Application to the Informatics Europe Best Practice Award 2015

ALaDDIN
Computer Science Department
Università degli Studi di Milano, Italy

1 Introduction

In Italian schools, most of the cultural impact behind informatics is neglected, since this fertile scientific discipline is often blurred by the use of office automation tools or Internet communication facilities. For the latter meaning associated with the term 'informatics' we coined the term 'applimatics' in order to wipe out any ambiguity: in fact, although such activities might indeed need special skills, they can be presented and mastered without referring to computing at all.

To cope with this troublesome state of things, in 2008 we founded the ALaDDIN working group ("Aladdin: LAboratorio di Divulgazione e Didattica dell'INformatica", `http://aladdin.di.unimi.it`), aimed at changing the way informatics is taught and perceived, with special attention to K-12 non-vocational schools.

All the activities we developed in these six years focus on two key goals.

1. To popularize the scientific aspects of informatics, by distinguishing them clearly from the use of informatic tools and devices: with this intent, we started a game contest (Kangourou of Informatics [18, 19], `http://kangourou.di.unimi.it`) aimed at distributing to pupils and teachers of secondary schools (grades 6th to 13th) rigorous but amusing materials about the scientific aspects of informatics; in 2012 we joined the Bebras community (`http://bebras.org/`) and the Kangourou of Informatics adopted the approach of its 'International Contest on Informatics and Computer Fluency'. Since 2009, 10'804 pupils have partecipated to the contest and we have distributed about 13'000 booklets ([1, 22, 21, 16, 17, 14, 15]) with commented solutions to the proposed games.

2. To teach the basics of informatics starting from low grades: to this end, in 2010 we started devising some activities aimed at presenting and discussing the core of informatics as the *"automatic processing of information"*. Planning to expose to informatics pupils of different ages, generally not involved in a computing curriculum and without previous specific knowledge, we developed an approach based on

playful activities which imply a mix of tangible and abstract object manipulations: a strategy which we call ‘algomotricity’ [4, 7]. The computer is never a starting point, but all activities end with a computer-based phase in which participants use specific software tools that we have developed. After experimenting with different formats, we consolidated five two-hour workshops, which we have proposed to about 2’400 students between 2011 and today. Since 2011 we are also engaged in the training and continuing education of teachers; in particular, we could propose a methodology based on the algomotricity approach to about 300 educators.

We are firmly convinced of the importance of exposing all pupils to basic informatics concepts and believe that our unconventional approach is indeed successful in presenting informatics both as an attractive scientific discipline and as a fundamental formative subject. Thus we would like to apply for the 2015 Best Practices in Education Award with the activities described in point 2 with the aim of further developing our activities and expanding the audience to which they are proposed.

2 Names and addresses of the applicants

- *Violetta Lonati*, Assistant professor. Computer Science Department, Università degli Studi di Milano.
- *Dario Malchiodi*, Associate professor. Computer Science Department, Università degli Studi di Milano.
- *Mattia Monga*, Associate professor. Computer Science Department, Università degli Studi di Milano.
- *Anna Morpurgo*, Assistant professor. Computer Science Department, Università degli Studi di Milano.

Address: Via Comelico 39, I 20135 Milan, Italy (`aladdin@di.unimi.it`).

2.1 Indication of whether the submission is on behalf of an individual or a group

We apply on behalf of the ALaDDIN team (“Aladdin: LAboratorio di Divulgazione e Didattica dell’INformatica”, `http://aladdin.di.unimi.it`).

3 Description of the achievements (max 5 pages)

Our goal is to present informatics as an attractive scientific discipline and expose to it pupils of different ages, not necessarily involved in a computing curriculum or with a previous knowledge of information or programming. To this end we developed an approach in which abstract symbolic manipulation is partially replaced by physical activities that should help pupils in developing their mental representations: a strategy which we call *algomotricity* [23, 4, 5, 6, 7, 20].

3.1 Methodological roots

As the name suggests (the neologism is a portmanteau combining *algorithm* and *motoric*), algomotricity exploits kinesthetic learning activities [2], with a first phase in which pupils are informally exposed to a specific informatic topic, followed by an abstract learning phase devoted to let students build their mental models of the topic under investigation and a final computer-based phase to close the loop with their previous acquaintance with applications, in order to match at least in part the expectations of pupils, who often identify informatics with the use of a computer. In this last phase pupils are confronted with specially conceived software tools and exploit what they have learned during previous phases.

Our approach took inspiration from several papers in computer science education (for example [8, 9, 24, 3]), and it is clearly rooted on the *Experiential Learning Theory* (ELT), specifically on *Problem based learning* (PBL). ELT defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience. [...] Immediate or concrete experiences are the basis for observations and reflections, these reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences" [13]. PBL designs an educational environment based on experiential learning organized around the investigation, explanation, and resolution of meaningful problems.

In our workshops, as advocated by PBL, students work in small collaborative groups and learn what they need to know in order to solve a problem [12]. The conductors of the workshops help pupils toward the learning goal without forcing them to follow a specific path; rather, the teacher should be able to exploit unexpected events to point out relevant issues not necessarily foreseen in the original design. This requires a trade-off between free exploring and external constraints: the didactic environment should suitably limit the available degrees of freedom so that pupils can effectively and proficiently explore the solutions' space without either getting lost or having the feeling that there is only one *right* answer. A key part is that pupils should have a real possibility to *make mistakes, i.e.,* to explore strategies that give incorrect or sub-optimal results. Since pupils are asked to work in groups in all steps of the activities, they confront and exchange knowledge and skills one with each other.

3.2 Sketch of workshops

Table 1 summarizes the proposed workshops and the relative target grades.

Each activity was designed to focus on one fundamental concept:

information What is information? How can symbols/numbers be used to represent it?

processing How can information be manipulated/changed in order to produce new knowledge?

Grade	4^{th}–8^{th}	7^{th}–11^{th}	10^{th}–13^{th}
information	Wikipasta	Human Pixels	Human Pixels (advanced)
automation	Mazes	Mazes (advanced)	Clickomania
processing			Greedy Money

Table 1: Proposed workshops

Figure 1: Pictures taken during the workshops: Wikipasta, Human Pixels, and Mazes.

automation Which manipulations can be performed by a *mechanical* interpreter? How can this be done?

3.3 Short description of the workshops

We propose several workshops (see `http://aladdin.di.unimi.it/laboratori.html`, Figure 1 show some pictures taken during the workshops), the most popular ones are the following:

Wikipasta In this workshop pupils are posed the problem of describing the typographic aspect of a text. By playing with pieces of pasta and other small objects, they are led through a game to the discovery of mark-up languages and then introduced to a lightweight "wiki" syntax. The final activity on the computer is about editing Wikipedia-like pages.

Human pixels After being shown a video of animations made in stadiums by coordinated soccer teams supporters (so called "human LCD"), pupils are asked to discuss how to set up a very simplified version of such animations using only two colors (e.g. black and white). They eventually discover grids, sampling, resolution, compression and complete the activity by using a multi-view editor showing a picture along with different representations as a matrix of numbers. In the advanced version of the workshop pupils use a set of colored, transparent tiles to be stacked onto a bidimensional grid in order to reproduce simple images, being faced with the problem of color quantization.

Mazes In this workshop pupils are faced with the problem of guiding someone through a simple maze. Pupils first focus on the task of verbally guiding a *human robot* (a blindfolded mate) through a simple path. Initially they are allowed to freely interact with the robot, then they are requested to propose a very limited set of primitives and to compose them into a program to be executed by the robot, with the possibility of exploiting three basic control structures (if, repeat-until, repeat-n-times). After this, pupils are provided with a visual programming language (a simplified version of MIT Scratch) and are asked to write programs guiding a sprite through mazes of increasing complexity. The advanced version of the workshop uses more complex paths and mazes in the first and second part of the activity, respectively, also introducing pupils to the concept of *variable*.

Greedy Money In this workshop pupils work on greedy strategies. They have to write down an algorithm for an automatic change dispenser, after having played with money on the change-making problem with a set of coins that admits a greedy solution. Then they are guided to apply the same strategy to a scheduling problem and, by playing with an ad hoc software tool, evaluate its suitability in finding the optimal solution.

Clickomania This workshop focuses on arrays, loops, and variables for counting. The final task of the workshop is the implementation of a program to play (a simplified version of) "Clickomania" (also known as Chain Shot! or Same Game) or, more precisely, a program that updates the board after each player's move (click). Here the software tool (`http://click-aladdinunimi.rhcloud.com/`) is an application based on Blockly [11], a web-based visual block programming editor. Initially pupils have to tackle the problem of how to update a single column. They first focus on the task by playing with multicolor pegs by simulating the effect of moves on a pegboard, then they are requested to formally describe their procedure, and finally to implement it with Blockly.

More detailed English descriptions are available in [7, 6, 20].

4 Evidence of availability of the curricula materials to the teaching community (max 2 pages)

We are disseminating our approach to teachers in multiple ways. Since 2011 our group is involved in several activities devoted to the initial training of prospective computer science teachers for the upper-secondary school, as well as in the continuing education of (also non computer science) secondary school teachers. Such activities have been delivered in various forms: two-hour workshops for the continuing education of teachers (`http://aladdin.di.unimi.it/formazione.html`), specific semester-based classes for the initial training of teachers (`https://mameli.docenti.di.unimi.it/A042`), and an elective class on Informatics teaching devoted both to computer science master students and to secondary school teachers (`https://mameli.docenti.di.unimi.it/didainfo`). Despite such diversity, all activities have been focused on (i) introducing teachers to the workshops described in Sect. 3, and (ii) analyze them in depth with the aim of enabling

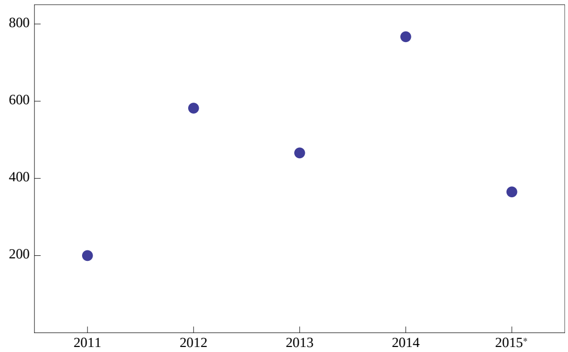

Figure 2: The numer of pupils who participated in the proposed workshops between 2011 and 2015; the last year is marked with an asterisk to highlight that the figure reported represents partial data.

participants to autonomously and efficiently reproduce the workshops in their classes. To this end, the web sites contain all the material needed for the workshops.

It is worth noting that the algomotorial activities in the first part of each workshop require inexpensive materials (for instance paper clips, pasta, sticky notes, tiles or other material which can be easily created with paper and scissors) and that the software tools we designed for the final part of the workshops are freely available from our web site `http://aladdin.di.unimi.it/materiali.html`.

5 Evidence of impact (max 5 pages)

A main impact of the activities described in this document is the number of participants to the proposed laboratories, whose temporal trend is also graphically shown in Figure 2:

2011: 200 students (Ist. Marie Curie (Garda))

2012: 582 students (matematita centre)

2013: 466 students (matematita centre)

2014: 767 students (matematita centre and Ist. Ilaria Alpi (Milano))

2015: [january-may] 365 students (matematita centre and Ist. Maria Ausiliatrice (Lecco))

As far as training and continuing education of teachers is concerned, the number of participants to our courses have been:

Education of prospective teachers (TFA/PAS)

- abilitation courses for Informatics teachers for secondary schools (2013, 2014, and 2015: around 40 participants).

Continuing education of teachers

- Workshops for secondary school teachers held during the Kangourou of informatics contests (between 2011 and 2015: 123 participants)
- Refresher courses for primary and secondary school teachers held at the Museo Nazionale della Scienza e della Tecnologia 'Leonardo da Vinci' (2014: 60 participants) and in the Bolzano IV institute (BZ) (2014: 50 participants)

Elective course on Teaching of Informatics

- we started this academic year with a mixed class of around 20 participants: Computer science master students and secondary school teachers who have enrolled just to attend this single course.

5.1 Evaluation

During the last academic year we set up an assessment process which involved 150 pupils and their teachers. The pupils were attending the same suburban state school, who promoted the participation of all its 6th- and 7th-grade classes to two of our workshops: Mazes and Wikipasta. Each of the pupils filled out the questionnaires: currently we have examined and analyzed all the questionnaires (see Sect. 5.1.1) about Mazes (proposed to the 6th-grade classes), in the spirit of grounded theory [10]. Moreover, we organized a focus group (see Sect. 5.1.2) with representative pupils from most of such classes. We collected:

- field notes written during the observation of some classes taking part in the workshop;
- questionnaires filled out by pupils;
- three focus groups with pupils;
- interviews with some teachers.

5.1.1 Questionnaires

Pupils were asked to answer three open questions: 1. What did you like of the workshop? 2. What didn't you like of the workshop? 3. Is there something you feel you have discovered during the workshop? We analyzed the answers and identified some recurring themes and strong concepts. Pupils claim to like: the fact that the workshop is both amusing and complicated/clever/challenging/engaging, and the fact they have created/built something; moreover, they feel they have discovered:

- the importance of thinking/designing/figuring in one mind's what to do before doing it;
- the need for precision;

- that computers and other automatic devices do not work alone, but follow commands;
- that computer science is not only using computers;
- that informatics is a science;
- that informatics may be fun.

It is worth noticing that such concepts emerged from all classes quite uniformly, thus they can be considered well-representative of the content and methodology of our proposal, and not depending on the different conductors or tutors who carried out the workshops.

5.1.2 Focus groups

We proposed as discussion topics the main themes and concepts arising from the previous analysis. In order to activate the discussion, some selected sentences from the questionnaires were handed out and read aloud with the participants.

During the discussion most themes were recognized by all the participants. Everybody agreed on the importance of precision to avoid errors and/or risks for the robot, both during the execution of instructions, and when defining the instructions themselves (*e.g.,* how many steps, which turning angle). We registered a unanimous agreement also on the need for reasoning before doing; in the discussions pupils repeatedly used verbs like *thinking, processing, preparing, foreseeing, understanding, solving, schematizing, agreeing*; or terms like *problem* and *logic*; or expressions like *organizing, ordering, putting together*, referred to both *ideas* and *instructions.*

Pupils confirmed that the tasks they had to carry out were fun and difficult at the same time, and stressed the fact that the challenge was part of the amusement, because "solving complex tasks is rewarding". However, when asked whether tackling with complex tasks is always amusing, they all clearly gave a negative answer ("I'm willing to use my brain, if the situation is enjoyable."), and pointed out that in this case the activities were fun per se. Words like *playing* or *game* were used to describe the activities, but someone felt such terms too reductive: "it was not child's play", "it was educational".

Another topic proposed during the discussion is the perceived relationship between the workshop and the subjects taught in school. The concept of *precision* was immediately associated with technical drawing and mathematics; geometry was associated with the measure of length (number of steps of the robots) and turn angles. No spontaneous reference to science emerged. After the moderator suggested some hints, however, all pupils easily associated what happened during the workshop with the typical *observation-hypothesis-prediction-testing-analysis cycle* of the *scientific method*, and in particular with the concept of *experiment.* They reported several circumstances in which they had made a hypothesis (for instance about how many steps were needed), designed a program/experiment, executed/tested it, and verified the correctness of their hypothesis. They also recalled that, when the experiment failed, they reviewed the hypothesis according to its outcome, and started the process anew: "the robot went too far, let's try with fewer steps!" And "when something goes wrong, you often discover something new that you didn't imagine before" (*e.g.,* one is concerned about the number of steps, but finds out that also the the turn angle is wrong). Such an approach was also used to choose among ideas proposed by different members of a group: some were tried and failed, while other survived to the experiment and were accepted in the final solution.

5.1.3 Final observations

The focus group showed that the activities proposed were effective in thoroughly engaging the pupils in the work. Moreover it also highlighted that some important educational values were conveyed with the workshops. The first one was precision, often felt by pupils as an unnecessary requirement imposed by teachers but with little sense for the pupils. Here they had to recognize the necessity of precision and appreciated it as an important value, not as an inappropriate constraint. Then they admitted that they tend to be unwilling to make efforts in the things they study at school, but realized that when they are involved in something fun, they are happy to accept challenges and work and think hard, and even reason before doing. Finally, the activities are designed with the scientific method in mind and pupils actually observed, made hypothesis, verified them in the context of the activity, possibly reviewed them, and eventually built mental models (theories) and recognized having worked in this way.

References

[1] Barboglio, E., Carimati, F., Compagnoni, A., Filippazzi, F., Italiani, M., Lissoni, A., Lonati, V., Monga, M., Morpurgo, A., Raimondi, R., Rebagliati, N., Repetto, L., and Torelli., M., Eds. *Testi, soluzioni e commenti della gara Kangourou dell'Informatica 2009*. Edizioni Kangourou Italia, via Cavallotti 153 – I-20052 Monza, 2009.

[2] Begel, A., Garcia, D. D., and Wolfman, S. A. Kinesthetic learning in the classroom. In *Proc. of the 35th SIGCSE TSCSE* (New York, USA, 2004), ACM, pp. 183–184.

[3] Bell, T., Rosamond, F., and Casey, N. Computer science unplugged and related projects in math and computer science popularization. In *The Multivariate Algorithmic Revolution and Beyond*, H. L. Bodlaender, R. Downey, F. V. Fomin, and D. Marx, Eds. Springer-Verlag, Berlin, Heidelberg, 2012, pp. 398–456.

[4] Bellettini, C., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., and Torelli, M. Exploring the processing of formatted texts by a kynesthetic approach. In *Proceedings of the 7th Workshop in Primary and Secondary Computing Education* (New York, NY, USA, Nov. 2012), WiPSCE '12, ACM, pp. 143–144.

[5] Bellettini, C., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., and Torelli, M. Teaching informatics for fun and profit. In *Proceedings of the International Workshop on Science Education and Guidance in Schools: The Way Forward* (Oct. 2013), A. Raschi, A. Di Fabio, and L. Sebastiani, Eds., ACARISS, Edizioni ETS, pp. 125–128.

[6] Bellettini, C., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., and Torelli, M. What you see is what you have in mind: constructing mental models for formatted text processing. In *Proceedings of ISSEP 2013* (Feb. 2013), no. 6 in Commentarii informaticae didacticae, Universitätsverlag Potsdam, pp. 139–147.

[7] Bellettini, C., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., Torelli, M., and Zecca, L. Extracurricular activities for improving the perception of informatics in secondary schools. In *Informatics in Schools. Teaching and Learning Perspectives* (Sept. 2014), Y. Gülbahar and E. Karata s, Eds., vol. 8730 of *Lecture Notes in Computer Science*, Springer International Publishing, pp. 161–172.

[8] Ben-Ari, M. Constructivism in computer science education. *Journal of Computers in Mathematics and Science Teaching 20*, 1 (2001), 45–73.

[9] Curzon, P., McOwan, P. W., Cutts, Q. I., and Bell, T. Enthusing & inspiring with reusable kinaesthetic activities. In *Proc. of the 14th annual ACM SIGCSE conference on Innovation and technology in computer science education* (New York, NY, USA, 2009), ITiCSE '09, ACM, pp. 94–98.

[10] Glaser, B., and Strauss, A. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Observations (Chicago, Ill.). Aldine Transaction, 1975.

[11] Google. Blockly. `https://developers.google.com/blockly/`, 2011.

[12] Hmelo-Silver, C. E. Problem-based learning: What and how do students learn? *Educational Psychology Review 16*, 3 (2004), 235–266.

[13] Kolb, D. A., Boyatzis, R. E., and Mainemelis, C. *et al.*. Experiential learning theory: Previous research and new directions. *Perspectives on thinking, learning, and cognitive styles 1* (2001), 227–247.

[14] Lissoni, A., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., Repetto, L., and Torelli, M. *VI Kangourou dell'informatica 2013–2014*. Edizioni Kangourou Italia, 2014.

[15] Lissoni, A., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., Repetto, L., and Torelli, M. *VII Kangourou dell'informatica 2014–2015*. Edizioni Kangourou Italia, 2015.

[16] Lissoni, A., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., and Torelli, M. *Kangourou dell'Informatica 2012*. Edizioni Kangourou Italia, via Cavallotti 153 – I-20052 Monza, 2012.

[17] Lissoni, A., Lonati, V., Malchiodi, D., Monga, M., Morpurgo, A., and Torelli, M. *V Kangourou dell'informatica 2012–2013*. Edizioni Kangourou Italia, 2013.

[18] Lissoni, A., Lonati, V., Monga, M., Morpurgo, A., Raimondi, R., and Torelli, M. Primi salti del Kangourou dell'informatica. In *DIDAMATICA 2008 — Informatica per la didattica* (Apr. 2008), A. Andronico, T. Roselli, and V. Rossano, Eds., AICA, Giuseppe Laterza, Bari, pp. 65–70.

[19] Lissoni, A., Lonati, V., Monga, M., Morpurgo, A., and Torelli, M. Working for a leap in the general perception of computing. In *Proceedings of Informatics Education Europe III* (Dec. 2008), A. Cortesi and F. Luccio, Eds., ACM – IFIP, pp. 134–139.

[20] Lonati, V., Malchiodi, D., Monga, M., and Morpurgo, A. Is coding the way to go? In *8th International Conference on Informatics in Schools: Situation, Evolution, and Perspective* (Sept. 2015). To appear.

[21] Lonati, V., Monga, M., Morpurgo, A., Rebagliati, N., Repetto, L., and Torelli, M. *Kangourou dell'Informatica 2011*. Edizioni Kangourou Italia, via Cavallotti 153 – I-20052 Monza, 2011.

[22] Lonati, V., Monga, M., Morpurgo, A., Repetto, L., and Torelli, M. *Kangourou dell'Informatica 2010*. Edizioni Kangourou Italia, via Cavallotti 153 – I-20052 Monza, 2010.

[23] Lonati, V., Monga, M., Morpurgo, A., and Torelli, M. What's the fun in informatics? Working to capture children and teachers into the pleasure of computing. In *Informatics in Schools: Contributing to 21st Century Education. Proceedings of the International Conference on Informatics in Schools: Situation, Evolution and Perspectives (ISSEP2011)* (Oct. 2011), I. Kalaš and R. Mittermeir, Eds., vol. 7013 of *Lecture Notes in Computer Science*, Springer-Verlag, pp. 213–224.

[24] Pattis, R. E. *Karel the Robot: A Gentle Introduction to the Art of Programming*, 1st ed. John Wiley & Sons, Inc., New York, NY, USA, 1981.

6 Letters of support

We enclose two letters of support.

The first one is from prof. Simonetta Di Sieno, the Director of the Interuniversity Research Center for the Communication and Informal Learning of Mathematics (`http://www.matematita.it/presentazione/index.php?NL=en`). This center hosts most of the lab activities we organize.

The second one is from Prof. Micaela Francisetti, Principal of the state school in Milan in which we organized the workshop evaluation reported in this document ('Ilaria Alpi' institute, Milan, `http://www.icilariaalpi.gov.it/`), and prof. Martina Palazzolo, the math and science teacher responsible for locally coordinating the activities.

matematita
Centro interuniversitario
di ricerca per la comunicazione
e l'apprendimento informale
della matematica

2015 Practices in Education Award Committee
Informatics Europe
Sumatrastrasse 25
8006 - Zurich
Switzerland

Dear Committee Members,

I am writing this letter to support the proposal of the Aladdin team of the Computer Science Department of the University of Milan, Italy.

The "matematita" research center for the communication and informal learning of mathematics was born around the idea that informal activities are often key to enable any subsequent more formal and systematic learning. We believe that, to foster learning, experts in any subjects should aim at finding the most appropriate contents and the most effective contexts, and focus on what role language plays in aiding learning and comprehension. Aladdin shares our approach and intends to address also math teachers, their privileged interlocutors in non vocational schools. Thus we were happy to welcome their workshops for secondary schools among the activities hosted by our center.

We have now been hosting their workshops for three academic years (since 2012-2013), about 50 in the meanwhile, renewing the agreement every year. The activities attract also schools where informatics is not taught and meet both pupils' and teachers' expectation of rigour with fun, by proposing challenges as team work with unconventional materials or contexts and the possibility of approaching a new concept with the scientific method. We appreciate the engagement with which pupils take part in the activities and that teachers who have attended one workshop book to attend others, as evidence of the fact that the workshops are carefully designed.

We give the application of the Aladdin team to the 2015 "Best Practices in Education Award" our fullest support as their proposal definitely addresses the need to expose pupils to basic informatics concepts and themes (information representation, programming, algorithms), presents informatics as an attractive discipline and shows how it can be taught in a seductive way; besides, the activities are based on easily available and inexpensive materials and are thus widely reproducible.

Sincerely,

Simonetta Di Sieno

SDS

Director of "matematita",
Interuniversity Research Center
for the Communication and Informal
Learning of Mathematics
http://www.matematita.it
c/o Dipartimento di Matematica
via Saldini 50 - 20133 Milano (Italy)
Tel 0039-02-50316159
Mail simonetta.disieno@unimi.it

Ministero dell'Istruzione dell'Università e della Ricerca
Istituto Comprensivo "ILARIA ALPI"
Via Salerno 1 - 20142 Milano
Tel. 02 88444696 Fax 02 88444704
e-mail uffici: MIIC8DZ008@istruzione.it
posta certificata: MIIC8DZ008@PEC.ISTRUZIONE.IT

Prot. N. 2248/C24b

To whom it may concern,

In the current school year the Aladdin team introduced two of their "algomotricity" activities in 18 classes of our secondary school. Each of our nine 6th grade classes (about 200 pupils) participated in a 2 hour workshop focused on programming and based on mazes. Each of our nine 7th grade classes (again about 200 students) participated in a 2 hour activity about formatted texts (``Wikipasta").
In both these workshops computers and software tools were of secondary importance but the link between the proposed activities and the use of technology was clear.

Most of the pupils were enthusiastic and enjoyed the activities, that are still recalled as interesting and fun. The Aladdin group was able to show students and teachers the scientific value of the informatic discipline. In particular, the interplay between activities with tangible objects and computers was key to emphasize the underlying problem solving process.
The pupils' previous idea that informatics is just word processing and web browsing drastically changed. We are quite sure these activities increased the attractiveness of the discipline through a playful but rigorous approach.

Although the workshops were conducted by different people, they were always structured in the same way, and pupils reached similar learning goals. This clearly highlights that the teaching activities were designed in a rigorous and reproducible way.

All the 18 classes were accompanied by their math and science teachers. Among these nine teachers only two had participated before to seminars about teaching computer science. But at the end, also the others declared to be interested in repeating the experience and they demonstrated a new interest for informatics and the scientific approach oriented to problem solving used by the Aladdin team.

For these reasons, we fully support the application of the Aladdin team to the 2015 "Best Practices in Education Award".
If you have any questions regarding this support letter, please do not hesitate to contact us.

Yours sincerely,
Martina Palazzolo
(Coordinator teacher of the project at the school)

D.S. Micaela Francisetti
(Head teacher)

Milano, 25.05.2015