

The role of leadership in education as a decisive factor for the Communication of Sciences: The case of the European project Connect (Horizon2020)

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The quality of leadership, more than any other parameter, determines the success or failure of an Organization.

Fiedler, Chemers & Mahar ("Improving Leadership Effectiveness")

There are numerous definitions for the leadership. A very comprehensive definition for leadership can be outlined as "the process of influencing the thinking, feelings, attitudes and behaviors of a small or large, formal or informal group of people by an individual (i.e the leader), in such a way that they voluntarily and willingly and with appropriate cooperation give their best for implement effective goals that derive from the team's mission and aspiration for progress or a better future" (Μπουραντάς, 2005).

Looking at various definitions that have been given so far, two fundamental common characteristics of the concepts of leadership and leader can be distinguished:

The first is the existence of the leader's influence on other people in order to achieve common goals. Considering Leadership, as an indication of influence, is about attitudes, emotions and behaviors such as

passion, enthusiasm, initiatives, creativity, inspiration, commitment, dedication and belief, which are prerequisites for people to fully integrate their potential skills as well as their performances.

If we turn to the second point we can indicate that leaders set as a main objective the growth and development of an organization and therefore the concept of leadership is fundamentally associated with change, progress and "the better future" for people. In this context, people voluntarily and willingly seek to achieve goals that involve aspirations or ideals for progress or a better future.

In the school context, according to Leithwood & Riehl (2003), school leadership is more of a function and less of a role, so it can be serviced either by people who have formal authority or by people who have a different role in a school unit. Also, school leaders do not impose goals on their subordinates but work collaboratively with them to create a sense of common purpose. Finally, school leaders work mainly through and with other people, helping them to be effective and thus promote school goals indirectly as well as directly.

Leadership vs. Management

Management is the process of achieving organizational goals through planning, organizing, directing and controlling organizational resources.

Managers are different from leaders because "Managers do things right, leaders do the right things."

Figure 3 below illustrates the difference between a leader and a manager.

Management and leadership are complementary and mutually influencing roles (Kotter & Cohen, 2001), equally necessary for the effectiveness of the executives and the organizations they manage (Fig. 1).

		Leader	
		Yes	No
Manager	Yes	Ideal Leader	administrator
	No	Visionary	Incapable principal

Therefore a person can and should practice both management and leadership at the same time. What does the ideal leader do?

- He/ She Inspires fellows to follow him voluntarily and willingly by investing in trust, inspiring through his vision expectations and values and committing them to higher performance.
- He/ She targets changes focusing on a better future and seeks to bring out others to be leaders too.

Types of leadership

The bibliography related to leadership is incredibly rich and highlights a variety of types of leadership. The types of leadership are about how the leader adopts his/ her role, uses his/ her authority and power, and makes decisions. In the case of Connect Program, the transformational and distributed leadership was exercised.

Transformational leadership

Transformational leadership is the human-centered approach to leadership.

The transformational leader works with his/ her partners and inspires enthusiasm and motivation to promote change and innovation (Thomson et al., 2016) while encouraging them to interact with the beneficiaries (for example students in a school) and to care about their impact on the social environment (Grant, 2012).

In the school context, the key elements of transformational leadership are threefold: motivating and developing a collaborative culture, contributing to the continuing professional development of teachers, and expanding problem-solving skills (Μπουραντάς, 2017). Transformational leadership provides vision and inspiration to energize all members of the school community. Transformational leadership is a shared leadership model that aims to bring about change through bottom-up actions.

Distributed leadership

Distributed leadership recognizes that the distribution of responsibilities and authority can be distributed among all members of the organization since the assignment of responsibilities contributes to the development of their abilities (Χατζηπαναγιώτου, 2019). Also, the division of responsibilities is the means by which managers ensure the maximum contribution of the abilities and skills of the members of the organization.

In turn to the case of schools' communities, if the principal maintains a positive attitude towards his colleagues, he/ she creates necessary conditions within school in which teachers are committed to their work and the principal can direct his/ her efforts to general goals of the school unit while the use of effective communication helps teachers to achieve their educational goals (Heck & Hallinger, 2010).

If we turn now to the basics of the communication of sciences we have to outline them as below

- **To address urgent issues**

What we've seen in the pandemic and climate change, communicating science is critical to solving the world's most urgent issues. While it's not always a fair fight — too often, misinformation travels the world while the scientific truth is tying its shoe laces — it's a hugely necessary one.

- **To make science more transparent**

What we discuss in our piece on [storytelling and the impact of academic research](#), most basic science is funded by the public. At the same time, the public communication of this science — that is, the published articles and books — tend to be stuck behind a hugely expensive paywall.

Whatever the merits of this system, the science community needs to communicate in order to continue to justify the investment of their main stakeholders: the public.

- **To educate the public**

Scientific education is a good thing in its own right, and plenty of science of communication is produced simply to educate the public about what we know — and don't know — about life, the universe, and everything. Science education can also aim to increase public engagement on the most critical issues of our time.

- **To educate decision makers**

It is good to educate the public; however, it's *critical* to educate those making decisions. While we sometimes like to imagine — or hope — that our leaders are informed about the most important issues we face, the truth is rather less inspiring. In most countries, leaders have, well, *mixed* knowledge about science (to put it charitably).

While it might be considered a 'stretch goal', one clear aim of science communication is to inspire better understanding of science by policy makers. Ideally, this can lead to evidence based public policy and decision-making by governments across the board.

- **To inspire the next generation of scientists**

If we consider the future of our economies, environments, and societies, it's critical that the next generation of talented people embrace a career in the sciences (including social sciences). The best way to do this is inspire them with excellent public science communication.

- **To inspire local communities**

All science happens somewhere, and it's important for science communicators to engage with their local communities. While this is often difficult — there are only 24 hours in a day, after all — it's a key tactic in producing a more well-informed citizenry. Great community outreach can even inspire contributions to science by amateurs in the local community, otherwise known as citizen science.

To ensure scientific research is understood by the public and improve scientific literacy, today's science communicators need to use many different formats, including social media, blockbuster documentaries, popular podcasts, cartoons and comics, and more.

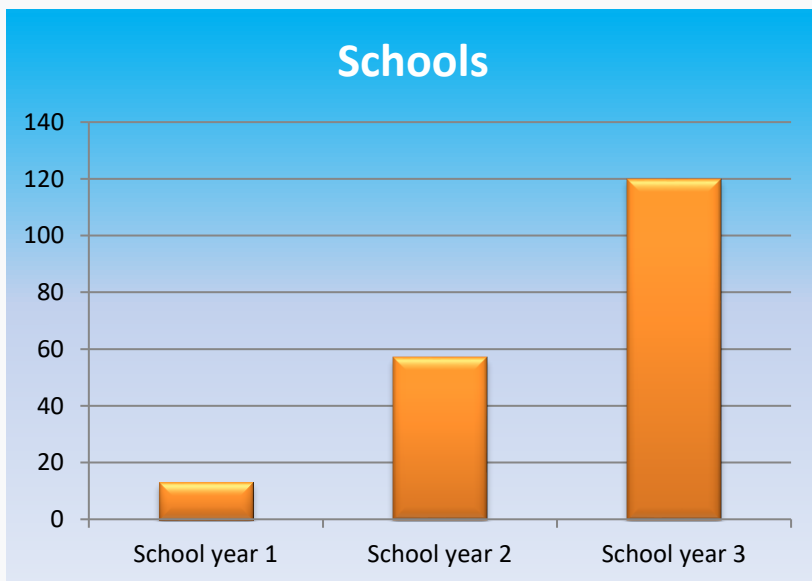
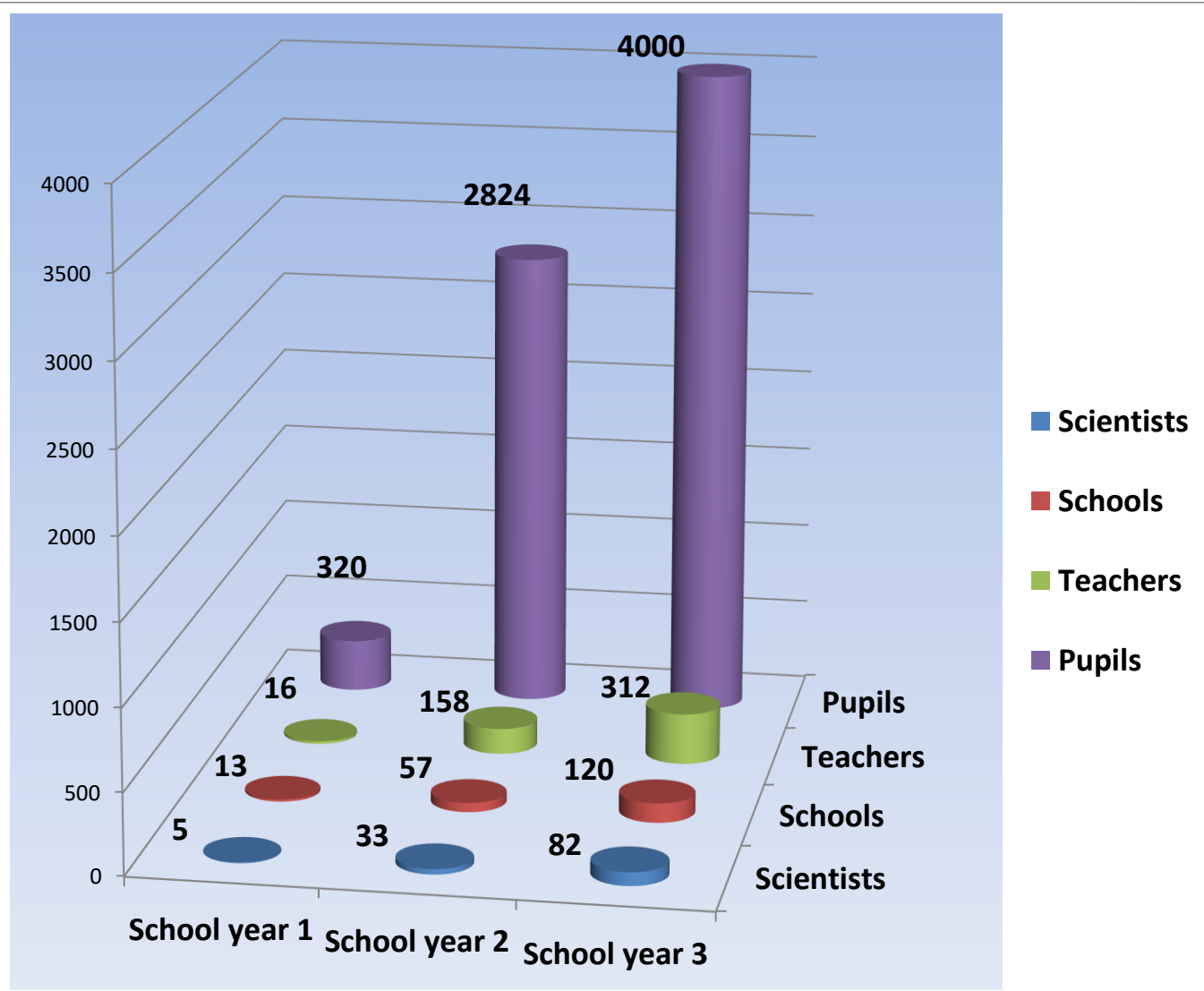
A typical case of the application of all the previous ones is the project Connect (<https://www.connect-science.net/>), a three-year project (2020-2023) in which the Regional Directorate of Education of Crete participates, within the European Program "Horizon 2020" in the framework of the "Science with and for Society" (SwafS) module. It is aimed at schools and offers an inclusive and sustainable model that strengthens children's confidence in their engagement with science as a method of solving everyday problems and at the same time brings them into contact with scientists and experts of various specialties by involving parents and the local community. In other words, Connect tries to foster the belief that "science is for me". Projects produced in schools as part of the Connect are based on STEAM (Science, Technology, Engineering, Art, Math) methodology.

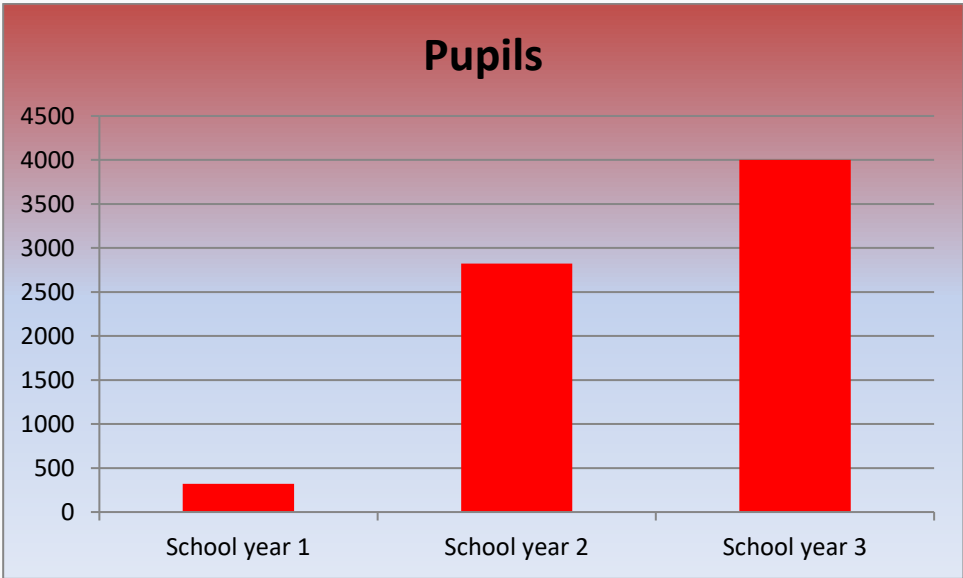
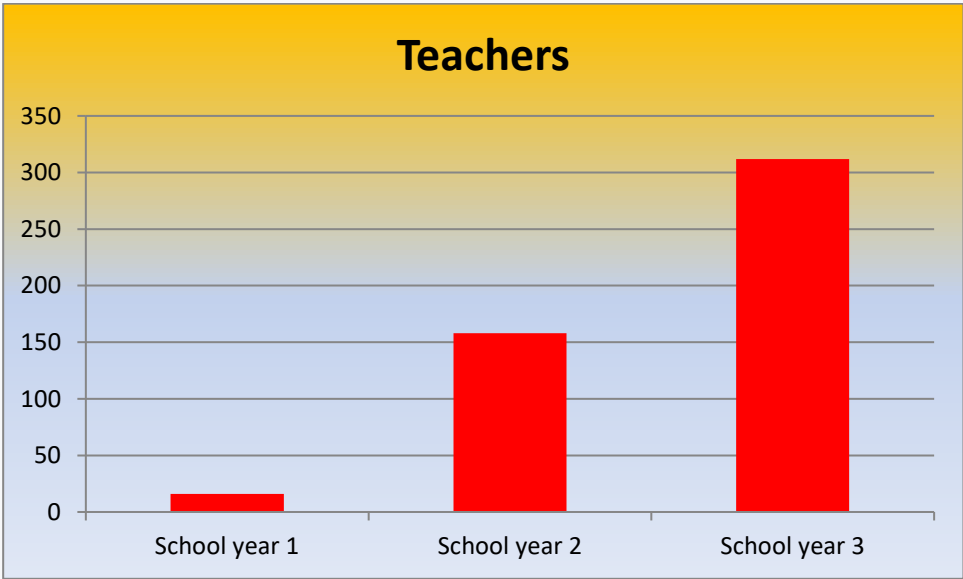
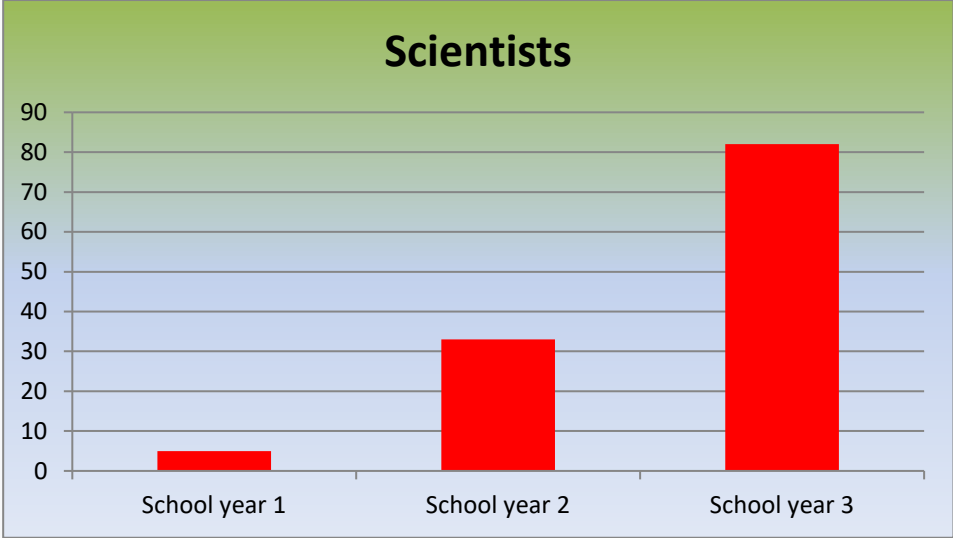
STEAM according to Michalis Bletsas, the director of IT at the Media Lab of MIT, promotes in schools the methodology of science, i.e. investigation, discovery, logic, analytical and synthetic thinking and ultimately cultivates soft skills such as teamwork, creativity, communication skills, etc. In conclusion, Bletsas argues that through STEAM projects, it is possible to increase the confidence of the people involved in science, an element that is considered necessary to enable the individual to function constructively in a world of increased complexity.

The RDE of Crete has increased its extroversion, participating to various european programs (Erasmus+, Horizon 2020 etc) as a trusted partner as well cooperating with institutions for pupils' and teachers' benefits.

Our goal and our strong commitment on transformational and distributed leadership can be traced in different levels of management, beginning from the Director who sets the framework, outlines the guidelines, encourages and trusts his colleagues for the evolution and the achieved outcomes in every step. Moreover, the project managers communicate with the partner schools following the same leadership, distributing certain works to be done, supporting them constantly for mutual benefits and encouraging them to work within their staff and pupils under the same scheme. Under the schedule set by the leading team (Director and Project manager), every 2nd week online meetings were held with all schools participating in Connect to resolve queries or problems and determine next steps. The atmosphere among the partner schools was friendly and cooperative, resulting in open and honest communication between those involved. There was an exchange of opinions and ideas between the participants and this helped to commit them to the common goal, i.e. the creation of the projects that preceded the communication of science. Additionally, the RDE of Crete organized plenary meetings of the consortium as well as pupils' conferences where members of the school communities involved in the program presented their works. The overall results achieved by the RDE of Crete following the Transformational and Distributed leadership are impressive as we can see and it was recognized by the coordinators. Moreover, the enrollment of the

RDE of Crete to the Connect has contributed significantly to the improvement of its brand name as a reliable and efficient partner for similar activities and programs.





Transformational and Distributed leadership for the program at a school

We focus of the work of a typical public school, the 1st Model High School of Ilion, Attica which participated in the Connect project in the last two school years (2021 – 2023). It is worth noticing that the school year 2021-2022 this particular High School was approved by the Ministry of Education to function as a Model High School within the expanded framework of Model and Pilot Schools established by the Ministry of Education. This new era of the school created several issues in school's every-day-life and among them was the change of the composition of the teachers of the school, adding with new teachers and, at the same time, changed the profile of the students since the 1st Grade joined the school after succeeding at entrance exams.

Under this scheme, the actions undertaken by the principal of the school in terms of exercising leadership and contributing to positive outcomes can be traced in several aspects:

Initially, she foresaw that "Connect" could be a powerful tool in order to promote the Communication of Science with both students and parents, to improve the quality of the education provided, to promote the extroversion towards society, the implementation of innovations and actions and to achieve inclusion in all areas in the school. In order for "Connect" to take place successfully at the school and applying the principles of transformational and distributed leadership, the principal set as her main goal the cultivation of a climate of cooperation, solidarity and encouragement and undertook actions to correlate all of the above goals and their functional integration into the school's goals.

During the school year 2021-22, she conducted exploratory meetings with teachers to investigate trends, trends and interests, an action that was recorded in the official principal's diary. According to *Connect's* schedule, during the year 2021-22 it was addressed exclusively to Sciences' teachers, so the principal informed them in details about the possibilities and benefits offered by the program both on scientific and pedagogical levels. She urged them to participate and she took part in order to strengthen them and set a positive example. During that 1st school year, the enrollment of the school was based on the participation of the principal of the school as well as of two Science teachers. An initial meeting was held with the Teachers' Council in order to formulate a common vision and plan the individual actions to be held on behalf of the teachers. The principal tried with consultative discussions to encourage teachers for the implementation of the innovative practices of *Connect* which are fully consistent with the goals of Model Schools. Moreover, in order for the teachers to be informed and to cooperate constructively, a shared document was drawn up after mutual agreement to monitor the actions of *Connect* and the relevant trainings that were carried out, as well as their obligations and commitments. It is important to mention that throughout the process, there was direct collaboration among the entire *Connect* team. Soon, the principal and the two teachers worked as a team and developed a collaborative culture in a pleasant and creative atmosphere. Within the team, the trust that developed between its members acted

as a decisive factor. The principal was available every time there was either a new idea or a problem and she made sure to provide a solution that resulted from discussion and mutual agreement, acted as a motivator, showing enthusiasm for the achievements of teachers and students, praising them not only individually but also in front of the whole school, posting and displaying their actions on the school's website and social media, congratulating the participants by name.

The outcomes were two STEAM projects which were carried out by groups of students and one lecture dedicated on Renewable Energy Sources which was organized at the school by scientific fellows of the University of Western Attica (PADA). Moreover, students presented their projects at the Connect student conference held by the Regional Directorate of Crete, while the Principal and the two teachers participated in the Scientix conference held at the National Technical University of Athens presenting a scientific paper related to *Connect*.

On the other hand, the teachers took initiative and acted as leaders for the pupils they were working with for *Connect*. Collaborations were developed by everyone in all directions and the group's openness to new ideas that may have come from pupils, parents, collaborating scientists, other educators, etc. was distinguished.

The results of Connect in the first year justified everyone's effort.

During the 2nd year, following the schedule of the *Connect* required the enrollment of teachers of various subjects and consequently the school team was formulated by the principal of the school and four teachers. The outcomes were two more STEAM projects were produced by groups of students which included complex constructions, two lectures on environmental pollution and proposed solutions were organized at the school by scientific fellows of the University of Western Attica and the involvement of pupils' parents. The students visited PADA and were informed thoroughly about the solutions for environmental issues. The pupils wrote articles in the school newspaper related to the *Connect* topics, interviewed PADA professors and they published it. The pupils presented their projects at the student conference of *Connect*, while the principal together with the four teachers are going to participate in a forthcoming conference with two scientific papers about *Connect*.

The activities as well as the questionnaires given at the end of the program and filled in by parents, students and participating teachers showed that *Connect* was an inspiration as well a motivation for students and parents to understand and get closer to science in a pleasant and creative way. Also it transformed the students to small researchers and the positive outcomes gave satisfaction and pleasure to the teachers involved.

The evaluation of *Connect* by the coordinating institutes (EXUS holding the Project management and The Open University holding the Scientific Management) so far has shown that the successful implementation

of leadership, both at the level of the project coordinators and at the level of the principals of the participating schools, has been the critical factor for the success of the project and the achievement of the objective, i.e. Science Communication with society.

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