‘Discovery on Film’ Festival 2011
Summary of the TERECoP group activity

Organizer: Town Museum of Rovereto – Educational Department

People of the Museum involved: Franco Finotti (Director), Nello Fava, Stefano Monfalcon (Educational Department)

Other components of the TERECoP group involved: Emanuele Menegatti, Michele Moro (Univ. of Padova), Javier Arlegui, Alfredo Pina (Public Univ. of Navarra – Spain).

Other collaborators: Barbara Demo (Univ. of Turin), Gianfranco Festi (ITI Marconi Rovereto).

Introduction

On the days May 25th-29th, 2010 the town Museum of Rovereto organized the 11th ‘Discovery on Film’, the annual festival of the scientific and technologic film (fig. 1). The usual robotic section hosted for two days (Friday 27th and Saturday 28th) exhibitions and other related presentations in a covered area, just outside of the main site of the Museum, called ‘arena’. Every presentation lasted half an hour and was attended by general public sit on both sides of the arena. Several schools of different levels (both primary and secondary) and also some research institutions presented their robotic projects interleaved by presentations of various scientific initiatives in a ‘continuum’ until evening. Among the others, there were the Universities of Padova and Verona, the Sant’Anna Institute of Pisa, the Comau robot manufacturer, the ATEC robotics enterprise, the Bruno Kessler Foundation, the National Space Agency (photo 1). The workshops were held in the conference room (photo 2).

Figure 1

Photo 1

Photo 2

A training prologue

Before the inauguration of the Arena, an interesting event was held at the teacher training center of Rovereto (photo 3). Scuola di Robotica presented a seminar entitled 'Educational Robotics in the primary and secondary teaching'. The seminar included a general presentation of the activities promoted by this association situated in Genova and particularly the teacher training courses held for several schools in Italy trying to follow a vertical curriculum; a junior secondary teacher working in the area of Verona presented the results of recent positive experiences of ER in her classes together with a brief description of the current working project KeyTTT (http://keyttt.europole.org/) in which her school and other schools of a local network are partners. Some details of these activities can be found in (http://www.scuoladirobotica.eu/pt/Item/251/European project KeyTTT: educational robotics at the space camp in Turkey.html) and (http://www.fumanescuola.it/offerta/robotica.htm).

Photo 3

Workshop: 'The Educational Robotics: experiences, problems and perspectives

The workshop, divided into a morning and an afternoon sections on Thursday 26th and one morning session on Friday 27th, was dedicated to give the overall view of the point reached by ER in Italy (fig. 2). During the 26th morning section conducted by Nello Fava (photos 4 and 5), most of the presentations were done by people of educational authorities and

institutions of different level (the Minister, local authorities, some school directors). The final discussion of this session was centered on critical aspects like the laboratory-oriented education with respect to official curricula, a real and effective multidisciplinarity, how avoiding to propose a mechanistic view of ER.

workshop

PRESSO IL CENTRO DI FORMAZIONE INSEGNANTI
VIA TARTAROTTI N.7 ROVERETO

mercoledì 25 maggio - ore 15.00-18.00
[SEMINARIO] **La robotica educativa nell'istruzione primaria e secondaria**
Relatori:
Fiorella Operto - Presidente della Scuola di Robotica di Genova
Emanuele Micheli - Scuola di Scuola di Robotica di Genova
Tullia Urschitz - Docente istituto comprensivo di Fumane, Europole
destinatari: insegnanti di ogni ordine e grado di scuola interessati all'approccio che la robotica educativa propone
La robotica nella scuola è un settore di tecnologie didattiche ormai "maturo"che si è sviluppato a partire dall'impostazione costruttivista di S.Papert fino ai progetti recenti in ambito europeo come RoboDidactis e Roberta. La "Scuola di Robotica di Genova" sta cercando di sviluppare un curricolo verticale al fine di sperimentare conoscenze e competenze scientifiche, tecnologiche e umanistiche nel primo e nel secondo ciclo di istruzione.
Simposio a cura di: Centro di Formazione Insegnanti di Rovereto con Museo Civico di Rovereto e Scuola di Robotica di Genova
Aperto a tutti gli insegnanti della Provincia Autonoma di Trento

SALA CONVEGNI FORTUNATO ZENI - MCR

[WORKSHOP] **La robotica educativa: esperienze, problematiche e prospettive**

giovedì 26 maggio
9.00 Saluto Ass. Cultura di Rovereto Giovanna Sirotti,
Dir. MCR Franco Finotti e Dir. Centro di Formazione Docenti Provincia di Trento Luciano Covi
Introduzione di Nello Fava Coordinatore Sez. Did. Museo Civico di Rovereto
9.30 **La riforma della scuola superiore e i laboratori scientifici**
Antonio Lo Bello (MIUR)
10.00 **La didattica laboratoriale e la riforma della scuola trentina**
Marta Dal Maso- Assessore all'Istruzione e allo Sport Provincia di Trento
Antonia Romano IPRASE del Trentino
10.30 **La didattica laboratoriale e la robotica educativa nei curricola in Alto Adige (Obiettivi, problematiche, stato attuale, sviluppi futuri)**
Nicoletta Minnei Sovrintendente Scolastica Provincia di Bolzano e Paolo Lorenzi Ispettore Intendenza scolastica Provincia di Bolzano
11.15 **La didattica laboratoriale e la robotica educativa nel Veronese (Obiettivi, problematiche, stato attuale, sviluppi futuri)**
Rappresentanti Provincia di Verona
12.00 **Il Liceo Scientifico Rainerum di Bolzano e la flessibilità sulla robotica** Fabrizio Mattevi, Dirigente Scolastico

L'esperienza degli Istituti superiori di Trento
(Ist. Tambosi, Ist. M. Buonarroti, Liceo L. Da Vinci, Liceo G.Galilei, Enaip Trento). Aldo Gabbi - Centro di Formazione Docenti Rovereto
L'esperienza del Liceo Messedaglia di Verona. Giancarlo Peretti Dirigente Scolastico e Gianluca Capasso consulente.
12.00 **Discussione guidata** con interventi da parte dei docenti in sala sulle problematiche:
-La didattica laboratoriale nella scuola vantaggi/svantaggi e praticabilità all'interno della nuova scuola secondaria superiore
-Pluridisciplinarietà (come coinvolgere più discipline e non solo scientifiche)
-Come evitare di fornire una visione meccanicistica della Robotica Educativa
Pausa pranzo

15.00 **Scuola e ricerca**, coordinatore Paolo Fiorini, Professore Associato Dipartimento Informatica Università di Verona, in collaborazione con Comau, Fond. Mondo Digitale, Rete robotica Piemonte, Università di Trento, Università di Verona, Università di Padova, Università Pubblica di Navarra
16.00 **La Robotica e l'interdisciplinarietà**
Emanuele Micheli e Fiorella Operto: Scuola di robotica di Genova
16.30 **Robocup Junior come Laboratorio Nazionale**
Enzo Marvaso - Rete Robotica Piemonte
Alfonso Molina - Fond. Mondo Digitale

venerdì 27 maggio
9.00 **La nuova rete internazionale per la robotica educativa**,
Michele Moro - Doc. Ingegneria Informatica Università di Padova
9.30 **Laboratorialità e Robotica Educativa** Javier Arlegui, Alfredo Pina - Università di Pamplona (Spagna) (**FLL come esempio di laboratorio Nazionale**)
10.00 **La Robotica come primo approccio all'informatica nella scuola**
Barbara Demo, Professoressa Associata Dipartimento Informatica Università di Torino
10.45 **La formazione dei docenti a livello nazionale e territoriale:**
Enzo Marvaso, Rete robotica Piemonte; Michele Moro, Docente Ingegneria Informatica Università di Padova ; Sezione Didattica Museo Civico di Rovereto,
11.15 **Discussione guidata** con interventi da parte dei docenti in sala sulle problematiche:
-La didattica laboratoriale nella scuola vantaggi/svantaggi e praticabilità all'interno della nuova scuola secondaria superiore
-Pluridisciplinarietà (come coinvolgere più discipline e non solo scientifiche)
-Come evitare di fornire una visione meccanicistica della Robotica Educativa

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Figure 2

Photo 4

Photo 5

Our group was mainly involved in the afternoon session. With a discussion panel entitled ‘School and Research’, conducted by Michele Moro substituting prof. Fiorini of the University of Verona, all the speakers (Arturo Baroncelli, Comau S.p.A. Torino; Riccardo Muradore, Univ. of Verona; Renato Vidoni, Univ. of Bolzano; Emanuele Menegatti, Univ. of Padova; Alfredo Pina, Public Univ. of Navarra; Alfonso Molina, Mondo Digitale Foundation, Rome; Enzo Marvaso, "Robotica a Scuola" Piedmont network) presented some remarks about the relationship between the educational system and research focusing on robotics, both as an educational tool and a learning object. Some recent initiative like the two agreements of Turin (4/11/2010 see: http://www.piemonte.istruzione.it/allegati/2010/ottobre/comunicato_stampa_robotica.pdf) and Rome (16/3/2011 see http://www.mondodigitale.org/files/PROTOCOLLO_160311.pdf) were recalled.

Regarding our group, Moro introduced the session argument highlighting the not obvious links and expectations that are present between the two world, education and research, observing that ER acts as a powerful engine both when it is introduced for preparing new professionals for the enterprise needs and when it is used as a wide spectrum means to support multiple disciplines and the learning process in general.

Menegatti (photo 6) presented some recent perspectives of autonomous, mainly service, robots with respect of the future everyday life and the related issues that arise under the educational point of view. He also mentioned what the DEI does using educational robotics both to support the learning of robotics of our undergraduate students and to motivate secondary students to choose engineering studies. Interestingly, NXT Mindstorms and educational humanoids were used for either purpose.

Pina (photo 7) spoke about motivations and ways to introduce ER at school working on new curricula that start from the primary school. He also referred about the necessity to teach/learn focusing on new competences. He gave some ideas of the objectives of the First Lego League activity (this subject was dealt with in broader details the day after) and some information about the fruitful collaboration with an external professional organization (CEIN www.cein.es). He concluded showing and commenting a diagram giving the

relationships linking the different actors (researchers, teachers, authorities, job world etc) that are globally activated when ER is concerned.

Photo 6

Photo 7

On the second day, chair Nello Fava, there were some specific contributions which involved our partners more directly.

Michele Moro (photo 8) introduced the session with a presentation entitled 'The new international network for educational robotics'. The presentation was divided into two part: the first was a small list of recent initiatives (projects, competitions, conferences, education centers, school networks) that are in connection with ER. In the second part, taking inspiration from the paper by Bredenfeld, Hofmann and Steinbauer presented at our SIMPAR workshop in Darmstadt, the speaker summarized the more relevant critical aspects that every type of the abovementioned initiatives currently show. Then he introduced the EERC Manifesto showing and briefly commenting its main objectives, its promoters, the foreseen initial actions and its basilar principles.

The second presentation ('Laboratorial activity and educational robotics') was a double one. Alfredo Pina (photo 9) gave some further details about the FFL competition and how this initiative in Navarra is promoting ER in their area. Javier Arlegui stimulated a reflection on introducing robot programming at the primary level even in presence of a very simple project like the simplified simulation of a public bus.

Photo 8

Photo 9

Barbara Demo (photo 10) dealt with the theme 'Robotics as a first approach to computer science at school' that offers some challenges to promote a correct and fruitful introduction to computer science in the official curricula, avoiding the common actual unique view as an operative tool. She showed the relationship between this aim and the Manifesto of computer science in Secondary school issued in May 2010, as a joint action of the associations GII (Group of Informatics Engineers) and GRIN (Group of Italian university Informatics teachers) with CINI (Consortium Inter-universities)

Moro, Fava and a third speaker, Enzo Marvaso, teacher in a vocational school and coordinator of the 'Robotics at school' network in Piedmont, discussed on the subject 'Teachers' training at national and local level'.

The workshop ended with a plenary discussion on future initiatives (photo 11). 'Mondo digitale' asked for a more active collaboration within the new agreement of Rome. MCR, the IAS-Lab of DEI (Univ. of Padova) and the Univ. of Turin signed the agreement and therefore all these entities will be involved in the next initiatives of this new national network. The TERECoP group agreed in going on with the EERC proposal in order to establish a 'super' network at European level able to support collaborating national networks and organizations at this level. MCR proposed to translate the TERECoP book in Italian for a broader distribution in and out school.

Photo 10

Photo 11

Exhibitions

On Friday 27th and Saturday 28th several exhibitions were held at the 'arena' (photo 12 and fig. 3).

The DEI partner, thanks to the collaboration of two students, showed some educational demonstrations 'inspired by nature' like the theme of the Discovery of this year (photo 13÷17). A first group of three examples (a worm showing its peristaltic movement, 'visual stereoscopy' recalling the 'vision' mechanism used by bats based on ultrasonic echoes, and a carriage with a double-axis motorized head maintaining its vertical orientation thanks to the signals read from an accelerometer mounted on the head) were proposed emphasizing their didactical values related to the relative simple theories guiding the behavior of the Mindstorms NXT robot in each one of the examples. The last one is a very simplified version of the feedback-oriented control to maintain the standing of the human body when walking. This was more precisely shown in the forth example, implemented on

a V-Stone educational humanoid Robovie-X able to swiftly walk also on an incline plane without falling down. It was also mentioned, and partly shown through a video, the possibility to improve this control by means of a visual system (a omnidirectional camera) mounted on the humanoid head.

Photo 12

Figure 3

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

On Saturday 28th the Spanish group present at the Discovery 2011, formed by our two partners, two primary school teachers and four sixth-grade students, showed two demonstrations, one based on the FLL competition to explain its potential and its rules, and one with a kind of coordinated dance between two robots, recalling a bull and a torero (photo 18 and 19). The examples were shown twice, once in the morning and once in the afternoon.

Photo 18

Photo 19

During the days dedicated to exhibitions various schools presenting interesting examples were in major or minor extent related to the activity and legacy of the TERECoP project (schools where some of our partners work and involved teachers who attended TERECoP-oriented training courses). Among the other we mention ITI Marconi and Liceo Rosmini of Rovereto, ITIS Fermi of Lucca, Liceo Scientifico Rainerum of Bolzano (see the curious mecca-puppet of photo 20).

Photo 20