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# Raising awareness of children on air pollution and its health effects: the MAPEC_LIFE experience in health communication

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## Introduction

MAPEC_LIFE is a project funded by EU Life+ Programme (LIFE12 ENV/IT/000614) which intends to evaluate the associations between air pollution and early biological effects in children. One of the objectives of the project is the awareness-raising of children on air quality and its health effects. To achieve this goal an educational package was created and validated.

## Materials and methods

The type of tool and the topics to insert in the educational package have been discussed in a focus group with primary school teachers and it was decided to use a cartoon and three educational video games, with a more complex explanation for teachers and parents through five dedicated leaflets. They were further tested for efficacy and pleasantness in a pilot test on 266 children attending the second and third grades of seven primary school in four Italian cities (Pisa, Turin, Brescia and Lecce). Finally, a control test on 51 children was carried out to assess the increase of knowledge without the use of video games and educational cartoon.


Fig 1. Screenshots of the educational video games realized in the MAPEC_LIFE project.

## Results

The didactic cards produced for teachers and parents faced five main topics: atmospheric pollutants, environmental policy, health effects of pollutants, healthy lifestyles and cellular effects of pollutants. The children dedicated tools included an introductory storyboard explaining the main information of the above cited topics, and three videogames (Fig 1) on the most important messages: air pollution (1), lifestyles (2) and cellular effects (3). The pilot study showed an increase of knowledge in children after using the education tools compared to the control test (Fig 2 and Tab 1). In addition the children involved expressed a high level score on the pleasantness of the game.

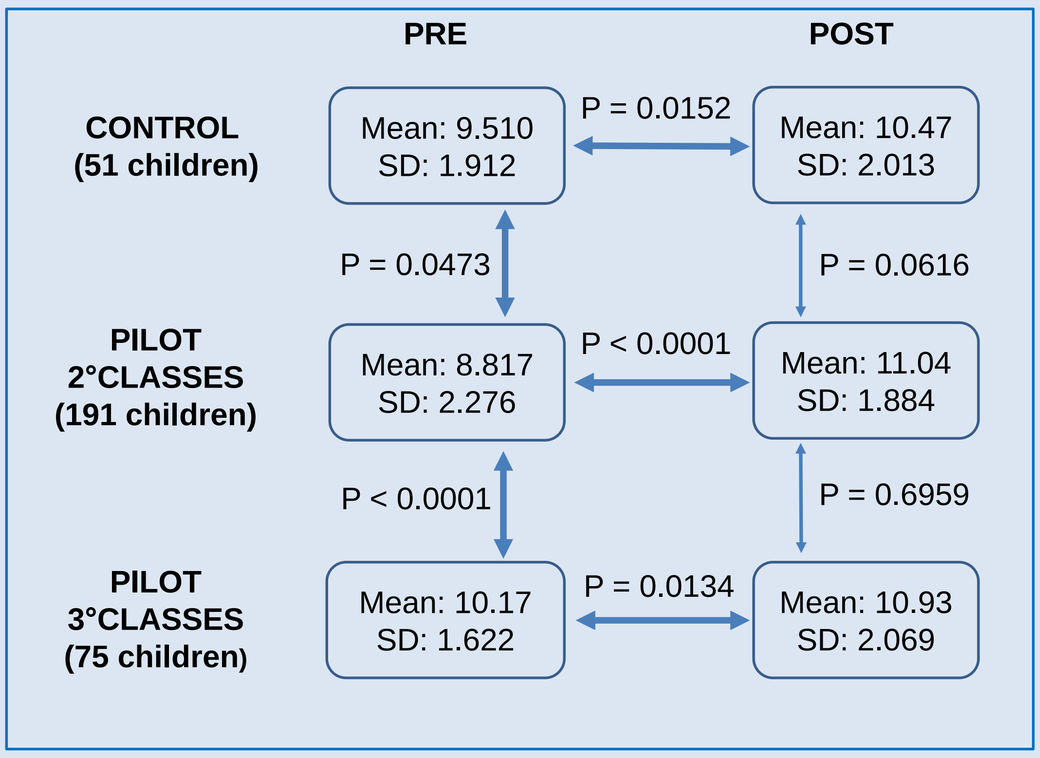


Fig 2. T-test between various groups compared. The thick arrows represent difference statistically significant.

| QUESTION | PILOT STUDY | | | CONTROL STUDY | | |
|---|---|---|---|---|---|---|
| **1 - What behaviors are correct to combat the health effects of air pollution?** | **%** | **P value** | **Odds ratio** | **%** | **P value** | **Odds ratio** |
| **1a - Walking in the urban street** | **14.7** | **<0.0001** | **2.98** | -5.88 | 0.2426 | 0.134 |
| **1b - Go in the park** | 1.88 | 0.5865 | 1.20 | 13.7 | 0.1091 | 2.83 |
| **1c - Bicycle riding in the countryside** | 3.76 | 0.2891 | 1.32 | 1.96 | 1.0000 | 1.11 |
| **1d - Walking in the downtown** | 5.64 | 0.1764 | 1.32 | 5.88 | 0.6458 | 1.38 |
| **1e- Eating chips, hamburger and donut** | **7.14** | **0.0294** | **1.75** | 1.96 | 1.0000 | 1.11 |
| **1f - Eating oranges** | 4.13 | 0.1539 | 1.57 | -1.96 | 1.0000 | 0.815 |
| **2 - What organ is most affected by air pollution?** | **14.3** | **<0.0001** | **5.23** | 9.80 | 0.1599 | 3.90 |
| **3 - What are the health effects of particulate matter?** | **19.5** | **<0.0001** | **4.03** | 13.7 | 0.1874 | 1.98 |
| **4 - What are the differences between each type of particle matter?** | 5.26 | 0.2005 | 1.31 | 3.92 | 0.8102 | 1.26 |
| **5 - What is the ideal temperature at home?** | **28.2** | **<0.0001** | **3.95** | 17.6 | 0.0566 | 2.87 |
| **6 - What food is highest in vitamin C, which increases the body's defenses?** | **6.78** | **0.0109** | **2.29** | 1.96 | 1.0000 | 1.23 |
| **7 - What is the meaning of passive smoking?** | **36.1** | **<0.0001** | **4.81** | 13.7 | 0.2343 | 1.74 |
| **8 - What are free radicals?** | **33.1** | **<0.0001** | **3.97** | **23.5** | **0.0289** | **2.611** |

Tab 1. Fisher's exact test on each question. The percentage (%) shows the increase of correct answers after didactic activity in the classroom.

## Conclusions

This intervention of environmental education and health literacy showed that the use of educational video games with tailored messages is very useful in stimulating interest and improving knowledge of children.