So What's New About Roamer®-Too

**We have waited patiently for Roamer-Too. Now it's starting to roll off the production line. GO took the opportunity to ask its designer Dave Catlin what is so special about it?**

From my previous talks with you, I get the impression that there are some big questions behind what we see in the new Roamer.

Well, my first educational robot, the Turtle, was designed in 1983. I then created the Classic Roamer in 1989. In those days robotic technology was very rudimentary. Even in university robotic research departments the technology was fairly basic. In schools students interacted with robots by programming them to perform tasks.

As you can imagine the technology has moved on in leaps and bounds. In research projects like Cynthia Breazeal's Kismet Robot, people interact naturally with the robot which simulates emotional responses. The area of HCI – Human Computer Interfaces and its

A surprised Kismet.

subset Human Robot Interfacing (HRI) are growth areas of research. My fundamental question was how students could interact with robots in a way that would benefit them – a way that would provide them with a valuable learning experience.
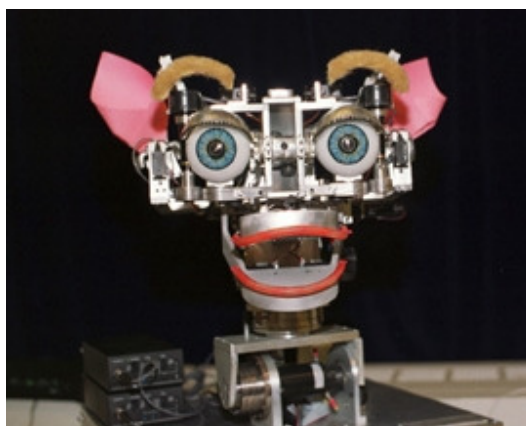
So the critical difference with new Roamer is the focus on interaction and not programming.

But the Basic Roamer still involves programming?

Yes. I am not saying that just because we can interact with Roamer in different ways, that programming becomes obsolete. Our judgment criteria are educational and not technological. All the activities done with Classic Roamer are still valid, good learning experiences but expect to see some new ideas.

Can you give us an example of that?

Speech is the most obvious. Roamer is the World's first talking educational robot. I am in the process of developing a lot of ideas around the use of language and stories. Of course language has always been a major element in the learning process.

But the student is not controlling the robot – they are just listening to it

Traditionally we look at students controlling their world as the key educational process. Controlling the robot is an extension of that process. But if you think about that situation the student programming the robot is only part of an interaction. What the robot does as a consequence of that programming is also part of the process. Did the robot do what the student wanted it to do? If it did not they reprogram it. So for example if they're programming the

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Roamer to go through a maze and they make it turn right and it should have turned left then they can see the mistake and correct it.

But it does not have to be that way. You can have the robot initiate the interaction. For example in the Incy Wincy Spider Activity the students listen to Roamer singing the nursery rhyme, but they realise Roamer has gotten it wrong. They then spend time trying to teach it to say it correctly. They do this by pressing the keys in the right order. This is an activity for early year's students. It involves critical skills: listening and comprehension. Typically kids will know the words to a nursery rhyme, but they do not understand what it means it's just words in their heads. In this activity they have to start giving those words meaning.

Can we talk to Roamer?

Not yet. But certainly Roamer is designed to have that and many other capabilities added to it. There are lots of exciting technologies out there that form an HRI. Yet it is important that we know the answers to a number of questions before we can use them. First, is there an affordable version of the technology that works reliably? Robots like Asimos are incredibly sophisticated. Researchers at Carnegie Mellon University have conducted experiments on using the robot to tell stories to students. They match the student's attention to where the robot appears to be looking and how close it appears to be to them: it's very interesting work. However, it would cost you $2M to buy this robot or about $150,000 per month to hire one.

Asimos conducts Detroit Symphony Orchestra. It will take time for some HRI technologies to become affordable.

The next question is, do we know how it can help create a successful learning environment. Too often we throw technology at education then try and figure out what to do with it and even whether it works.

We have lots of projects underway developing technologies and ways of using them in the classroom. Roamer is a platform that you can change to suit your specific needs and it will evolve as we answer those questions.

That sounds exciting, but isn't it technically complicated?

**Cosmobot powered by Roamer.**

No. All of us use very complex technology everyday. Television for example is extremely sophisticated technology, yet we can all switch a TV on. Technological complexity does not need to correlate to difficulty in use. In fact the HRI project is all about developing natural ways to interact with the technology. In a project with AnthroTronix, one of our American partners, we have been working on using sign language and hand gestures to control Cosmobot (Roamer in disguise).

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So is the idea that Roamer has all these different capabilities?

Roamer is a platform. You can modify it to suit your needs. With a computer you run different software packages. With Roamer you can change the way it behaves. So for example in the programmable versions we have four Standard Roamers. That is, four different behaviours. So students can start with a simple version and gradually we introduce different commands until they have mastered the Roamer Programming Language.
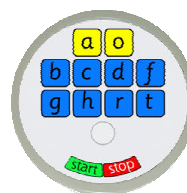

Early Years Roamer   Infant (K-2) Roamer   Primary Roamer   Junior Roamer
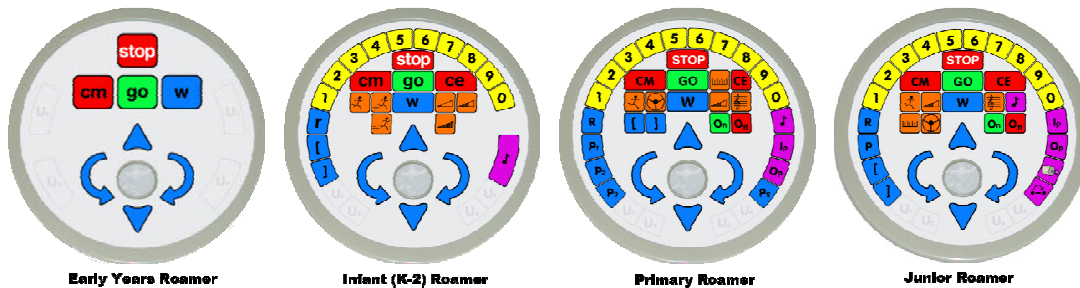
Standard Keypads gradually increase the capability of Roamer as a programming tool.

You can also configure Roamer to have Activity Behaviours across a wide age range.
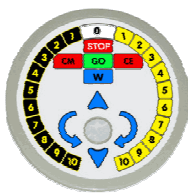
◄ A keypad for exploring negative numbers and arithmetic with negative numbers.

◄ A keypad for young children learning to spell cvc words.

Does that mean you need a new keypad for each activity and isn't that expensive?

Not necessarily. Many activities simply use the Standard Keypad designs. But generally, it's like downloading an App to your phone; you can change the behaviour in the keypad Module and then change the graphic. It's very quick and simple.   One strategy is to have the keypads, that you use regularly, permanently set up. Then have a keypad that you can set up as you require.

So the Basic Roamer is the Base Platform and a Keypad Module?

You could say that, but really you can have many different combinations. For example Cosmobot is a Roamer with a different body. So it is not just the behaviour that makes a different Roamer; it can be its physical set up. Another example is making Roamer into a Turtle robot. That is a robot than you control via Logo software on the computer. There you do not need a keypad; you replace it with a wireless controller.

Aren't you worried that this is a bit overwhelming?

You don't learn to swim by jumping into the deep end of the pool.   You can engage in a huge range of activities with the most basic Roamer set up. Roamer activities are graded according to the teacher's expertise with the robot so that when you go to the Activity Library, you can find the activities that you feel comfortable working with.   In fact the Activity Packs take into account the

Activity Library.

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Roamer skills issue by assuming that the teacher and student don't know how to use the equipment to start with. The activities gradually increase the Roamer skills. The activities incorporate the ideas of "just-in-time" and "learning on the job" skill development. Teachers can learn the technology as the students engage in activities.

We continue this principle into the free online training site. So if a skill is required in an activity, it links directly to the training resource. We have broken the resources down into micro fragments. They are something that a teacher can watch or read in a few minutes – just before a lesson.

Training Site

Well that was informative; thank you.

It's my pleasure.

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