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# Studies and Current Trends in Science of Education

## A Point where Science and Research Meet Young Students and Interested Stakeholders - The European Researchers' Night

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# A Point where Science and Research Meet Young Students and Interested Stakeholders - The European Researchers' Night

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*Abstract*

*As already known, one of the most attracting event organized for general public is represented by the European Researchers' Night, which targets to bring near Science and Research all the interested actors, having actually a major coverage in more than 30 countries and almost 300 cities, being organized on the last Friday, in September.On the other hand, this event offers a good opportunity for disseminating the outputs designed in several projects that have as objective to promote science and scientific literacy to different target groups, starting from the young learners, to various stakeholders, less or not involved in research activities. In this respect, in the frame of the FP7 project called IRRESISTIBLE, in Romania, the European Researchers' Night was organized at the National Complex Museum "Curtea Domnească" Târgovişte (History Museum & Museum of Romanian Police), gathering scientific demonstrations, interactive presentations, experimental activities and discussions, but also a dedicated Science exhibition, named: "The World of Nanomaterials and Solar Energy". Most of the visitors were young students, but also general public was interested to participate to this event. The paper illustrates some aspects related to the participation to the event, but also the feedback recorded from the participants concerning responsible research and innovation aspects that have to be retrieved in the educational practice.*

**Keywords:** European Researchers' Night, Responsible Research and Innovation, non-formal education, nanomaterials, exhibition, demonstration, IRRESISTIBLE project;

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## 1. Introduction

In the last years, the "*European Researchers' Night*" became one of the most important events for spreading and disseminating the importance of science and research for the society. More, it has the role to let the children, their families and general public know about the researchers' activities and the impact of their findings on our daily lives.

The event is clearly promoted in the European Commission dedicated webpage, being presented as "a unique opportunity to meet researchers and take part in science activities aiming to showcase both the fascination of research as a career and its significant societal impact" (European Commission, http://ec.europa.eu/research/researchersnight).

On the other hand, the "*European Researchers' Night*" represents a suitable moment for presenting the results of the projects that promote science and research to general public, using in many cases museums halls or their interactive spaces for transferring scientific information, for enriching the participants' scientific knowledge, being in this manner decisive for the spiritual formation of individuals. In this respect, the museum becomes a knowledge vector, having a major role on educating, presenting, promoting and receiving of specific values in particular areas.

## 2. Pedagogical valence of museums

Nowadays, the museums represent real educational sources, either as non-formal learning environments, or informal ones, proposing a connection between them, able to vary *from* continuity, complementarity and mutual strengthening, *to* discontinuity, inhibition or opposition between those elements (Lucas, 1987). But what is important at this level, is that such continuities or discontinuities activate and impel each other, conducting so to enlarge and spread knowledge or experiences (Zbuchea, 2006), with the help of making interventions by using specific didactic strategies (inquiry-based science education) and related methods (problematization, modeling, demonstration, case-study).

The pedagogical valence of a museum - as specified by Constantin Cucoş (2013) - embraced the format of identifying and validating the strategies that lead to maximize the formative virtues of the museum environment, having as target to stimulate the interaction - at the educational level - between museum and school, to train and form specialists, but also

the general public, for valuing the educational potential brought by this cultural environment.

The museum education aims, among other issues, to open the museum for all learners, helping them to understand and conquer new values. An education carried out in this environment develop the learners' sensitivity (Ansart, 1991) and help it to develop positive feelings related to the exposed objects, but also to the existed world.

There are several major objectives of the museum education and they can be activated function of requests or circumstances (Cucoș, 2013):

- the completive objective - related to the educational objectives and contents. In this respect, the museum can become an extension of the school, a place for transferring knowledge and values and an environment for acquiring competences.

- the applicative objective - the museum becomes an environment for applications, including also research, experimentation, involvement.

- the customization objective - related to the learning cultural content. This represents an opportunity for including in the curricula of new information or formative elements with a more concrete nature, beyond the general or mandatory curriculum.

- the cultural identity objective - valid for each person, at local or national level, through knowledge, internalization and assumption of the social space flagship values, in which the person is about to be integrated.

- the self-discovery objective - through the enhancement of the provisions or individual interests that do not direct target to school.

As the *European Researcher's Night* is organized mainly in museums, the above-mentioned objectives remain valid to be reached through the educational activities proposed within this event.

## 3. Methodology

In two consecutive years (2015 and 2016), the *Community of Learners* set up in the frame of the FP7 project called *IRRESISTIBLE*, organized and designed educational activities for students, teachers and general public during the *European Researchers' Night* event, organizing scientific demonstrations, interactive presentations, experimental activities, exhibitions and discussions at the National Complex Museum "Curtea Domnească", in the city of Târgoviște (more precisely at History Museum of Dambovita County - 2015, and Museum of Romanian Police - 2016).

As the IRRESISTIBLE project was designed to train and educate both students and teachers concerning *Responsible Research and Innovation*,

through specific learning modules designed for this purpose, the activities proposed at the event targeted also on underlining several RRI dimensions: *open access* and *science education* (mainly), but also *engagement*, *ethics* and *gender equality*.

For evaluating the feedback recorded from the participants, related to the introduction of RRI dimensions in the educational practice, an analysis was performed on a sample of 100 participants, based on a survey, in which most of the questions propose a predetermined answering scale with five steps: *strongly disagree / disagree / undecided / agree / strongly agree*.

In this paper, it is emphasized the participants' feedback concerning two important RRI dimensions: *open access/open science* and *science education*. The results obtained through quantitative methods have been correlated also with the discussions held with participants, undertaken during the event, and oriented mostly on specific aspects of the pedagogical methods used for involving participants in the event activities: problematization, modeling, demonstration, case-study, targeting on the interactive-active character of learning. Those methods are particular linked to the *interactive* and *creative learning* - a process of creating meanings concerning the new information and prior knowledge, the transformation of individual's cognitive structures as result of the incorporation of new acquisitions (knowledge, skills and abilities), by intellectual and psychomotor efforts of building knowledge (Oprea, 2007).

## 4. Results and discussions

The first groups of items are in relation to the *open access / open science* RRI dimension.

When participants were asked to what extent they would be interested on being informed about the research findings, their responses illustrated that most of them (64%) expressed their interest, while 27% are undecided on how to answer (figure 1). This opinion entitles us to believe that a large part of the societal members considers useful to correlate education with research, having public access to scientific research results. However, 9% from the respondents seemed to be not interested on those issues, even taking into account the declining interest in science subjects among young people.

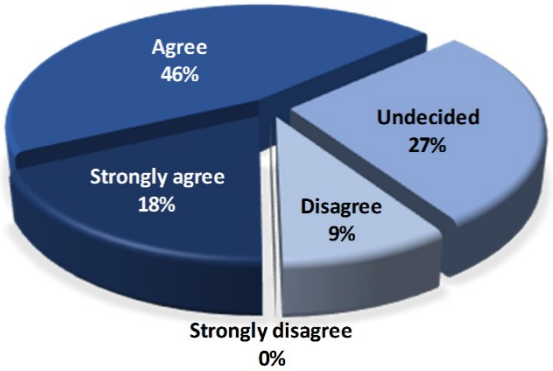


**Figure 1.** Participants' feedback concerning their interest for being informed about the research findings

Considering the extent to which respondents - as being in a potential position of researchers -, would support the introduction into the educational practice of "*open access / open science*" RRI aspect, 73% expressed a clear agreement, let 27% to be undecided (figure 2). However, it can be noticed a deep awareness of the respondents related to a better and efficient involvement of the educational institutions in terms of accessibility to the information sources, in particular to scientific information, for different categories of users (students, teachers, parents, school managers, general public).

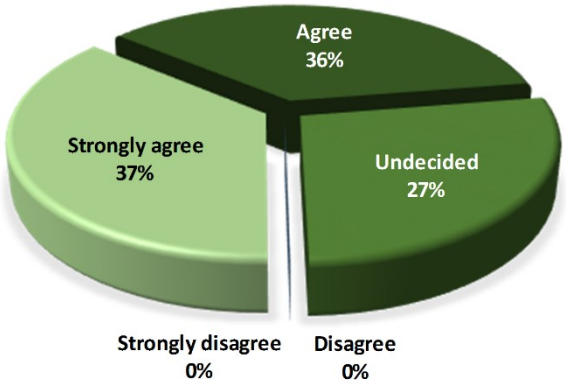


Figure 2. Participants' feedback concerning their support for introducing open access / open science RRI aspect in the educational practice

Among the ways considered by the respondents as effective for introducing the "*open access / open science*" RRI dimension in education, designing a database which allow the open access to research results, being

accessed anywhere and anytime, represents the best channel (36%). Other ways mentioned by the participants are: setting up of specialized servers particular to scientific areas (27%), designing of a universal server for hosting research projects that can be accessed by anyone who is interested (18%), maintaining project servers with the projects findings, research methods, involved personnel etc. (18%) - figure 3.

As emerged from the discussions with the respondents, it can be remarked the necessity for a better connection of the educational contents to the latest scientific results, especially by the means of virtual instruments, designed to give to those interested scientific information in real time. In line with this idea, a great part of the respondents perceived the need for an appropriate funding for correlating the educational content to the research findings.

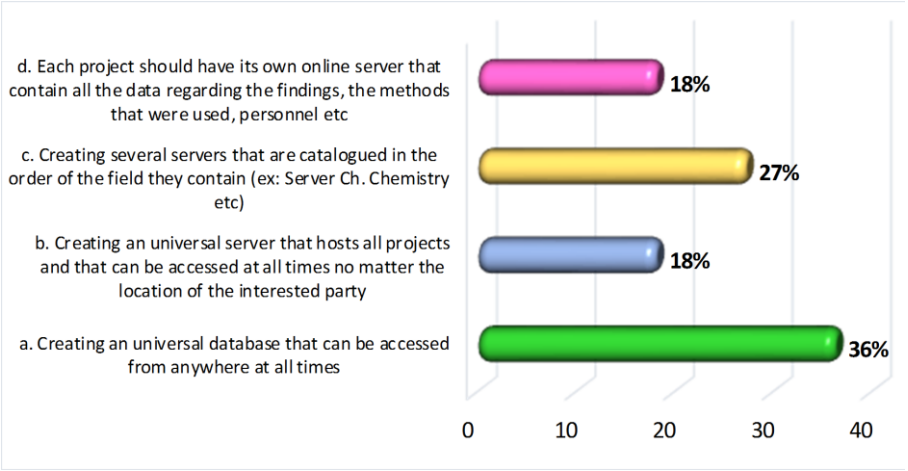


Figure 3. Participants' considerations related to the introducing of the open access / open science RRI aspect in the educational practice

The second groups of items are in relation to the *science education* RRI dimension.

Concerning the measure in which each research project should consider its results to be promoted at educational level, 64% of participants strongly agree or agree with this fact, 18% are undecided and 18% disagree the idea (figure 4). It is obvious that most respondents tend to value the relationship between education and research based on the idea that any research activity should be placed in the service of the social progress and must lead to the improving of the quality of life. However, we cannot forget that, in certain circumstances, the scientific information may be used for

producing damages in the society, justifying in this way the percentage recorded for *undecided* or *disagree* options.

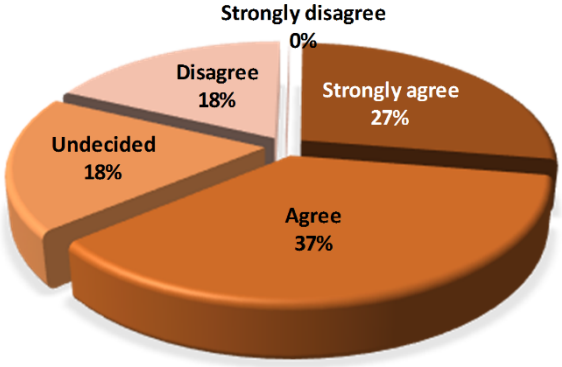


Figure 4. Participants' opinions related to the measure in which each research project should consider its results to be promoted at educational level

When the participants were asked if they would take part in activities carried out with the purpose of sharing scientific information, findings and expertise with the students, the same percentage of the ratings was recording as to the previous question: 64% agreed, 18% were undecided and 18% did not agree (figure 5). The high percentage of the respondents who expressed their agreement demonstrates a conscious and responsible attitude related to the involvement of researchers in science education. In addition, the respondents wanted to underline that if the researchers should take common actions to popularize their work among students - as done during the *European Researcher's Night* event -, the students' interest in science and research will certainly grow.

The last question tried to offer an answer to the support that can be offered to teachers, in order to increase the students' scientific knowledge and literacy. In this respect, approximately 73% of respondents are in totally agreement, demonstrating once more the need for a deeper involvement of researchers in the school life, while opening the educational system for research with the view to make known the research results (figure 6).

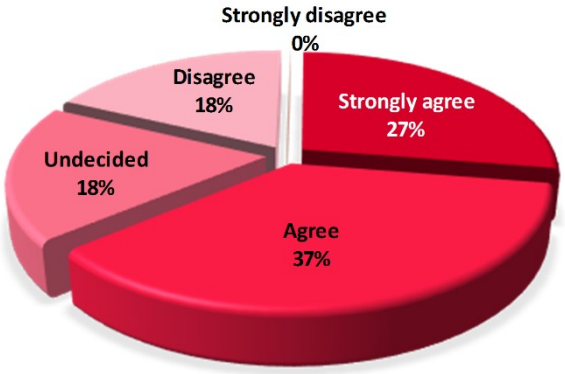


Figure 5. Participants' opinions concerning their involving in activities with the purpose of sharing scientific information, findings and expertise with the students

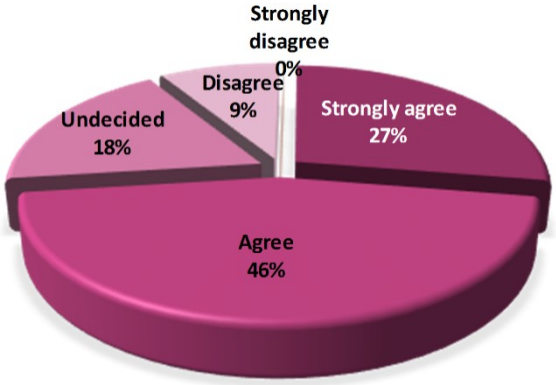


Figure 6. Participants' feedback related to the support that can be offered to teachers, in order to increase the students' scientific knowledge

## 5. Conclusions

The "*European Researchers' Nights*" - the event launched in 2005, as one designed for disseminating the importance of science and research and their impact of their findings on the daily lives - recorded a great success, counting millions of citizens and thousands of researchers as participants in Europe and neighboring countries. Many activities are organized in museums, those institutions having the role of cultural referential and facilitator, starting with pre-school children's education and going to the education of adults (Cucoş, 2014).

At the same time, in the last two years, the paradigm of *Responsible Research and Innovation* was introduced to the participants, together with demonstrations, experiments or simulations.

Two RRI dimensions - *open access* and *science education* - were explored in our research, with favorable feedback of participants, concerning their exploring in the educational practice. It is important also to conclude the positive impact of such issues measured on the participants' level, but also the recorded powerful formative effect.

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## References:

Ansart, P. (1991). Sur les finalités de l'utilisation pédagogique des musées, *Revue canadienne de l'éducation*, *16*(3), 258-266.

Cucoş, C. (2013). Pedagogia muzeală - statut, obiective, valenţe practice. http://www.constantincucos.ro/2013/11/pedagogia-muzeala-statut-obiective-valente-practice

Cucoş, C. (2014). News Arguments for Aesthetic Education and the Educational Dimensions of the Art Museum. *Review of Artistic Education*, *7/8*, 228-233.

European Commission (2016). European Researchers' Night - Exploring Science whilst Having Fun. http://ec.europa.eu/research/researchersnight/index_en.htm

European Commission (2016). European Researchers' Night 2016. http://ec.europa.eu/research/researchersnight/about_en.htm

Lucas, A.M. (1987). Interactions between Formal and Informal Sources of Learning Science. In: D. Evered, & M. O'Connor (Eds.), *Communicating Science to the Public*, London: Wiley, 64-79.

Oprea, C. L. (2007). *Strategii didactice interactive*. Bucureşti: Editura Didactică şi Pedagogică.

Schouten, F. (1992). The Paradox of the map: Semiotics and Museum Education. *Museum Management and Curatorship, 11*, 285-289.

Zbuchea, A. (2006). Informal and Formal Education in Museums. *Revista Muzeelor*, *1*, 45-53.