Ana Paiva, Full Professor in the Department of Computer Engineering at Instituto Superior Técnico (IST), University of Lisbon and coordinator of the GAIPS group at INESC-ID talks with Conceição Costa, MILT coordinator and Principal Investigator at CICANT - Universidade Lusófona de Humanidades e Tecnologias about peer learning with robots.

Conceição Costa: In your speech at MILT conference, you started with "In search of the right technology for Education" and the audience (I felt it) and myself were grateful for remembering us, that research is, at first place about making questions. Did you avoid 'Educational technology' establishing a difference among it and technology for education?

Ana Paiva - This is an interesting question, and because I've been working on technology for education (or learning) for many years, sometimes I wonder if the quest for a "right technology" is not a misleading direction to take. Education is about so many factors, valences, similarities and differences, that there is no such thing as the right technology. As we try to make some learning activities more engaging, motivating and lively, we are relying not only on the experience of many years of successful educational technology as well as some failures to use technology when in reality just pen and paper is enough. So, to really be successful in understanding what really works or not, we need to research the different factors that contribute to learning and raise the right research questions to investigate.

Conceição Costa: Thinking in the iCat project, can you develop more on how it can be applied in formal and informal Education?

Ana Paiva - The technologies built that lead to the creation of the iCat scenario (a robotic cat that plays chess) can be generalised to other contexts and domains. At the end of the day what we have created is a system to generate generic behaviour for a social robot. So, there is an opportunity for using this technology in other domains, less ludic and potentially more formal. For example, we have a robot now that plays a game designed to help people to understand cooperation in scenarios like the climate change crisis. This scenario has the ingredients to be used both in formal and informal education.

Conceição Costa: How can robots enhance Education?

Ana Paiva - Well, like other technology, like games, tables, VR, robots can be used successfully in scenarios that require social interaction in the physical world. As such, they can be used not only as tools for learning how to program, for computational thinking, but also as systems that become part of an educational environment that learners interact in.

Conceição Costa: Do you envision a classroom with robots in Europe and in Portugal, taking into account the atual Educational system? Or do you see robots as playful learning outside school?

Ana Paiva - Both. I think there is an interesting role for robots to play in a classroom context, for example, supporting teachers, providing activities, and so on. They can also be part of an extended learning context featuring homes where the role of robots can be extended to supporting activities in the physical world. We have also used robots for therapy with very successful results.

Conceição Costa: From your knowledge, are teachers afraid of robots? Do you feel that the economy and the Institutions in charge of education in European Union are thinking of robots in Education as teachers substitutes, maximising efficiency or as Educational peers or companions for students in a lifelong learning perspective?

Ana Paiva - Are teachers afraid of robots? Certainly not. In fact, all the experiences we had with teachers were fantastic and most of them are very enthusiastic about the potential role of robots for education. I don't think teachers see them as substitutes. At the end of the day robots are very limited in what they can achieve, and if the teachers are given the opportunity of having some help in a classroom, robots can be a technology for them.

Conceição Costa: In an inclusive approach in Education, how do you envision the role of robots and artificial agents for students with Special Educational Needs (SEN)?

Ana Paiva - I believe that scenarios and systems to help students with special needs are one of the most important areas of application of these social robots. Students with special needs often need one to one interaction and support, and these new types of system can play a role, because they can be adapted to the different needs of each

individual student, perform repetitive activities, and be there 24 hours without being tired. So, indeed I think they will play an important role in the future.

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