential developer a quick view before getting into the real Android programming. They provide three simple apps as the exercise with quick video tutorials as guide. Other advanced module is Javascript which will able the user to develop simple games based on it. All these modules are suitable to be learned by students from middle schools and above.

CONCLUSIONS

Computer programming is not hard as thought by many. They were introduced incorrectly that make the students lost interests to learn it. Using tools such as provided at www.code.org is such convenience for both students and trainers. It helps the students easily digest the basic concept of programming such as declaration, selection and loop. The trainer also finds that it is easy to deliver such complicated subject through the jigsaw like pieces in building the complete program. From our observation during the training, every student is very keen to solve the problem and try to understand the logic behind it. The website does not only provide basic concept to program, but also up to modern style programming which include smart phone apps development and advanced web technology such as JavaScript and XML.

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