ROBOTICS WITH WED0 2.0 PROGRAMMING-A REVIEW

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ABSTRACT

Robotics education has grown in popularity and importance as a method for learning in scientific and engineering stem labs. It's not easy to teach robotics for a certain subject. The robotic kit piques the interest of the students. We've been experimenting with instructional robotics in primary school informatics as part of our research.In this research, we focus on elementary school kids who used Wedo 2.0 programming to programme a robotic kit with legos. Students were encouraged to participate in activities such as learning how to use a robotic kit with motion sensors. Our goal was to see what other types of activities people solved well and what types of activities they made the greatest mistakes in. We can make progress in this direction if we work hard enough.These activities are part of the instructional robotics curriculum that we have been developing as part of our PhD study. We've been performing design-based research within, and we've chosen a few qualitative data gathering and analysis methodologies.

Based on data analysis, we discovered that participants solved preset assignments in the majority of cases, in which they worked with programmes from worksheets (customizing the program, explaining the differences between the two programmes and completing programs). The majority of errors made by students were in explaining a programme and generating a specific order of commands in the programme. We'll go on to the next step of our investigation.

Keywords *instructive robotics, robotic kits LEGO Wedo 2.0 programming Hub Light sensor*

INTRODUCTION

Educational robotics is widely used in practically every country, from preschool to university courses. Academicians and tutors have been attempting to inspire students to choose science and technology courses in order for them to acquire and improve skillsMany questions have been raised by initiative teachers, including the selection and implementation of specific sorts of activities that will allow students to fully exploit the capabilities of the robotic kit chosen. In our research, we attempted to integrate educational robotics and informatics in a lower secondary school setting.

RESEARCH METHODS

In this tutorial, we'll go over a variety of activities that may be done with the LEGO WeDo robotic kit, with a focus on programming robotic models with motion sensors. These activities are part of our educational robotics curriculum.something we've been working on for a long time as part of our advanced research. We employed duodecimal data collecting and data analysis in motion sensor activities, which included observations (fieldnotes and transcriptions), audio-visual materials (photographs and recorded videos of pupils' work, and pupils'.We developed educational materials for teachers as well as worksheets for students. Following that, selected teachers taught their students one lesson every week using our materials. In one session, there were almost ten to eleven students — Boys

and girls in varied ratios each week. During all of these robotics classes, two researchers were gathering data.

Motion sensor in robotic kit LEGO WeDo

During plotting activities with motion sensors we were examining its features, functions and different ways to program robotic models with it. LEGO Education WeDo Construction Set includes carefully selected bricks in different tones, axles and pulleys, which can bring motion to models, precise components, such as rope and elastic bands, which can increment a varied range of models pupils can create and two minifigures. There are also Power Functions, Motor, two sensors (motion sensor and tilt sensor) and WeDo materials – one lesson per week. There were around 10 to 11 pupils in one class – boys and girls in various ratios each week. During all of these classes with robotic kits there were also two researchers, who were accumulating data.

A. USB Hub:

It manages engines and sensors via software for WeDo robotic kit, when it is connected to a computer. Motion sensors can detect objects within 15cm range. It is spontaneously detected by software, when we connect it with USB Hub to a computer

We provided representation of the software environment for LEGO WeDo in Here we focus primarily on types of activities within programming with motion sensors. In this software motion sensor is detected in the form of parameter, which can be constituted by integer or state.Value of motion sensor parameter can acquire integer value from 0 to 10 object is further than 15 cm from sensor, 10 – object is right in front of sensor). In Hub we can see a sensor, which finds objects at a distance of nearly 15 cm and a parameter of motion sensor contains an integer value 1.

Value of the motion sensor parameter can also have two states:it does detect a movement and it does not detect a movement. It is not dependent on whether the motion sensor detects the object or not at the first time. We can use this parameter in various ways and in mentioned software it can be connected with various icons of order. In we can see five icons of commands (motor power, sounds, display text on computer screen, display background on computer screen, add value of number to display), combining with them , parameter can contain integer value.

These icons are defined from left:

· motor on until sensor detects motion.

· wait until sensor detects motion.

· count loops (a loop with a known number of repetitions, but without an explicit loop variable) until the sensor detects motion.

These commands can be parameterized to let out different behaviours of robotic model / program These icons are designed from left:

· *motor on for ten periods of time (we labelled it as ten LEGO seconds).*

· *wait for ten LEGO seconds.*

· *count loops with three repetitions*

When we were plotting activities with motion sensors, we were accurately designing and choosing quests for pupils.We tried to forbid possible misconceptions with application of known icons of commands (icons previously connected with integer value as parameter). At first pupils worked with these icons of commands with motion sensors as parameters, where they can obtain integer values. So this motion sensor as a parameter worked like a known integer value as a parameter. And later pupils worked with a combination of icons with motion sensors as a parameter,which can acquire a state value.

Activities with motion sensor

Activities with motion sensors are part of our educational robotics,which currently has 12 lessons (one lesson = 45 minutes, one lesson per week).During all these activities pupils were working in pairs (alternatively one pupil worked alone, when there was an uneven quantity of pupils). Before activities with motion sensors we had been conducting four lessons with pupils.During the first three rounds pupils had clarified a term of robot, designed robotic models on basis to building instructions and examined basic icons of commands (icons for motor control and icons, which play sound) in software. In fourth round we had followed principles of "creative robotics for all" that consisted of(Rusk et al., 2007):

· *focus on the theme.*

· *combine art and engineering.*

· *support storytelling.*

· *organize exhibitions.*

During this round pupils had created their own robotic models and their own programs for controlling/accessing them. Then we went forward and conducted activities with a motion sensor, which we had divided into three more lessons.

We can see specific types of tasks with motion sensors in Table 1. We divided these activities into three categories, which include constructing robotic models, programming robotic models and presenting robotic models. Then we evaluated pupils' project work according to these three categories mentioned above.

References

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