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MONOGRAFIE

EDUCATION IN TIMES OF UNCERTAINTY

Imaging and shaping futures of education in a European and global context

by
Claudia Pennacchiotti, Valentina Tudisca, Adriana Valente
and the Rete Officina 2020-2021

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ABSTRACT

National research and innovation are feeded by the knowledge, skills and competences owned by citizens. How and to what extent these are promoted, acquired, used and valued has significant influence on both the research system and the country system. Culture, and in particular scientific culture, with the opportunities for non-formal and informal learning throughout life, significantly contribute to define the ways in which the knowledge society concretely takes shape and participates in supporting the R&I system within the training-research-innovation triangle.

For these reasons, since 2016, the research group "Social Studies of Science, Education, Communication" of the Institute for Research on Population and Social Policies of the National Research Council of Italy, in collaboration with the Italian Ministry of Education, has been organizing the "Officine Educazione Futuri", annual conferences aimed at envisaging and conceiving desired and desirable futures of education.

Considering education as crucial for individual and collective futures, Officine are developed around participation as a key factor to promote sustainable and shared innovation: scientific and educational communities, societal actors and policy makers share ideas, debate and co-create knowledge. This approach is aimed to align research processes and products to the needs, values and expectations of society, in line with the European conceptual framework of "Responsible Research and Innovation", with the "Sustainable Development Goals" (Agenda 2030) and the principles promoted by the "Conference on the Future of Europe" promoted by the European Parliament, the Council and the European Commission.

Over the years, Officine have been addressing various issues relevant to the education system and to society as a whole. How to rethink the relationship between the school, society and the world of work? What are the key competences for society and social inclusion? How to promote active engagement of all actors in educational, social and scientific innovation processes at national and European level? As highlighted by Funtowicz and Ravetz (1994), seeking shared solutions in contexts characterized by a high level of uncertainty and multiple

interests at stake requires time and space for extended communities of peers to face with the complexity of the world.

The 2020 and 2021 editions of the Officine, organized in collaboration with the UNESCO initiative Futures of education and the European projects INCLUDE, OLA and GSO4SCHOOL, proposed a wide reflection on the futures of education, including themes that have gradually emerged as a priority during the pandemic emergency, at both national and European level (such as the distance learning and digitalization in education, the need to rethink teaching methodologies, social inclusion and exclusion, learning spaces and timing, reflecting on new roles of the actors involved in the educational process). The working groups, organized in virtual mode, reflected on the role of education in times of uncertainty, to imagine, in the short and long term, a more inclusive education (OECD, 2021; UNESCO, 2020). The topics debated were identified starting from the conceptual frameworks promoted by UNESCO, the European Community and the OECD, vis a vis the ongoing debate within the educational community: which concept of citizenship (local, European and global), and of Europe, to promote environmental, social and economic sustainability? what opportunities can be identified in the integration of art and science to build future scenarios of scientific citizenship? and which ones in educational innovations such as Content and Language Integrated Learning (CLIL) and Open Educational Resources (OER)? how to promote awareness of stereotypes and implicit conceptions conveyed by textbooks and other educational resources, to fight discriminations and misinformation? what is the possible and desirable relationship between knowledge, disciplinary skills and transversal competences in a competence-based learning?

The results of the work tables (which were acknowledged by the UNESCO International Committee), the video recordings and the documentation that feeded the co-creation of knowledge can be consulted on the website Officine Educazione Futuri.

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THE "OFFICINE EDUCAZIONE FUTURI" OF THE NATIONAL RESEARCH COUNCIL OF ITALY

In increasingly complex and interconnected social contexts, in which the boundaries between real and virtual, formal and informal learning are constantly changing, new physical and digital educational environments emerge. In these contexts, education faces to new pedagogical (Giancola and Piromalli, 2020) and ethical questions (Van Dijk, 2018) that entail an increasing need of: debate, co-creation and sharing of practices among the various actors involved; places where the educational community finds the space needed to reflect and imagine desired and desirable futures.

As highlighted by UNESCO in the framework of the Futures of Education initiative (UNESCO, 2021-a), education is the heart of every possible transformation and of every innovative scientific and social path (Valente and Mayer, 2018), being the place where knowledge is built and transmitted, where we connect to others and to the world and where we are exposed to new possibilities. At the same time, as shown by case studies centered on educational programs in situations of marginalization (Valente and Caravita, 2021), it is the place where individuals have the opportunity to acquire the tools to live a dignified and meaningful life and citizens shape their future as a community. Reflecting on the futures of education inevitably means to face to a variety of imaginable futures. In recent decades we have observed a progressive increase in the need for exchange between School and Society on multiple aspects: rapid development of knowledge and use of technologies; the processes of marginalization and social exclusion; gender and environmental issues; complexity of global economic and political systems; access to working life. The point is therefore to redefine the role we wish to attribute to education and become aware of the transformations it must undergo in order to fulfill it.

Starting from these reflections, the Officine were born in 2016. They are annual events organized by the research group "Social studies of science, education, communication" (COMESE) of the Institute for Research on Population and Social Policies (IRPPS) of the National Research Council of

Italy (CNR) in collaboration with the Ministry of Education (Pennacchiotti, Tudisca, Valente 2019).

How to reconstruct the relationship between school, society, educational community and world of work? What competences are central to full individual, civil, and social inclusion development? What is the specific weight of knowledge and skills in the educational process, and how to rethink the role of students and teachers? Is it possible to activate participatory processes for revising the official curriculum starting from those implemented in schools (Valente et al. 2018). How to promote an inclusive education free from stereotypes and misconceptions? What educational opportunities can be conveyed by the digital transformation of the school, and which teaching methodologies to adopt? What are the implications for the progressive digitalisation process of education, and what is the possible role played by Open Educational Resources (including Open Platforms) in preserving education as a common good, capable of promoting the values of social equality and inclusion (Van Dijck, 2018). These are some of the questions that have been guiding the reflection of the Officine community since 2016.

In continuity with the approach of Responsible Research and Innovation (European Commission, 2018; Valente, 2018) and considering learning and education as key factors for the individual and collective future, Officine are developed around a participatory approach. This perspective is applied to all specific issues addressed in the different editions: the collective management of innovation (Von Schomberg, 2011; European Commission, 2021), realized through the involvement of actors from relevant sectors – including school, research, business and civil society (Stilgoe, Owen and Macnaghten, 2013) – allows to make decisions that are shared and inclusive of all legitimate perspectives as much as possible.

Therefore Officine represent a co-working space, an open innovation environment in which the various actors collaborate in the development of proposals and ideas, acting as "well-informed" citizen, able to make informed choices relating to their own individual and social sphere (Jasanoff, 2011; Valente, 2018); without a predefined authority that imposes ideas before everyone has had the opportunity to explain and share their knowledge, experiences and points of view (Mayer and Valente, 2009). This makes it possible to intercept three principles: 1) the activation of an inclusive dialogic process among all the societal actors involved; 2) the alignment of research processes and its products to the needs, values and expectations of society;

3) the co-creation of innovation and research results from which everyone benefits.

During the various editions, participatory methodologies have been tested that provide an alternation of: individual reflection activities, stimulated through the sharing of in-depth materials and tools in the weeks before and after the Officine; multidisciplinary groups discussions (work tables of 6/12 participants) and plenary sessions (Pennacchiotti, Tudisca, Valente, 2020). This sequence is designed to encourage not only sharing experiences, practices and results produced, but a real process of co-creation of knowledge to foster the emergence of urgent issues.

The work tables are the place in which to reconcile experiences and points of view resulting from different initiatives and different societal actors. In the editions carried out in presence (2016-2019) it was decided to use the approach of the World Cafés (Brown, 2002) because of its orientation to "bring out the emerging elements of a project, a problem, an experience" (Mayer, 2013)[1]. In the editions organized in virtual mode (2020-2021) the focus group was instead adopted. In both cases, hybridizations with the Metaplan methodology, which allows tacit knowledge to emerge, were introduced. This innovation made it possible to stimulate conversations not just aiming to obtain consensus but to share different points of view and to generate mutual learning processes, in which the each one's contribution and the confluence of different perspectives are essential. The Metaplan technique (Valente, 2009), on the other hand, thanks to the alternation of individual reflection and the collective debate, allowed to stimulate and strengthen the creative process while making each participant aware of their contribution to the process of co-creation of knowledge. Every step was designed in order to give participants the opportunity to share their experiences, make explicit and share their tacit knowledge (Mayer and Valente, 2009), not losing sight of the final objective of the discussion. The collective knowledge and recommendations produced by the working groups are collected in the final reports, published on the Officine website and sent to all members of the community of practice.

[1] Both the Word Café and the Focus Group methodologies provide informal conversations on topics and issues that are relevant for the participants and are not aimed at achieving consensus, but producing mutual learning. However the Word Café has a more informal approach and promotes relationships among participants. The intimate and welcoming setting of a cafe is recreated, the tables are arranged freely in a room and are equipped with materials for annotating, drawing, writing.

Due to the pandemic and the social distancing, the Officine (2020, 2021) have undergone inevitable changes. The tables took place completely online and new modalities were explored, while leaving the guiding principles unchanged. If on the one hand we had to renounce to the interaction in presence, on the other hand the streaming and the creation of a dedicated web platform allowed an enlargement of the network and the experimentation of new methods and channels, with the opportunity to extend the community beyond the territorial boundaries.

OFFICINE EDUCAZIONE FUTURI - THE 2020 AND 2021 EDITIONS

Great social crises, such as the Covid-19 pandemic, represent breaking points of the status quo and push the different systems that coexist in society towards new forms of balance (Von Bertalanffy, 1968; Morin, 1993). Two years of pandemic emergency, with the unplanned and painful experimentation of distance learning, not only exposed the school community to enormous difficulties and challenges, but generated, inside and outside the school, in the public and political debate, the urgency to promote a reflection on the role of education at an individual and collective level and on possible imaginable futures.

The reflection carried out by the Officine community, in continuous interaction with the reference social context, has therefore broadened the temporal perspective by turning a more decisive gaze to the future. In fact, since 2020, the Officina, in a completely virtual version, have been connected to the UNESCO initiative Futures of Education. Perspectives on the aims of education and on competences were shared, starting from the dimensions of uncertainty linked both to the fragility, complexity and interconnection of every element of our planet, and to the context of "post-normal science", characterized by uncertainties, values under discussion, high interests at stake and urgent decisions to be taken (Funtowicz and Ravetz, 1994; Tudisca, Pennacchiotti, Valente, 2021).

In the last two editions (2020-2021), the reflection on the future of education was developed around five topics: education in times of uncertainty; Europeanness; competences, multimodality and citizenship; art, science and scientific citizenship; stereotypes in educational resources. These topics were placed in connection to an educational space based on quality, competences, global citizenship, inclusiveness and to the role that the feeling of a common European belonging can play in building the desired futures.

The multi-year perspective allowed the reflection to progress longitudinally, crossing the different phases of the pandemic experience,

relaunching the ideas that emerged from the work tables (2020) one year later, in radically changed contexts (2021).

If the structure of the Officine was adapted to the new virtual implementation modalities imposed by the pandemic throught the introduction of virtual work tables, the methodological perspective remained unchanged, aimed at fostering co-creation of knowledge, emergence of urgent issues and sharing experiences, practices and results producedwork table.

The Metaplan technique (Valente, 2009) was revisited and adapted to the shorter times given by the virtual context. In particular, the phase of individual reflection was brought forward to the weeks preceding the Officine, during which, in addition to the usual stimulus and in-depth materials, also the questions and points of reflection that would then be proposed during the work table were shared, with the aim of eliciting tacit knowledge before the interaction between the participants (Mayer and Valente, 2009).

During the work tables, managed through a virtual platform and publicly broadcast in streaming, the participants were then invited to share their experiences and reflections, systematized, during the discussion, with the help of dedicated maps and software.

A particular space was reserved for the requests and proposals of students. Furthermore, in the framework of the Officina Educazione Futuri 2021, the student community was involved more extensively also through a survey, promoted by the CNR – IRPPS and the MI and addressed to the Provincial Student Councils of Italian secondary schools. The survey was aimed at detecting, through a questionnaire, their points of view and attitudes on competences, didactics and the futures of education, vis a vis with the their perceptions of Europeanness and of the future of Europe.

The results of the work tables were merged into reports, now available on the Officine Educazione Futuri website, which have been acknowledged by UNESCO's Futures of Education initiative (UNESCO, 2021-b) and shared with the European projects "INtegrated Content and Language via a Unified Digital Environment"- INCLUDE, "Leverage students participation and engagement in science through art practices" - GSO4SCHOOL And "Open Learning for All-enhancing digital Open Educational Resources for inclusion against stereotypes" – OLA, all funded by the Erasmus Plus Program.

The following pages present the results that emerged from the work tables carried out in the context of the 2020 and 2021 editions of the Officine Educazione Futuri.

THE WORK TABLES OF THE OFFICINE EDUCAZIONE FUTURI 2020 – 2021

The work tables are organized around five topics:

TOPIC 1 – EDUCATION IN TIMES OF UNCERTAINTY: the topic was addressed by three work tables. The first two ones collected the voices, impressions and reflections of the scientific community and of the students of the Provincial Student Council of Rome in 2020, right after the beginning of the pandemic and of the distance learning. In this case, the debate focused on long-term perspectives, concerns and visions of education, with reference to phases of crisis, uncertainty and emergency. One year later, the emerged inputs and reflections were re-proposed to the students of the Provincial Student Council of Rome to resume their reflection in the light of the changes that have taken place and to collect concrete proposals.

TOPIC 2 – EUROPEANNESS: in this case we enhanced a reflection on what being European means today; on the conceptions and visions of Europe and on the opportunities to rethink it, starting from points of view outside the European context: those of the students from the International Studentate of Rondine, where young people from warring countries agree to live with each other. The table, held in 2021, was conceived starting from the European project INCLUDE.

TOPIC 3 – COMPETENCE, MULTIMODALITY AND CITIZENSHIP: the issues addressed during the two round tables held in this area were focused on the didactic innovation as a mean for promoting citizenship. The round table entitled "Citizenship, competences and CLIL", held in 2020, focused on the role that education and learning can play in promoting: knowledge and competences related to European and Global citizenship; individual and

collective awareness of the interconnections between local, European and global realities; personal self-realization.

During the table "Competences and multimodality in open educational resources", in 2021, the discussion promoted a reflection on the possible and desirable relationship, in a competence-based approach, between knowledge, disciplinary and transversal competences, and on the potential of the multimodality of Open Educational Resources for an increasingly inclusive school.

TOPIC 4 – ART, SCIENCE AND SCIENTIFIC CITIZENSHIP: this work table was focused on the opportunities conveyed by the integration of art and science (STEAM approach) to build futures of scientific citizenship. The informed exercise of citizenship rights is a fundamental prerequisite for the realization of a substantial democracy, in a context – the "knowledge society" – in which knowledge is the prime mover of the social, economic and cultural dynamics, in which technology development is faster and faster, and more and more often we are all called to take part in decision-making processes that include strong technical-scientific components. The work table, held in 2020, was conceived starting from the European project GSO4SCHOOL.

TOPIC 5 – STEREOTYPES IN EDUCATIONAL RESOURCES: the table addressing this topic promoted a reflection on stereotypes and implicit conceptions conveyed through school textbooks and the opportunities offered by Open Educational Resources to avoid discrimination, inequality and mis-information. The work table, held in 2021, was conceived starting from the European OLA project.

MAIN FINDINGS

The main findings emerged from the Officina Educazione Futuri suggest some possible trajectories to re-imagine the futures of education for a more inclusive and sustainable society in which education and knowledge go back to being central again.

Schools are called upon to play a key role in **tackling inequalities in educational opportunities**. On the one hand it is urgent to claim the role of education in the **democratic dynamic**, pursuing peace and equity: a lack of **equity** in education means a lack of equity into society (Caravita, Pennacchiotti, 2020; UNESCO, 2020). On the other, the pandemic revealed the existing gap among territories and made it clear how much this affects education and learning. In this dynamic, education rises as a **Global Common Good**, a **right of all people**, that must be guaranteed through a school system that is more capable of re-shaping itself according to the changing needs, more permeable to the world and able to overcome the classroom paradigm, no longer considered as the only physical and social space for learning.

The different educational contexts – schools, families, research centers, universities, local actors – should be considered as a whole, enhancing a balanced dialogue between all components. They can represent a training ground for student civic engagement, enhancing a critical approach to reality and information, helping students (and, through them, the whole society) to recognize and overcome stereotyped and oversimplified ways of thinking.

To get used, to and to get learners used to, face compexity and uncertainty through a process of co-creation of knowledge that involves societal actors has became essential. Along this process, simplifications, fear of facing errors, distrust in learners' abilities should be let behind.

Another aspect considered as a turning point by the Officine community is the ***relational dimension***, meant, in a broad sense, **among teachers, between students and educational community, between school and territory**.

The **relationship between students and educational communities** should acknowledge the centrality of the students in the educational process, giving all interested actors the opportunity to work together in an open and democratic space.

Besides, the **relationship among teachers** is intended as the place in which experiences and knowledge can be shared, overcoming the loneliness that risks to affect teachers. Nevertheless, it requires a predisposition to mutual listening, a de-bureaucratization of the opportunities for interaction and the enhancement of networks inside and outside the school.

At the same time, the relationship among teachers entails a relationship among disciplines, a tension towards transdisciplinarity not aimed at overcoming disciplines but at breaking down the boundaries among them. The disciplinary fragmentation of knowledge prevents us from grasping the "texture" of complexity (Morin, 1993), making it difficult to perceive the link between the parts and the whole. School cannot leave the progressive identification of the existing links between different fields of knowledge to the student personal experience or to the media. Otherwise, school should promote a full awareness of the deepen unity of knowledge and promote the ability to grasp global and specific problems. At the same time, transdisciplinarity does not mean to give up disciplinary insights, for example by promoting co-presence and co-planning among teachers of different disciplines. Indeed, despite simplicistic visions, there is a synergistic, complex relationship between the tension towards transdisciplinarity and the need for a deepen disciplinary knowledge.

Finally, the **relationship between teachers and students** is the place in which individual specificities should be recognised and aknowledged, also in terms of learning times, rhythms and spaces. Starting from listening to and respecting the individuality of each student, the teacher is called to arouse his/her curiosity, pleasure in knowledge and profound learning, generated through authentic questions. Starting from the student needs, teachers are also called upon to identify possible teaching strategies, taking in mind that learning should not aim at achieving common goals, but giving everyone the opportunity to make substantial progresses. In a context characterized by multiple individual and collective variables, teachers can be supported by methodologies as Project based learning, Debate, Making Learning and Thinking Visible, *the integration of textbooks and open educational resources,*

Alternating training as places of meaningful learning in real contexts, the global citizenship education programs, STEAM and CLIL approaches, education in affectivity and being together with others, in empathy, should also be valued.

The centrality of the student in the educational process introduces another point: how should **times** and **spaces** be considered at school? Taking into consideration the different individualities requires a flexible and non-standard time management. The contraction or expansion of the time dedicated to individual activities should be enhanced on the basis of the students needs and their rhythms in learning, which are by their very nature elastic and differentiated. By this way, education regains the value of slowness and listening, of "staying with questions", which can foster the growth of the positive identity of individuals and groups. This perspective, however, poses constraints, and among them the need for smaller classes, which allow each teacher, possibly assisted by a tutor, to listen, know and follow each student in the best possible way. In this direction it would be appropriate to rethink not only the redefinition of the numerical relationship between teachers and students and the vision of the class as a dynamic and not static element, but also the duration of secondary school courses.

Coming to the issue of **spaces**, attention inevitably shifts to the role acquired by digital educational environments, into the teaching daily life, mostly during the pandemic. Digital environements can hardly represent a valid alternative to face-to-face teaching and replace phisical spaces, where students experience a direct contact with phenomena into a real setting and develop embodied and emotional knowledge, central to the cognitive and skills development. However, it can represent a new environment for a quality, inclusive and equitable education, where networks of teachers (and students) develop cooperative practices involving the world of research and other societal actors. An example is the collective creation of Open Educational Resources promoted by teachers and school communities characterized by Creative Commons licenses that allow their free reuse, modification and redistribution, and that can be combined with traditional school textbooks. These innovations, which can be activated in the educational community, should however be systematized and developed at institutional level, to guarantee their quality, accessibility and a wide dissemination. Furthermore, digital learning, reaching at the same time subjects surrounded by various environments and coming from different family backgrounds, should develop

new and differentiated approaches, instead of reproducing the same one adopted in presence. For example, it should strengthen a personalized approach and integrate already existing and new educational resources. To this end, it is crucial to enhance the critical use of technologies and analysis of information - digital literacy - by promoting the digital and scientific citizenship.

The need for a global rethinking of educational **spaces** is also placed in the relationship between the school and the territory. The increasing openness of the school to the territory rappresents a turning point which should be further encouraged (also including a transnational dimention) in light of the urgencies that have arisen with the digital or blended learning: the educational space expands, leaves the classroom and opens up to places of culture and knowledge, environmental and social commitment during and beyond school time. The experience of the pandemic has shown us how important is to go beyond the classroom paradigm and formally include new external spaces among the educational spaces, involving the inhabiting communities in an innovative dialogue. At the same time, once the regulatory barriers have been removed, the school itself must become a public environment open to the territory and to their communities.

Thus, it becomes possible to promote students consciousness of their individual and social role, within the class and in the human society, so that they became a reflexive and responsible part of the educational process. Experiences in which students took part in the definition and implementation of school curricula have already shown the centrality of motivation, responsibility and pleasure of learning (Tudisca, Pennacchiotti, Valente, 2021-a; Tudisca, Pennacchiotti, Valente, 2021-b). Last but not least, experiences aimed at involving students in the evaluation and self-evaluation processes make it possible to consider evaluation not as an obstacle to overcome but as a moment of reflection and personal growth (Pennacchiotti *et al.* 2021).

Below we present the final reports (integral version) of the various work tables, organized by topic.

EDUCATION IN TIMES OF UNCERTAINTY

STUDENT WORK TABLE – EDUCATION IN TIMES OF UNCERTAINITY

Provincial student council of Rome
April 28, 2020

Coordinating: Adriana Valente (CNR-IRPPS). Took part in the work table: from CNR-IRPPS Valentina Tudisca, Claudia Pennacchiotti and from USR Lazio Alessia Vagliviello.

Participants:
Students from the Consulta Provinciale degli studenti di Roma Jacopo Augenti, Matteo Baldassari, Daniele Conti, Tommaso Esposito, Gabriele Francesconi, Flavia Lepizzera, Gabriele Manzo, Benedetta Gaia Meloni, Maria Monina, Silvia Pagliarulo, Giovanni Sicca, Daniele Svolacchia, Leonardo Soffientini, Erica Tomassetti

INTRODUCTION

The results follow of the work of the online panel discussion of the Provincial Student Council of Rome on the theme "Education in times of uncertainty". The discussion was held on April 28, 2020 as part of the "Officina Educazione Futuri 2020 (Education and Futures)", organized by the Institute for Research on Population and Social Policies, "Social Studies of Science, Education, Communication", of the National Research Council of Italy in collaboration with the Ministry of Education and the UNESCO initiative "Futures of Education".

The discussion focused on the principles which should inspire educational strategy, and on the objectives and methods of the learning action.

Among the proposals arisen there are: the adoption of multiple teaching methods, the personalization of courses, the opposition to early specialization, the prsuit of equity and the enhancement of the learning process.

The emergence of opposing visions among participants was also of great interest, in particular with reference to citizenship competences, to the concept of "progress" and the role of politics in the school system. Many

different opinions also contributed to the debate on competences, particularly as regards technology and school assessment and evaluation.

The school was also examined with reference to the functions of space and time.

VISIONS AND PROPOSALS

Imagining the education of the future, a first consideration is that rather than on the optimal didactic approach, we should be talking about a variety of didactics. This means structuring a greater range of teaching methods and adopting **multiple didactics**, which would help take into account students' different learning means[1].

The didactic approach must be identified and **personalized** because everyone learns differently. In this perspective, the issue of overcrowded classes – so-called "classi pollaio" (chicken-coop-classes) – should be overcome. Organization into smaller classes would improve the relationship between students and teachers and would enable the teacher to pay more attention to the needs of each individual student.

Education action must be able to grasp new interests and needs, and it should be able to make everyone achieve what they want and dream of doing. It should be an incentive and not an enemy. There should be no **early specialization**, nor a distinction between high school (liceo) and technical school courses, at least in the first two years of upper secondary education. The enhancement of experience could also play an important role, limiting the mere use of a predefined educational offer.

The school must also evolve for reasons of equity, in order to build **a fairer and more just society**. Today, the school is perceived as a place where the social divide is widening and which is not able to help the student to overcome social and cultural barriers. Traditional teaching (rigid times and spaces, standardized education) leaves those who come from disadvantaged backgrounds behind. Technology alone is not enough. On the contrary, this period of crisis and the consequent adoption of distance learning have led to inequalities among young people living in small spaces and with fewer resources. Distance learning can however be a source of opportunity, as will be seen below. Meritocracy too often translates into selection based on the

[1] Taking into account the different cognitive styles of the students, the teacher proposes differentiated methodologies and teaching resources in view of the same learning objective.

context of origin. Instead, the right to study is much more than just the right to enter school.

Education should **focus on the learning process and not on performance**. We should not expect everyone to arrive at the same point, but we should focus on the individual process. For the future, we hope to use integrated teaching methods that respect the different styles and learning times of individuals, giving everyone the opportunity to learn.

CONTROVERSIAL THEMES: CITIZENSHIP, PROGRESS, POLITICS

Two parallel meanings of "citizenship education" emerge. Harmonizing them is a great challenge for the school.

A first interpretation refers to the fact that everyone lives in a society and must contribute to social well-being. The school should contribute to forming the competences that society and the productive world require. Resilience and adaptability are examples of pivotal features in this approach, together with those of interest for the productive world. The goal is to educate individuals who know how to live consciously and integrate into society. The lack of enhancement of each individual's particular characteristics generates insecurity and difficulty in imagining own place in society.

A second interpretation, linked to criticism of the role of technoscience in society, denounces a vision of school as a training field in which we focus on what is useful for society and not on what is important for the person. The school must, above all, help the individual to form a critical conscience and not merely follow the needs of the market. It must be an institution that welcomes and promotes the change of society by renewing itself, promoting cultural, spiritual and political development. The goal must be to educate individuals who operate in a transformative way.

Likewise, we need to discuss – and where possible harmonize - the ideas of **progress** that we desire. This may mean "to make better machines" – closely linked to technological innovation as the driving force of changes for the benefit of all society – or "better people" – people who build an inclusive society, who have ideas and are also ready to change those ideas.

According to some students, **politics** at school is also fundamental as a vision of the future, a vision of the future society to be built, and should not be demonized. Politics should become a proper subject of study, also based on action, and capable of creating a bridge between school life and future life.

According to other students, teaching politics may make sense from the point of view of deepening **geopolitical issues**, but a real political education is difficult, because it would require a teacher capable of forming a critical conscience in the students, to help them to analyze critically also what he is teaching.

However, there was general agreement on the vision of politics linked to action, as a possibility of "contributing together".

Competences

In the future there will likely be a need for **competences** other than those required today. It is necessary to stimulate the construction of **competences connected to practice** and yet we must avoid sacrificing cultural competences in favor of those that are considered more useful in terms of job opportunities. The school should reward **learning and reasoning competences** and not simply the acquisition of notions. In order to live in a community with respect for the other and the identity of the other, **education about emotions and affectivity and sexual education** is fundamental, which in many cases still constitute two taboo areas.

Among the main **transversal competences**, problem solving, ability to work together, critical thinking and critical spirit should be enhanced. The school should also encourage the expression of opinions and promote exchange of ideas and debate.

The recommendations contained in international documents, including the Recommendation of the Council of Europe on key competences of 2018, should also be effectively applied in educational paths.

Technological and scientific competences should also be enhanced. Many digital natives are actually digitally illiterate. They use social networks, but they do not know how to use technologies in a broad and competent way.

This is also because **technology** has 2 facets: a positive one, which helps us to grasp the changes; and a negative one, which brings with it alienation and isolation. For this reason, the use of technology represents a risk, especially among the very young.

In this respect, in addition to traditional subjects, there should also be learning oriented to how we relate to technology. To make the best use of technology, it is necessary to bring about discussion at local, national and international levels, comparing the different uses of technology and its effects,

also considering the basic differences between countries. As we have seen during Covid lockdown period, distance learning can accentuate inequalities, which makes it necessary to think about a variety of alternative ways of teaching. For the future, in secondary schools, it could be useful to integrate teaching with online platforms that have been used during the lockdown phase. In this way it would be possible to do more tailored schoolwork, enhancing the relationship between student and teacher. For example, many teachers are taking advantage of distance learning in order to offer more individual exchanges with students and promote broader spaces for communication. In this way it is possible to support the student's choice to debate and go into greater depth with the teacher.

SCHOOL AS SPACE AND TIME

Students must have the opportunity to use the school to meet and engage with their peers. This vision of politics acts as a connection point between **teaching and spaces**. In promoting group didactics, there should also be a rethinking of school environments and learning locations. Individual, group, class and community should all find own space and not be opposed to one another. One issue that has arisen in the debate is whether the school will exist as a physical location in the future or whether it will no longer exist. This reflection has a social value and impacts on personal fulfillment because school is not only the place where knowledge is learned, but also the place where the individual lives in a community and integrate into it.

Also regarding this aspect, it is necessary to identify the good practices implemented in own as in other countries. For example, it is necessary to know and compare different realities where the **school is open** all day, as a place for physical encounter and extended exchange and debate, an indispensable space in the life of a community.

In order to experience the school as a place of aggregation and not only of study, it is also important to give greater importance to **sport**, which would also help to stimulate greater cohesion and a sense of belonging to the school.

In our discussion, **time** was analyzed as a dimension of the educational process and as a dimension perceived by the student. With respect to the former point, the need emerged to respect learning times (reassessment of slowness), relative to a society that is accelerating and requires the individual to acquire early professional competences. According to the students, there

is a conflict between this request and the time it takes for the individual to form own individuality and own cultural background. As regards the perception of the student, the need has emerged also to teach students that learning demands time to settle and reflect, and acquire critical knowledge. We should learn to **stay with the questions**, to keep them with us in order to be able to go into depth over time.

EVALUATION

With respect to the practice of **evaluation**, we can emphasize the constructive exchange it brings with itself, that is reciprocal improvement, and on the other hand the fact that evaluation is frequently perceived as competition and therefore leads to rivalry between students.

Evaluation should be a factor that contributes to everyone's growth, a positive lever, an incentive and not a weapon, nor a simple tool to "respect the rules". If the school is to enable learning to learn, evaluation cannot be punitive. If the student studies just to get a passing grade or to obtain a good mark, but not to learn the subject or to increase own interest in studying, then the educational system has failed.

We should focus not so much on being better than the other, but on bettering ourselves with the help of the other. In the verses of Hesiod: "so the one who works with less haste can reach who works swiftly".

It is above all necessary to change the perception of the grade. It should not be a value for either teachers or learners, nor should it be considered as an overall judgment on the person. Evaluation should be functional to learning and not the contrary, otherwise the risk is that rather than developing the necessary competences or knowledge, students merely develop techniques to obtain good marks.

WORK TABLE OF THE SCIENTIFIC AND EDUCATIONAL COMMUNITY – EDUCATION IN TIME OF UNCERTAINTY

May 5, 2020

Coordinating: Adriana Valente (CNR-IRPPS). Took part in the work table: Valentina Tudisca e Claudia Pennacchiotti (CNR-IRPPS)

Participants:
Clementina Cantillo, Tommaso Castellani, Elena Gaudio, Annamaria Greco, Rita Locatelli, Filomena Maggino, Ada Maurizio, Michela Mayer, Maria Chiara Pettenati, Giovanni Sicca, Andrea Vargiu

INTRODUCTION

The reflections which follow in this report are the outcome of the online panel discussion on the theme of "Education in times of uncertainty", which involved members of the Italian scientific and educational community. The online panel discussion took place on 5 May 2020 within the context of the initiative "Officina Educazione Futuri" 2020 organized by the Institute for Research on Population and Social Policies, "Social Studies of Science, Education, Communication", of the National Research Council of Italy in collaboration with the Ministry of Education and the UNESCO initiative "Futures of Education".

Based on the scholastic, teaching, scientific, planning and institutional experiences of the participants, the discussion set out to activate a reflection on the future(s), exploring the aims of education, considering the changes related to the dimensions of uncertainty and awareness of fragility, complexity and interconnection of every element of our planet. Concepts such as slowness, time, equity, democracy and peace emerged from the debate. We focused on the relationship between school and local territory, on the role of communities and on the need for a balanced dialogue between the various components. The collective reflection also focused on the relationship between knowledge and competences, crucial for personal development and work achievement in times of uncertainty, and related educational practices.

Finally, reference was made to the topics of teacher training and evaluation, which are necessarily involved in a reflection on the futures of education.

RETHINKING EDUCATION REFLECTING ON THE FUTURE

Reflecting on the future in our present time creates an awareness of coming to terms with uncertainty and complexity. This awareness has already been prefigured by central figures in educational debate since the last century, as well as being present in much philosophical reflection. Uncertainty is not only a feature of thinking directed towards the future, whose unpredictability was revealed in the last century, but also the result of a disposition towards reflection. It is the reflection itself that causes uncertainty[2].

Facing uncertainty makes us aware of the need to make decisions not having all the relevant information available. The awareness of our ignorance, already indicated by Jonas as a possible factor of strength, must contribute to the transformation of educational contexts. Proceeding by trial and error, prepared to turn back, and therefore accepting the plurality and variability of possible solutions, should not be considered a sign of weakness, but of wisdom. Vulnerability and fragility must not be seen as impediments, but as opportunities for listening, reflecting and configurating the multiple declinations of educational success. Reconsidering positively concepts such as **time, listening, coziness, slowness**[3], even **error**, must fully enter into educational practices.

In particular, the reference to slowness is a suggestion to placing side by side the dominant model, established in recent decades, of New Public Management, with the non-efficientism approach, which rather focuses on the effectiveness of the system in giving answers.

The complexity of reality is a richness and must be seen as an opportunity. Education must help everyone to experience this complexity and **build oneself in terms of complexity**. Excessively early specialization in the

[2] Morin, in *I sette saperi necessari all'educazione del futuro* (2001), Raffaello Cortina, refers to the motto of Pericles in "History of the Peloponnesian War" by Thucydides, who however attributes this connection between reflection and indecision only to enemies.

[3] With reference to the "slowness of learning in the human life cycle", see vCIES Futures of Education Keynote Panel del 24 March 2020, and in particular the reflections of Arjun Appadurai and Karen Mundy.
https://en.unesco.org/futuresofeducation/news/vcies-keynote-panel-discussion-futures-education.

development of a person inevitably leads to a weakening of the person and of own role in society. Not only is this rigid position in experiencing complexity found in individuals, but also in society as a whole. The difficulty of maintaining a global vision weakens social systems. Complexity, however, is not to be taught. On the contrary, we can learn to experience complexity. Complexity is also a precise orientation of thought, not randomly developed in the contemporary world, which has been transferred from the scientific context to the philosophical and cultural one[4].

To conceive the ways of building oneself in terms of complexity, with reference to all levels and to all the actors of the educational issue, the concept of **imagin-action** can help, which recalls the importance of configuring the image of the future to create the action. Acting to change the course of the future, if the scenarios require us to change course, is based on a series of knowledges of the present/past, memory and cultural heritage, but also of competences under construction to be enhanced. The recovery of ourselves must be based on ethical-spiritual, aesthetic, social and moral aspirations. Imagination must be conjugated with "invenio", creativity and project ability.

It is necessary to reiterate the essential role of thought in its work of rational critical understanding of reality, where rationality does not exclude affectivity and thought does not exclude action. The exercise of **critical and transformative thinking** is central not only in the light of the processes that have demarcated the present but also in view of the configuration of future scenarios. This is crucial in moments of crisis, in which the usual, reassuring vision of the world fractures and a break between before and after is introduced.

EDUCATION, EQUITY AND DEMOCRACY

It is urgent to claim to the role of education in **democratic dynamics**, in the pursuit of peace and in the drive for equity. The very purpose of education needs to be oriented towards creating a sound and peaceful world. We are also convinced that if educational equity is lacking, all other equity is

[4] The term "complexity" was defined in the second half of the twentieth century in the scientific field following the revolutions that took place in this area and resulted in the theorizations of Ilya Prigogine, Humberto Maturana and James Lovelock. On the epistemological side, it found theoretical and philosophical expression in Edgar Morin's reflections, in opposition to the Cartesian conception of the method of knowledge, recognized insufficient in the face of awareness of the complexity and internal dynamism of reality in its various forms.

lacking. Unfortunately, education systems are not always capable of constituting a bulwark against inequalities, which continue to exist at the level of countries, areas, courses of study, gender and socio-economic status. Instead, it is necessary to contrast ghetto policies and implement targeted actions in favor of the most vulnerable categories, as well as to strengthen the principles and instruments of democratic discussion as a more effective form of conflict resolution and peace promotion, through dialogue and shared action. At present, on the other hand, the contribution of education to the construction of democratic systems is not sufficiently emphasized. A case in point is that the education system appears in none of the 60 criteria used by The Economist in establishing nations' state of democracy and thus does not contribute to the publication's Democracy Index[5].

GLOBAL COMMON GOOD AND GLOBAL PERCEPTION: THE ROLE OF COMMUNITIES

The consideration of education as a global common good (UNESCO 2020b), in emphasizing the intrinsically shared essence of some goods and therefore the need for a participatory process for their fruition, reaffirms the nature of education as a social as well as an individual process, which requires involvement of all society.

We can consider as very topical Morin's reflection on the fact that the lack of **global perception** brings with it a lack of responsibility – by preventing to gain a complete culture of responsibility - and a lack of solidarity – by inhibiting more links, connections with others. This must lead to an enhancement of the **public dimension** of education. Public dimension also means knowing how to act together collectively, responsibly. In the transition from individual to person, collective action is based on the concepts of responsibility and freedom, both intimately connected to the relationship with – and respect of – alterity, whether we refer to another person, or to another environment or another culture[6].

[5] Among the criteria of The Economist democracy Index we can find a reference to the "engagement" of citizens and also one to "adult literacy", but no reference to the level of equity guaranteed by the educational system.

[6] There are similar considerations in the Instrumentum laboris of the Global Compact on Education, promoted by Pope Francis in 2020, which also refers to a risk of the "globalization of indifference".

As a place for the production of sense and understanding of the world through relationships governed by principles of solidarity and reciprocity, **communities** must be able to participate within a perspective of responsibility in the educational process. The activities of the education systems – schools, families, research centers, universities and local actors – should be thought of as a whole. The education of the future should keep these different components of the system together, in a global vision. Equal dialogue between these components should be enhanced, in which each one, including the school and the university, is able to listen to the others and to engage with each other in a non-top-down manner as regards experiences, opportunities and proposals, without prejudice to the specific skills of each. Among the tools to pursue this objective, there should be enhancement of the actions for the community and the environment, in part experimented since the establishment of the Agendas 21 for school. These include **service learning, cooperative learning and active and integrated didactics**. These are aimed at learning in working contexts at the service of the community, promoting democratic values, building knowledge as a practice of experience[7] and creating participatory training courses between the various educational systems, respecting diversity. It is essential that within these experiences the students are part of the decision-making process regarding the action to be carried out and with respect to the relative assessment. **Inclusion and cooperation** would therefore not be mere ritual references, but expert practices for social cohesion and to contrast the marginalization of the most vulnerable categories. These and other tools should increasingly be aimed at enhancing the "ethics of care" (Gilligan C. 1993) and the "passion of care of the world" (ENCICLICA LAUDATO SI', Pope Francis, 24 May 2015), in a dialectic between the various educational institutions and those of the local territory.

MULTIPLE EPISTEMOLOGIES AND TRANSDISCIPLINARITY

For an education of the future that truly manages to keep these components together, it is useful to reflect on the ways to convey **multiple epistemologies**, the specific systems of knowledge and operating rules that the various social components contribute to creating around their original

[7] Learning through experience is at the basis of teaching in Dewey, J. (1938). Esperienza e educazione, la Nuova Italia.

functions, and to launch a dialectical tension among them. This is so as to bring into the democratic game of knowledge the different voices expressed by the actors that contribute to the formal, non-formal and informal education of young people and adults, in order to bring about lifelong learning.

A parallel discussion should be made regarding knowledge divided into disciplinary varieties, frequently veritable closed disciplines that Foucault already defined in terms of "social quarantine" (Foucault 1976).

The consideration that the fragmentation of knowledge prevents us from grasping the total texture highlighted already by Morin, should constitute a continuous drive towards the practice of **transdisciplinarity**. The same dialectical tension in the dialogue between disciplines should lead to understanding and **overcoming the epistemological paradigms** (Evelyn Fox Keller 1996) of each disciplinary field and promoting awareness of the profound unity of knowledge. The same etymology of the term University refers to a complex of elements, to a whole, and not to a sum of the single parts.

KNOWLEDGE, SKILLS, VALUES

Although we can take advantage of a rich production of documents at international and European levels, there is still lively debate as to the connection between knowledge, competence, values, skills, attitudes and experience[8] within educational paths and to the ways in which the dichotomy between **studying and doing** may be overcome.

As has been reiterated in education studies, it should also be possible to guarantee *a suspension time* to learners, especially in the school curriculum. It is however difficult in practice to reconcile this time of suspension with the other needs of the educational path. These include the exchange with real life,

[8] In many of its documents, UNESCO refers to the International Standard Classification of Education (ISCED) 2011, in which learning is defined as the "individual acquisition or modification of information, knowledge, understanding, attitudes, values, skills, competencies or behaviors through experience, practice, study or instruction".
At a European level, following international reflections elaborated over the years, competencies have been considered as consisting of knowledge, skills and attitudes (Recommendation of the Council of Europe 2018). In the Italian debate, competences, and particularly transversal competences, inclusive of skills, attitudes and values, are contrasted with knowledge, which traditionally make up a central element of teaching activities. In this document these terms are used with this latter meaning.

with work expectations and with the great social, environmental and ethical issues of our world, of which the interconnection is increasingly clear.

In learning to experience complexity and to build an autonomous point of view within it, so as to be able to open up to transformation, it is necessary to acquire lenses to observe reality within a perspective of complexity. **Transversal competences** are needed, including the set of cognitive and socio-behavioral skills. These are competences based on critical thinking and on the transformative approach both with respect to individual growth, as a citizen and as a person, and to the life of the planet. In order to be competent, knowledge must be interconnected and contextualized.

Linking educational paths to the building of **sustainable futures** is an opportunity to develop transversal skills through interdisciplinary and transdisciplinary approaches.

This entails changing the way of teaching, both in the physical class and at a distance, and making it less transmissive and more participatory.

However, it should be stressed how necessary a solid **knowledge** base is. The construction of the self in terms of complexity operates throughout life and not only during the duration of a school year or a university course, or of a training module. Consequently, this process of construction of the self is the more complete the more it is based on systematic knowledge deepened and chewed (Illich I. 1993), enhancing the process of acquiring and elaborating **disinterested knowledge**.

We can present an example. In order to enter into epidemiological reflection, central to social and environmental discourse, it is necessary to know how to read a simple graph. Moreover, continuing with the specific example, scientific disciplines such as statistics are not intended to give certainties, but to arouse curiosity and interest and to "trigger questions". In order to **trigger questions**, it is necessary to start from knowledge, data and reflections on them.

It is therefore necessary that the school (the Italian one, in particular), while not giving up disciplinary – and interdisciplinary – study, is less encyclopedic, and also uses the tools of the past to give value to the future and to promote further reflection and action, giving value to what is being done.

To integrate transversal knowledge and competences, in particular socio-emotional ones – necessary to consistently experience the values of democracy, equality, equity, inclusion – educational systems, and school in particular, should embrace some key forms of education. In particular, these

should be civic and global citizenship education, sex and affectivity education, and environmental and sustainability education. Sustainability must be understood in its broadest meaning and combined with the exercise of responsibility and creativity, with its influences on research and technological development. Technological competences should also be enhanced to the extent that they lead everyone to be a conscious citizen capable of using own knowledge to participate in individual and social choices increasingly pervaded by technology[9]. Technology that is not mastered can become a hindrance rather than a support for personal and social development. Therefore, among valuable competences, we should consider not only technical and professional ones, but also personal and social competences, such as building a discussion, knowing how to choose what and where to deepen a topic of interest, knowing how to listen to others and constructively intervening, learning to learn and knowing how to translate ideas into actions.

LISTENING AND PARTICIPATION IN TEACHER TRAINING

Every project of change in the educational path invokes the issue of **teacher training**. Hand in hand with teacher training, it is necessary to reconsider the role of teachers. In fact, in some countries such as Italy, the high level of skills and abilities that society expects from teachers contrasts with the role and social attention reserved for them. It is therefore essential to act also at the level of motivation and promote teaching based on the educational enthusiasm of all members of the educational community. It is necessary to rethink the identity of the teacher and the profile of the strategic skills necessary for education in complex contexts.

We should also call into question the universities and institutions that mainly deal with the training of teachers, trainers and tutors. With a view to listening and cooperation between educational and research institutions, it would be advisable to favor the action research model in the training process; this would enable a participatory definition of course aims, based on real needs, contexts and methods of intervention by all those involved also through the in-depth analysis of good practices carried out at various levels in the territory. This would also avoid the situation, sometimes denounced by

[9] Similarly, Jasanoff uses the concept of "knowledgeable citizen": Jasanoff, S. 2012. The politics of public reason, in Rubio, F.D. and Baert, P. (Eds.), The politics of knowledge, Routledge, Oxford, 11-32.

the teachers themselves, in which the courses offered to teachers, while providing knowledge, do not give tools to intervene in the classes and bring about change.

Assessment as learning and collaboration

The willingness to listen and relate to others should also enlighten the **assessment and monitoring** phases of and within educational contexts.

Assessment, both as an evaluation of learning outcomes and as an evaluation of operators, institutes and systems, should acquire a new role, beyond the logic, highlighted by Foucault, *of supervising and punishing*. It should, instead, create an awareness of own strengths and own weaknesses. The 2018 Council of Europe Recommendation on key competences for lifelong learning tells us that evaluation can help structure learning processes, and also facilitate orientation. Evaluation should therefore be considered as a possible resource and self-assessment competences should be developed, also in view of the definition of the specific educational success. To this end, the assessment indicators should not be imposed externally, but elaborated in a co-construction process, giving great importance to self-evaluation and the common definition of objectives and of assessment criteria.

A national education system cannot disregard a qualitative monitoring phase. The monitoring activity at a national level should provide for the contribution of various subjects internal and external to the school administration, in order to favor those equalizing measures necessary to improve the educational offer and avoid early school dropout.

The monitoring activity could also help to put good practices in the system, capitalizing on experiences and avoiding dispersion of resources.

In practice, assessment should also be a **system learning tool**, rather than a means of control and government.

WORK TABLE – RETHINKING EDUCATION IN TIMES OF UNCERTAINITY

April 23 2021[*]

Coordinating:
Alessia Vagliviello (USR Lazio), Valerio Cianci e Clarissa Celli (NINA London Ltd). Took part in the work table: Adriana Valente, Valentina Tudisca e Claudia Pennacchiotti (CNR-IRPPS).

Participants:
Students from the Provincial Students Councils of Roma: Daniele Conti, Gabriele Manzo, Benedetta Gaia Meloni, Maria Monina, Silvia Pagliarulo, Giovanni Sicca

INTRODUCTION

The virtual discussion table of April the 23rd 2021, concerning the matter of "Rethinking education in time of uncertainty" and including the Provincial Student Council of Rome, is conceived within the scope of the initiative "Officina Educazione Futuri 2021". Its implementation was possible thanks to the CNR Institute for Research on Population and Social Policies together with the Ministry of Education as well as with the UNESCO project "Futures of Education". The aforementioned discussion table delves into the aspects which had already emerged, with the very same participants, during the Table Officina 2020 and attempts to outline the characteristics of schools thirty years from now, on the grounds of students' stated needs.

The virtual discussion table resorts to a facilitation process that aims at promoting shared proposals not only by means of the Lego Serious play approach that enables to comprehend "what people assume on different aspects". But also, due to digital boards that visualize the workgroup's elaboration process of ideas and projects in addition to action plans.

[*] *This work table is realized in the framework of the Erasmus plus project INCLUDE*

THE DISCUSSION TABLE'S ITINERARY

The virtual discussion table dwells on the experiences one would never want to face as a student along with the proposition of inclusive and prone-to-change schools that ease the processes of growth and learning/enrichment of each person and citizen.

By embracing aspects such as personalized learning while ruling out those regarding educational inequality and student social isolation, which was experienced with distance learning during the outbreak of COVID-19, it was possible to define desirable school paragons thirty years from now.

Every participant has agreed on the necessity of defining a kind of school open to the territory and that embodies and protects culture and learning. A kind of school that reflects the idea of taking learning outside the classroom, into parks and local realities that become key places of learning. That is why, this idea of school is fully engaged in a constant and open dialogue with the community so that the traditional learning experience, with its regular morning classes, is enriched with other activities such as conventions and debates, real experiences of representation and democracy. Even during the afternoon, this School identifies with a moment of social gathering, learning, support and tutoring between equals, not to mention with a place suitable for concerts and filled with libraries and convention rooms.

It is clear that this idea of school is so much more than the building itself and gains a further out-of-doors feature: it is rethought so to reduce the sitting time in the classroom by becoming eco-friendly and safe. As a matter of fact, this kind of school can be seen as a bridge to inclusion between people of different biography, back ground and culture for it resorts to innovative didactic methods, primarily based on experience. What is more, it is on account of this School that every single student is able to grow in a unique and different way, developing his or her fullest potential. Lastly, it is tackled the matter of equity, in the name of which it is crucial to wide access to learning opportunities and to respect gender differences, everyone's personal resources and the so-called alias careers.

EUROPEANNESS

WORK TABLE – EUROPEANESS FROM OUTSIDE EUROPE

April 21, 2021[*]

Coordinating:
Elisa Butali, Adriana Valente (CNR-IRPPS), Marina Imperato (MI-GOSVI). Took part in the work table Mario Paolucci (Direttore CNR-IRPPS), Noah W. Sobe (UNESCO – Futures of Education Initiative)

Participants:
International students of the World House In Rondine Cittadella della Pace-Phil (Nigeria), Sharizan (Abkhazia), Aleksandre (Georgia), Nour (Palestina), Gunay (Azerbaijan), Sergio (Colombia), Nika (Abkhazia), Juliana (Colombia)

Following lines contain the results of "Europeanness from outside Europe" online discussion table, focused on Europeanness, perceived and discussed by non-European university students, hosted at Rondine associative reality. The virtual table took place on the 21th of April 2021, as part of the "Officine 2021: Futures for Education and Europeanness" initiative, organized by the Institute of research on Population and Social Policies and, in particular, by Social studies on science, education, communication research group of the National Research Council, in collaboration with the Italian Ministry of Education and the UNESCO "Futures of Education" project.

The purpose of the table was to investigate perceptions regarding Europeanness and Europe among non-European university students – who are temporarily living in Europe – in order to enrich the European narrative, considering external perspectives and interactions with what is apparently outside of a narrow definition of Europe, quite often seen as a geographical area.

The discussion debate was based on students' perceptions and perspectives regarding Europe of the past, of the present and of the future as well as their ideas and suggestion in order to rethink a better Europe.

[*] *The work table is realized in the framework of the Erasmus plus project INCLUDE*

From the discussion emerged how students connect Europe to particular key words: Freedom, Diversity, Culture, Greek and Roman Culture, Political Unity, Human Rights, Freedom of speech, Stability, Integration, Opportunities, Realities, Openness, Equity, Awareness, Influence, Power, Colonialism, Heterogeneity, Responsibility, Historical process, Wars, Economic Union, Need of discussion.

During the debate, Diversity was highlighted as a key word that characterizes Europe, where different cultures, realities and traditions coexist, linked to a sense of community, where integration and freedom is maybe possible. At the same time, it has been pointed out how diversity could limit Europe development because of European countries heterogeneity in terms of perspectives regarding goals priority, values, human rights, inclusiveness and challenges, such as migration phenomena. Part of the students believe European countries are too heterogeneous to be a community and could be just an economic union able to affects the rest of the world in terms of work opportunities, influence and exporting culture. Otherwise, part of the students believe that, in order to understand what Europe is and how it could be better, Europeans need to discuss about common challenges, shared values and common past from a more aware perspective: putting on the table mistakes, responsibilities and wrongs suffered. In this line the future of Europe depends on how Europe will choose to deal with diversity and inclusiveness, also with reference to what happened in the past, where the European colonialism contributed to the disruption of several expression of diversity. At the same time, taking into account their responsibility, Europeans should be aware, as an example, of considering the negative effects of current hate speech in reference to foreign people and of the responsibility connected with the terminology used. In this perspective the Diversity concept needs to be discussed, rediscovered and "opened" to a different and more inclusive meaning. To this end, it has been highlighted the role of education in moving from an influence perspective to a dialogue one, to make people aware of their beliefs and therefore more responsible. It has been pointed out the importance of creating an "educational space" enabling students to relate with the otherness without been influenced by tacit hegemonic visions, to fight stereotypes, wrong automatisms, nationalism and radicalism.

COMPETENCE, MULTIMODALITY AND CITIZENSHIP

WORK TABLE – CITIZENSHIP, COMPETENCES AND CLIL

A reflection on the futures of global citizenship and the opportunities of CLIL
May 8, 2020[**]

Coordination: Claudia Pennacchiotti (CNR – IRPPS). Took part, for the CNR-IRPPS, Valentina Tudisca e Adriana Valente

Participants:
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INTRODUCTION

This report outlines the outcomes of the online panel discussion on the theme "Citizenship competences and CLIL", which involved members of the Italian scientific and educational community. The virtual panel discussion took place on 8 May 2020 as part of the "Officina Educazione Futuri 2020 (Education and Futures)", organized by the Institute for Research on Population and Social Policies, "Social Studies of Science, Education, Communication", of the National Research Council of Italy in collaboration with the Ministry of Education and the UNESCO initiative "Futures of Education".

The session set out to activate a reflection on the "futures" of education starting from the teaching, scientific and institutional experiences of the participants, exploring the possible role of education in promoting competences for a global citizenship. The aim was to start from the development of a edicational strategy that promotes awareness among individuals and the community of the interconnections between the local and global level and the individual and collective impact on social, environmental and economic sustainability. Within this context and starting from a reflection

[*] *This work table is realized in the framework of the Erasmus plus project INCLUDE*

on teaching in a broad sense, a specific focus was proposed regarding the possible evolutions related to CLIL (Content and Language Integrated Learning) teaching. This approach, by its very nature, contributes to developing the key competences for a global citizenship: critical thinking, awareness, interpersonal communication, multilingual competences, which are all linked to the individual's ability to be an active and responsible part of own educational and social background.

THE POSSIBLE FUTURES OF EDUCATION AND GLOBAL CHALLENGES – THE SKILLS FOR A GLOBAL CITIZENSHIP

Imagining the possible futures of education in promoting coexistence and open exchange between peoples and cultures puts us face to face with the urgency of an open reflection on multiple and interconnected themes. First of all, it means asking ourselves what we think our citizens will have to know and be in these possible futures.

An important aspect will be the ability to take on board a vision of global challenges by affirming the individual and collective awareness of belonging to a global and democratic, fair and sustainable citizenship. This is according to the UNESCO approach that declines sustainability in its various dimensions of social, economic and environmental.

This first challenge immediately prompts individuals and societies to recognize the need to "mobilize and use relevant values, attitudes, skills, knowledge and/or critical understanding to respond appropriately and effectively to the needs, challenges and opportunities that arise in democratic and intercultural situations" (Council of Europe 2016). Within this framework, an understanding of the concept of citizenship is identified which expands to include also the value dimension and which enables us to avoid the duality between identity and diversity, thus emancipating the concept of identity from the divisive value that the term has recently acquired.

Education and learning can contribute to promoting awareness and equip individuals with the tools to cope with a complex reality. This is made up of intertwining and legitimate points of view, of interconnected dimensions. Within this, we have the centrality of the competences necessary to integrate and make multiple worldviews and different value systems coexist, to manage uncertainty and resilience, to tune in to global problems, in a continuous process of debate and coexistence. As already indicated by the Council of

Europe[1] by the European Commission in the 2018 Recommendation on key skills for Lifelong Learning (Council of the European Union 2018) and by the 2030 Agenda (goal 4), everyone has the right to acquire competences that enable them to participate fully in society. In a rapidly changing and extremely interconnected world, each person will increasingly need to possess a broad spectrum of skills and competences and will have to develop them continuously throughout own lives. These key competences (social and personal, citizenship, linguistic, etc.) lay the foundations for creating more equal and more democratic societies. They meet the need for inclusive and sustainable growth, social cohesion and further development of democratic culture.

THE SCHOOL AT THE TIME OF UNCERTAINTY – CHALLENGES AND OPPORTUNITIES

It is crucial to start from the awareness that, in a complex and multicultural reality, in order to experience the future in an open and conscious way it is important to know the past, with otherwise the risk of being uprooted.

Yet today the area of citizenship policies is one of those in which there are the greatest differences between declared curricula (official) and carried out (implemented in classes), which are often far from everyday experience.

We are well aware that complexity is not taught, but were taught to live in a complex world. The school, looking to possible and desirable futures, is therefore called upon to open up and welcome citizenship. This involves promoting a multiple citizenship, which is positioned between the local and global, which promotes the ability to renegotiate shared values and to give value to the relationship with others, already enhancing diversity within the classroom.

At the same time, schools are prompted to enhance significant learning processes that start from students' 'legitimate' questions. The educator/teacher cannot/does not necessarily have to already have all the answers, but to avoid the risk of not leaving room for students' questions, they must propose her/himself as a facilitator in the research process.

These are some of the possible visions of futures from which it is necessary to start facing the challenges and problems of the present, exacerbated by the current crisis that has brought to light the lack of equity of our education

[1] https://www.coe.int/en/web/education/competences-for-democratic-culture.

systems and highlighted the non-sustainability of social and economic policy choices implemented so far in Italy. Despite the reaction capacity shown by the school community, involved in a sudden process of acceleration of the digitization process, the emergency generated by Covid19 has mainly affected the more exposed students and families, increasing the existing gap, social inequality and the risk that in the near future the same possibilities will not be offered to all students. The disadvantaged students, due to social origin and family status, have already been excluded from or shifted to the margins of what the school has tried to do to deal with the emergency. Concepts such as fragility, sustainability, equity and inclusion have taken on a new color in the educational landscape. Educational poverty is increasing significantly and there is a worrying situation regarding the loss of socialization that children, especially the youngest ones, are facing. We must consider the effects produced by interrupted learning, especially for the less privileged or special needs students and for children from contexts in which even their own basic needs are met thanks to school, and also the dropout rates that rise in periods of protracted school closings. For example, girls are 2.5 times more likely to drop out. Furthermore, the strong digitization has made the critical aspects of the technological equipment possessed by families evident and at the same time highlighted the gap of inequalities. There is the gap between urban and non-urban areas, between rich and poor, between connected and unconnected. The government has allocated funds to try to address the structural gap. What has remained at the margins of the discussion is the reflection on both the contents of distance learning, and on the relationships that should also be central to the issue.

And therefore, for the school and for its possible futures, there is a central theme, already suggested by Morin (2001), of the human condition. This implies the construction of an ethical vision of the human race and a sense of teaching and learning which, by means of dialogue and care, leads to an appropriate educational approach that follows a long-range perspective. These include the centrality of some key competences identified by the European Commission, such as digital and entrepreneurial competences, which aroused different perspectives and positions among the panelists in the discussion. In this way, the school itself can become an educational ground for citizenship, a place where one is called upon learning to learn, to acquire awareness of one's ability to influence, spurred towards understanding and reciprocal interconnections.

PROMOTING CHANGE

In this perspective, the goal is not to transmit/learn sectorial knowledge and notions (infinite and multiple), but to learn to use them to read the world, decentralizing one's point of view and grasping the multiple interconnections. This is not a novelty. From Dewey onwards, educational reflection has always invited the school to build those basic competences that enable the individual to continue learning throughout their existence (learning to learn). Educating for life, as Morin argued, to decipher the complexity of society. For this to happen, resistance to change must be overcome. Which conditions and dimensions are necessary for this to happen?

- educational structures, capable of proposing strongly interdisciplinary education and which put the students at the center of the educational process, empowering them and following their natural biorhythms, and which make adequate spaces available from a structural and aesthetic point of view, and which is also capable of reinventing them (open spaces, learning spaces outside of school, virtual spaces, etc.). The education of the future cannot be compartmental learning. The disciplines must be structured according to a post-curricular approach, starting from an interdisciplinary perspective, in which the subjects are fundamental tools for understanding the world, not simply an end in themselves in terms of learning.
- school time, which must not coincide with class time. The school can and must also become a space for discussion for students, a place and a time to meet outside of the classroom and to carry out/experience the fundamental principles of an inclusive and democratic citizenship;
- appropriate teacher training. In order for there to be a real change in the school, it is also necessary to promote adequate training for the future teaching staff, starting from their university education. It is therefore the very same university educators, who train tomorrow's teachers, who must be trained in a new idea of school and education, based on approaches oriented towards a non-sectoral, but interdisciplinary logic. At the same time, it is necessary to promote virtuous practices such as the Educational Avant-garde Movement

promoted by INDIRE2, which is already experimenting with real change in the field.

An example in this sense can be found in the history of art which, due to its intrinsic characteristics, is transversal and interdisciplinary and which could introduce a new concept of educational space. Art manages to connect numerous disciplines together. It can bring together history, mathematics and technology. However, it requires new ways of use and learning, which involve the educational community, the local territory and take the student out of school, into direct contact with real art (acquiring "open air" competences). Space educates like an educator.

CLIL – PROPOSALS FOR COOPERATIVE AND STUDENT-CENTRED LEARNING

Of particular interest is CLIL methodology (Content and Language Integrated Learning). This approach, by proposing content in a foreign language, facilitates the activation of the dimensions of transversality, interdisciplinarity (as underlined by David Marsh) and student-centered learning. CLIL contributes to developing the key competences for a global citizenship: critical thinking, awareness, interpersonal communication and multilingual competences. These are all linked to the individual's ability to take part actively and responsibly, participating in their own educational process, as shown by the conceptualizations proposed by Coyle, Hood and Marsh (2010), but also by Langé and Cinganotto (2014). These authors highlight the cooperative dimension of CLIL, collaboration between teachers, team teaching, and the co-creation process also through the active involvement of the student in the construction of the educational path. The student is therefore at the center and is empowered. CLIL methodology is interdisciplinary in nature. This is why it is easily integrated into the kindergarten where the true holistic curriculum is implemented, without distinction of disciplines, and in primary school, where the teacher has skills in multiple disciplines. It is more complex, however, introducing CLIL methodology into first and second grade secondary schools, where the separation of knowledge between subjects is more rigid and where its implementation is often left to the initiative of the individual teacher. CLIL is

[2] http://innovazione.indire.it/avanguardieeducative/

not aimed only at language learning, but at developing a broader socio-linguistic awareness. This characteristic, as expressed in the Recommendation of the Council of Europe (2019) on a global approach to teaching and learning languages, should represent an element that cuts across internal school curricula, within each subject. It is an awareness which in CLIL develops through learning new mental patterns, facilitating sharing and meeting with each other (each language brings its own history, culture, uniqueness, and its vision of the world to be shared). The student does not study a language, but uses the language to learn another subject, using the schemes of the vehicle language learning to think in a flexible manner. This helps to contrast the resistance to change that is in each of us (what is already known is more reassuring) and to read the world according to different interpretative schemes, conveyed by the different languages, thus promoting the development of full global citizenship.

CLIL methodology is aimed at developing critical thinking, activating various cognitive skills, from LOTs (Lower Order Thinking Skills) to HOTs (Higher Order Thinking Skills).

CLIL also promotes democratic education: by proposing the learning of some subjects in a language other than the official language, it supports students who do not speak the official language. For example, this can occur in some areas of India, where students from poor families at home speak local dialects and at school study in the official language with extreme difficulty. There is also the potential application to the integration of foreign children in Italian schools.

Furthermore, CLIL by its nature affects the student-teacher educational relationship. The student is no longer a simple user of frontal teaching, but she/he is at the very center of the learning process, a co-creator, together with the teacher, of content, knowledge and skills. The teacher, in turn, becomes a facilitator.

Conclusions

It is possible to imagine multiple futures for education, characterized by an educational system, understood in a broad sense as an educational community, which is capable of conceiving itself as responsible for the growth of the younger generations and knows how to carefully rethink its weaknesses, as a protector and safeguard of more fragile subjects. It is a system, oriented

towards sustainability, which is an integrated set of multiple learning environments (physical and virtual, inside and outside the school), which integrate the formal and the informal and promote fluidity between the different educational levels. There is vertical continuity from primary school to secondary school through the progression of the objectives related to the different skills and the development of strategies for learning, and this involves a large educational community, which counts on the active participation of schools and teachers, enhancing their autonomy and competences. It is an educational system which, starting from the knowledge of disciplines, reinforces the interdisciplinary dimension. This, in turn, promotes differentiated approaches according to the learning objectives and strategies of the student, who becomes the protagonist (as already theorized by Paulo Freire) and author of his/her own path, called on to experiment with knowledge and apply that already acquired, as happens for the use of language in CLIL methodology. This can be all within a community that also learns beyond its geographical borders. For example, we can have virtual classes that connect students from different countries with each other). In this perspective, the teacher becomes moderator and facilitator. CLIL is already a cutting-edge educational proposal among other teaching approaches.

WORK TABLE – COMPETENCES AND MULTIMODALITY OF EDUCATIONAL RESOURCES

April 27, 2021[*]

Coordination:
Claudia Pennacchiotti (CNR-IRPPS); Elena Gaudio (DGOSV-MI). Took part in the work table: Valentina Tudisca e Adriana Valente (CNR-IRPPS).

Participants:
Teresa Bencetti (IC Margherita Hack, Roma), Domenico Bracciodieta (IISS Leonardo da Vinci in Cassano delle Murge), Alessandra Bruzzi (IC di Cadeo e Pontenure), Roberto Castaldo (ISIS Europa di Pomigliano d'Arco), Letizia Cinganotto (INDIRE), Raffaella de Luca (CISP), Michele Gabbanelli (IIS Savoia-Benincasa di Ancona), Elisabetta Maiuolo (ITE V. De Fazio di Lamezia Terme), Patrizia Malausa (Liceo Caterina Percoto Udine), Alessandro Manni (IIS Pertini di Alatri), Maria Rita Marconi (IP Cavour Marconi Pascal di Perugia), Emanuele Panni (IIS Savoia-Benincasa di Ancona), Carmina Laura Giovanna Pinto (IIS Galileo Galilei di Jesi), Raffaella Tomasini (ISIS Malignani di Udine)

"Officina Educazione Futuri 2021" third virtual discussion table puts forward an integrated reading of the 2 issues through the Goal 4 of the 2030 Agenda which aims to achieve inclusiveness and equity of educational systems. Those systems, imbedded in an increasingly complex, uncertain and interconnected reality, accompany students in the process of exploration and decoding. In other words, tackling uncertainty not by giving in to simplification or claiming to know how to teach everything but by proposing complexity management strategies that focus on the act of thinking. As a matter of fact, simplifying breaks knowledge apart and does not reinstate the dimension of complexity.

Therefore, the main goal is to equip students with the ability to organize and frame personal resources into various contexts of application, better yet to make them build the necessary competences for life.

[*] *This work table is realized in the framework of the Erasmus plus project INCLUDE*

In this transformation, what is the possible and desirable relationship between knowledge and competences, disciplinary competences and transversal competences?

Despite the fact that many are yielding to dichotomous and simplifying visions, between these two dimensions there is a synergistic, complex relationship. In terms of complexity, self-construction is the more and more complete as it becomes based on in-depth organic knowledge.

This is the reason why schools need to be free, "wild", and to overcome not the disciplines themselves but the barriers between them. Teachers must free themselves from the burden of academic programs they are no longer required to follow.

The theme of relationships represents a keystone.

First of all, the relationship between teachers, which could be considered as the relationship between the very disciplines: through interdisciplinary co-planning, complexity acquires meaning; through networking, experiences are shared. Hence, the urgency of a central-level-strategic coordination not yet perceived by the teaching body, which traces change's direction.

Of importance is the relationship between students to whom schools teach to work together in an open space, restoring centrality in the educational process and in the didactic planning. Starting from listening, teachers are called upon to arouse curiosity (authentic questions), the pleasure of knowledge and deep learning made up of meaningful know-how. They are also requested to suggest strategies in order to manage complexity, maps to orient oneself and a value system.

Such a vision of schools does not require a radical rejection of traditional, disciplinary teaching: on the contrary, its integration with other forms of teaching. It requires a multidimensional and multimodal approach to the educational process that starts off, once anxiety linked to the academic program has been overcome, with a careful consideration of the uniqueness of the students, seen as individuals and as a group. In the aforementioned approach, the linear textbook becomes one of the tools available, the IWB a "window" on the world in which the teacher guides students in a "critical" exploration of the web so that together they build their textbooks.

This process of revolution is underway, as demonstrated by Officina and movements such as the Avanguardie educative, where new ways of teaching and learning are experimented through practices such as the Project based learning; the debate, learning by meaning, the *Making Learning and Thinking Visible, the integration of textbooks and open educational resources, PCTOs as places*

of meaningful learning in real contexts, global citizenship education programs, STEAM and CLIL for transdisciplinary teaching.

There remains a question to which teachers seek for an answer that can give them a strategic vision: where is the school going?

ART, SCIENCE AND SCIENTIFIC CITIZENSHIP

WORK TABLE – FUTURES OF SCIENTIFIC CITIZENSHIP AND GLOBAL SCIENCE OPERA

May 13, 2020[*]

Coordinating: Valentina Tudisca (CNR – IRPPS). Took part in the work table: Adriana valente e Claudia Pennacchiotti (CNR IRPPS)

Participants:
Paola Boggetto, Silvia Caravita, Rosanna Colombrita, Elisabetta Falchetti, Pietro Greco, Alba L'Astorina, Nicoletta Lanciano, Maria Monina, Leonardo Soffientini, Elisabetta Tola, Alessia Vagliviello

INTRODUCTION

The reflections which follow in this report are the outcome of the online panel discussion on the theme of "Futures of scientific citizenship and Global Science Opera", which took place on 13 May 2020 within the context of the initiative *"Officina Educazione Futuri 2020"*, organized by the Institute for Research on Population and Social Policies of the National Research Council of Italy, Social studies of science, education, communication, in collaboration with the Ministry of Education and the UNESCO project "Futures of Education". The discussion had the aim of activating a reflection on the futures concentrating on the theme of scientific citizenship, on the role of science education and the synergy between art and science in education. This is inspired by the initiative of "Global Science Opera", which foresees the collaboration of schools from many countries for the co-creation of musical "operas" on scientific themes, currently at the center of the Erasmus+ project "Leverage students participation and engagement in science through art practices" - GSO4SCHOOL.

[*] This work table is realized in the framework of the Erasmus plus project GSO4SCHOOL

VISIONS OF SCIENTIFIC CITIZENSHIP

In summary, scientific citizenship can be defined as an "informed exercise of citizenship rights", in a context – the "knowledge society"[1] – in which knowledge is the primary engine – of social, economic and cultural dynamics. Technological development is accelerating, and we are increasingly called upon to take part in decision-making processes that include strong techno-scientific components. Therefore, a demand for scientific citizenship rights arises as a prerequisite for the accomplishment of a substantial democracy. The experience of COVID-19, which has led us to passively accept decisions made by a technical-scientific committee without having the possibility of not only participating, but also of being informed and being able to fully understand the data on which those decisions were based, has shown how far we are from the participatory exercise of a scientific citizenship. We are within a context of "post-normal" science (Funtowicz S., Ravetz J.R., 1997), in which the decisions to be taken are urgent, values are in dispute, stakes are very high and science is uncertain. This highlights the need to rapidly prepare the tools useful for the fulfillment of a scientific citizenship.

Scientific citizenship includes a political dimension, but also a cultural, social, economic and ethical dimension. We are faced with complex global challenges which require knowledge that is able to account for the complexity of reality and that can be considered as a right and a common good, as a basic prerequisite for ensuring inclusion and equity. Knowledge is the only asset which, the more it is used and shared, the more it increases. Therefore, the fact that it is for the benefit of all humanity can only enhance it, as already hoped for by the philosopher Francis Bacon[2]. This is in line with the objectives of the United Nations 2030 Agenda for Sustainable Development, which at the moment seems to be the only shared future project and which has the advantage of including, in addition to environmental issues, also social issues, with references to equality of rights, tolerance and peace. Scientific citizenship should include and be based on certain values, such as peace, cooperation, democracy, dialogue and social inclusion, justice and equity, as already

[1] We should specify that, if the 20th century was defined as the "age of knowledge" or "information age", the 21st century is envisaged as the "imagination age", an era in which imagination and creativity are the most widely required competences.

[2] For reflections of Francis Bacon on this theme see "*Cogitata et Visa de Interpretatione Naturae*".

highlighted in the Science for the 21st century Document over ten years ago (UNESCO 2020a).

The problem is the realization of these objectives. Public research funding seems to be decreasing everywhere and this further affects increasingly serious situations of inequality, both between countries and between social classes, in terms of accessing knowledge and the benefits that derive from it, including the application of scientific research. For example, there remains a strong digital gap, not only between individuals but also between schools, as shown by the distance learning experience undertaken due to COVID-19. This last aspect, together with the lack of information education, makes it difficult to develop digital citizenship3 as an essential dimension for the development of full scientific citizenship. These inequalities, together with a science narration – both in school and in the media – in which the element of uncertainty characteristic of the contemporary post-normal science context is absent, contribute to fueling suspicious and distrustful attitudes towards science, conspiracies and conflicts. Historically rights – civil rights in the eighteenth century, political rights in the nineteenth century, and social rights in the twentieth century – have never been bestowed from above, but have always been the result of conquest. The same applies to scientific citizenship rights. How can we attain them?

It takes participation, "practice" of scientific citizenship, which requires effort and struggle. Knowing is not enough: knowing is the prerequisite for acting with awareness, as was already highlighted in the Aarhus convention on environmental communication (UN Economic Commission for Europe 1998).

"Taking part", in a more contemporary sense that looks to the future, means not only being able to access scientific contents and knowledge to experience an active and informed citizenship, but to help build them, "co-create" them, also sharing the responsibilities that the scientific enterprise involves, and also giving value to other types of knowledge in addition to that of the academic sphere. There are already numerous experiences of opening scientific processes to social actors that are not part of academia, in which "extended peer communities" are formed, from "citizen science" projects to "do-it-yourself science" experiences such as those of makers. A more

[3] On the theme of "digital life" see "The Onlife Manifesto. Being Human in a Hyperconnected Era" by Luciano Floridi, Springer Nature 2015.

"participatory" science, inclusive of multiple points of view, could also contribute to making the "narration" of science closer to reality, with the introduction of elements such as uncertainty and the transience of knowledge. In this sense uncertainty, from a factor of uneasiness, obviously negative, as in the case of the COVID-19 experience, could turn into an element of inclusion, which reflects the opening of the scientific enterprise to different points of view and contributions, in terms of knowledge and experience.

Thinking then about the place where scientific citizenship can develop, school plays an essential role, even more than the mass media. The school could be the gym in which to train scientific citizenship, in which to practice attaining it.

Towards a new conception of school as "gym of scientific citizenship"

In order for the school to become a "gym of scientific citizenship", it must be deeply rethought, contextualizing it within a complex, global and interconnected reality. For decades we have been thinking about changes to be introduced into the school. There are numerous very advanced European documents in this regard, but little has been achieved, at least in Italy; now the need for change is urgent.

The criticisms that can be levelled at the current school, especially with reference to the Italian context, are manifold. Although there are widespread experiences of quality, it is a place where knowledge is transferred in a frontal way, giving value to notionism, which offers an abstract and often not entirely engaging learning for students as it is distant from real life. It is an institution resistant to innovations. It is prescriptive, not very reflective, not very flexible, not very technological and digital. Indeed, technology is often viewed ideologically in a hostile way as something of exclusive interest of the new generations (despite the fact that the web has been an integrated part of our lives for thirty years now), with large gaps in the use of information technology and digitalization between the different schools. Individualism and competition are often encouraged, while the development of the personality is little cared for. Furthermore, this type of school hardly fulfills its function as a social elevator.

To become a gym of scientific citizenship, the school should be characterized by participatory and personalized learning, considering and encouraging students' desires and inclinations. It should favor the development of the personality and the fulfillment of people, in an inclusive way. These aspects are already present in the vision of the European school, but seem difficult to apply in the Italian school. Teachers should not transfer knowledge, but assume the role of "coaches" and facilitators in the development of knowledge, and listen, recognize and enhance new skills brought by students. In fact, this often happened with respect to the use of digital technologies during the COVID-19 emergency, which in this sense has prompted a positive shock. Affectivity and empathy should be the basis of the learning and teaching process, as also suggested in Socio Emotional Learning practices. This school should be conceived as a "research laboratory" in which participation and co-creation, creativity and imagination are stimulated, to counteract homogenization. It should be based on an interdisciplinary and transdisciplinary approach, in order to help future citizens to orient themselves in the complexity of reality, to grasp the interconnections between phenomena, between human beings, nature, the Earth and the universe. In this sense, the training of teachers should be reviewed and rethought, rather than be entrusted to academia, which is strictly divided into disciplines, based on conservative frontal lessons.

In particular, the following should be introduced and enhanced: an education regarding sustainability, environmental, social and individual; an education in affectivity and being together with others, in empathy. This is also keeping in mind the biological studies on other social animals conducted on these issues, for example on altruism in primates (think of the research by Frans De Waal and Jane Goodall). Experiences from cultures other than western societies (for example South America) should be introduced and listening education encouraged as an inclusive experience. There should be education involving the body, corporeality, and also stimulating manual skills in learning basic elements of concepts that cannot be defined and learned only theoretically, together with education in new technologies. An education on inclusiveness, including the theme of gender, and on intercultural dialogue should be transversal themes integrated seamlessly in learning, rather than being dealt with in dedicated workshops.

Among the competences that the school should stimulate and train (some of which have already been suggested by the Council of the European Union in the 2018 Recommendation on key competences for lifelong learning), are digital competences and the ability to find one's way in the multiplicity of sources of information. Another is multilingual competence, paying attention also to the languages brought by immigrant communities, in order to reflect our society. Others are critical thinking, the ability to "discern" (understood as the ability to choose and decide), social intelligence, resilience, the ability to imagine future scenarios and the ability to exercise citizenship, intended as a capacity for struggle and resistance, which must be practiced from an early age. Finally, last but not least, there is need for an awareness that knowledge and participation require effort and effort.

This school should be open to experimentation, constant rethinking, new experiences, and in general to continuous exchange with the outside world and with society (we could say a school "with and for society", recalling the expression referring to science in one of the activities of the European research funding program Horizon2020). Training should be entrusted not only to teachers, but also to other social actors, including foreign teachers and people from different cultures, and the training of educators should be ongoing. Beyond the school walls, cultural, natural and virtual spaces outside the school should also be experienced as educational spaces, for a more open school in the world. The school structures themselves should be aesthetically "beautiful", or at least significant in some way. Learning should never take place in the classroom as an isolated event, but through a dynamic process in which students "move in space and time" (Gray e Colucci-Gray, 2019). Furthermore, it should guarantee continuity and education coherence between the different levels of school.

Finally, this school should be considered not only a universal right (which is not yet taken for granted even in western countries with a well-established welfare state), but a common good in itself.

Prospects of science education

Science education is one of the essential prerequisites for the development of scientific citizenship.

Also in this case, alongside the criticisms of the current school system, we can highlight some critical elements of science teaching, which is often out of date, and neither motivating nor engaging. Scientific subjects are usually presented as an abstract prescriptive framework, the scientific endeavor in a simplified way as an ideal linear path from hypothesis to thesis, without emphasizing the element of creativity, changes of mind and the evolution of scientific thought. The education often remains notional and theoretical, devoid of the experiential and "tangible" practical part of experimentation and lacking an appropriate "narrative", capable of analyzing more in depth. The inadequacy of science education in the Italian school, which seems to be reflected also in the poor results of Italian students in tests such as in the PISA tests (INVALSI, 2018), is an obstacle to the achievement of a scientific citizenship. It also risks making people manipulable, leaving room for simplifications and making it easy to hunt out the enemy in public debate. A science education that promotes the construction of a scientific citizenship should work on the formation of a culture and a scientific sensitivity that goes beyond the differences between the various scientific subjects. It should prompt students to learn and experiment with scientific thought, the models of the sciences and work practices that characterize "doing science". This involves inspiring the students to ask questions that make sense and to devote time to building answers, with a maieutic, participatory and complexity-oriented educational approach. It entails giving space to experimentation, enhancing both mental experiments and the perceptive-sensorial experience of material reality and combining study with the emotions and the experience of the body (for example with experiences of astronomy in the field, or perception of forces through their own movements). There should be stress on the links between scientific concepts and daily life, giving space to the history of science and presenting science as a collective human enterprise linked to a historical context that includes the dimensions of uncertainty, doubt and error. We should be clarifying how production, distribution and access to scientific knowledge is organized in the contemporary world, emphasizing the political, ethical, social, legal and economic implications of research (also to avoid conspiracy theorizing) and its global dimension. There is a need to enhance the knowledge of human biological nature and the theme of health, understood as a multidisciplinary and transdisciplinary theme that includes physical, mental and social well-being. This brings about a positive

relationship with the environment and life skills necessary for adaptation, in line with the conception of the World Health Organization (Constitution of the World Health Organization 1946) and with further perspectives added in the international debate (Huber et al. 2011). We have to train students to use scientific information in the mass media, addressing issues such as how journalism works and the freedom of the press, fake news, privacy and online data processing, in order to make students more aware in using the web. Opening up to other cultures, past and present, is essential, particularly those that follow different rationalities and ways of conceiving human beings and their relationship with nature. The links between science and values such as altruism, collaboration, peace, should be taught, also by promoting among students a spirit of collaboration, essential for any scientific endeavor, rather than competition. In this way we are providing tools to reason about the future and sustainability.

TOWARDS AN EDUCATION THAT INTEGRATES ART AND SCIENCE

As already emphasized, promoting an interdisciplinary and transdisciplinary approach is necessary to encourage the development of thought capable of measuring itself with complexity (Morin, 2000), which requires both logical and intuitive skills. This is to prepare us for global challenges, such as global warming and pandemics, which by their very nature cross borders between disciplines.

In particular, given the critical points found in current schools and science education, interconnecting and integrating art and science could have positive effects to encourage the development of the different concepts of both school and science education described in the previous paragraphs.

Historically art and science have always influenced each other and, in past centuries, many artists have also been scientists. If we go beyond stereotypes, art and science have several essential elements in common. They are based on research processes, albeit with different methods, they require intuition[4] and creativity and they investigate the properties and qualities of things and the

[4] Among reflections on this theme see "An Essay on the Psychology of Invention in the Mathematical Field" by Jacques Hadamard (1945), Princeton University Press.

rules that underlie reality. This is developing tacit knowledge that is at the roots of the knowledge of the world, overcoming common sense and promoting the acquisition of awareness. Art and science develop the ability to abstract and to observe according to the mental categories of form and structure, they provide representations of the world and strongly influence our imagination and they engage with the mystery.

Bringing art and science to converse with each other in education could have many different positive aspects, as already shown by the numerous, unfortunately almost always sporadic, experiences implemented in this area quest'ambito (Sandu, Tudisca, Valente, 2021), also outside the national context (for example, the Global Science Opera initiative, by which the idea of this discussion was inspired), which led to the first international reflections on a STEAM (Science, Technology, Engineering, Arts, Mathematics) approach. It could help to find and rethink the element of "narration" and "narrative models", as a structure that connects, in the manner of Bateson (1999), in the epistemology and science education (Bruner, 2019), an all too neglected strategy (also through methodologies such as digital storytelling). This coming together of the two subjects can enhance the perceptual-sensorial experience and the pleasure of creating and manipulating (e.g. by means of the production, by the students, of "scientific" objects also possessing an aesthetic value), also as a way of building an ecological identity, a sense of oneself as part of an ecosystem (Clayton S., Opotow S., 2003). These subjects working together can help to explore emotions and encourage empathy (also by linking it to a discourse on values that should be part of scientific citizenship) and to promote collaboration/co-creation. They can help to stimulate curiosity, imagination, fantasy and creativity and to deal with information considering not only the reading of data and texts, but also the visual reading - and the creation - of images and videos, of graphic signs, so as to orient oneself in the multimedia environment of the web. They can encourage "understanding", the development of critical thinking, complex and systemic thinking (which are also objectives of education for sustainability), and teach students to deal with complexity, as Calvino already suggested with respect to the union of science, literature and philosophy (Calvino, 1967), describing reality as a labyrinth (also favoring the comparison between different visions of the world). Art and science combined open up to educational spaces outside the school, enhancing an emotional connection with the local territory and the cultural,

material and immaterial heritage (as hoped for by UNESCO already in the Convention for the Protection of the World Cultural and Natural Heritage of 1972 - with particular reference to Article 4 – and also by the European Union with the heritage education program – UNESCO WORLD HERITAGE EDUCATION PROGRAM-). Students and teachers can be involved in a redesign of school environments in order to reflect the present and future imagination of those who are experiencing them, and the aesthetic dimension of science itself may also be enhanced.

Feeling and appreciating beauty is, after all, a way of loving reality, as well as science and nature (as the physicist Paul Dirac pointed out – 2018). Recognizing beauty in science, in a theory, in a mathematical demonstration, a formula, and also considering this aspect in education can therefore be a way to perceive science also in an affective and emotional way, in the way of an "ingrained" science, which inspires a sense of belonging in us. And this would be an important step towards stimulating the exercise of scientific citizenship, the transition from knowledge to action5.

Suggestions for a Global Science Opera

More pragmatically, the implementation of some of the ideas that have emerged seems essential for the creation of a Global Science Opera. In particular, we can mention the enhancement of digitization and the technological equipment of schools, with the possibility of using tablets and connected computers, but also mixers, audio and video recording systems, graphics and communication programs. In addition, the setting up of multifunctional spaces in the school, also suitable for welcoming visitors. This includes the integration of the physical spaces of the school with digital spaces through platforms for distance learning (for example, Moodle or Classroom) and the use of public spaces as educational spaces, with the opportunity for experiences in places of culture and community life (also with visits to artist atelier). We can involve social actors in school life, such as alumni and ex-teachers, artists, researchers, public and private associations and institutions,

5 Further suggestions for going into depth on the theme of beauty in science brought up in the panel discussion are the "Letter on the Blind for the use of those who can see" by Denis Diderot (1749); "The science of Leonardo" by Fritjof Capra (2007), Anchor; the documentary film "The sense of beauty" (2017), by Valerio Jalongo.

from ministries to local authorities, to research centers and business enterprises. There should be the introduction into school curricula of expressive-creative practices such as theater, dance, music, poetry and the visual arts, with the expansion of languages and forms of school communication and the promotion of narrative forms. There is a need for more frequent co-presence of teachers, both to encourage collaboration and interdisciplinary exchanges and to be able to work in small groups, while leaving students more autonomy in experimenting with their own creativity.

These suggestions will flow into the intellectual outputs of the Erasmus + GSO4SCHOOL project, to form guidelines for the creation of a Global Science Opera.

STEREOTYPES IN EDUCATIONAL RESOURCES

WORK TABLE – INEQUALITIES AND STEREOTYPES IN TEXTBOOKS AND EDUCATIONAL RESOURCES

April 28, 2021[*]

Coordinating:
Adriana Valente, Valentina Tudisca (CNR-IRPPS). Took part in the work table: Claudia Pennacchiotti (CNR-IRPPS).

Participants:
Irene Biemmi (Unifirenze), Angela Biscaldi (Università degli studi di Milano), Giovanna Cipollari (EAS), Silvia Caravita (CNR-IRPPS), Marika De Acetis (Zanichelli), Daniela Donisi (ITIS G. Armellini di Roma), Antonella Festa (Liceo Vittorio Emanuele di Lanciano), Giordana Francia (CISP), Alessandro Fusacchia (Camera dei Deputati), Adelaide Gallina (Università di Torino), Maura Gancitano (Tlon), Gianluca Gatta (Archivio Memorie Migranti), Marina Imperato (MI-DGOSVI), Paolo Landri (CNR-IRPPS), Paolo Monella (Università Sapienza di Roma), Monica Smoljko (Scuola primaria Crispi di Roma)

During the virtual discussion of April 28th 2021, different aspects were tackled: national and international research projects, educational and editorial practices, ministerial guidelines and the current draft law on the promotion of diversity and the fight against stereotypes in textbooks. The above-said legislative proposal, in particular, envisages the production of guidelines on diversity and inclusion, the training of the players involved in the educational process, including publishing houses as well as the establishment of a National Observatory. The virtual discussion table also dwelled upon the UNESCO recommendations regarding textbooks inclusiveness and Open Educational Resources. Different experiences, that deeply enriched the discussion, were outlined throughout the entire virtual discussion table, from which have emerged various points that it is possible to highlight here below.

[*] *This work table is realized in the framework of the Erasmus plus project OLA*

The textbook is endowed with authority, but this can lead to an uncritical use. It should always be kept in mind that it is also a product of cultural industry, reflecting relations of power and its asymmetries, with a double function: that is, to affect individual development and guarantee cultural reproduction of society.

Still today textbooks convey stereotypes that generate discrimination, even through lack of representations, linked especially to: ethnocentrism, allochronism, gender, "right body", sole family model, representation of migrations, often faced with an eighteenth-century utilitarian approach (western), and LGBT+. The stereotype often seems to re-propose an anachronistic culture, but probably the symbolic to which it is connected is still a shared value. The delay in didactic transposition, which is, in other words, the time lapse between innovation (scientific, social, philosophical) and its appearance in textbooks, is neither fixed nor neutral, but strictly functional to the values rooted in the social fabric.

In addition to detaching from one-off stereotypes through a critical look at images and texts, a stereotyped way of thinking must be recognized and abandoned. As a matter of fact, it is necessary to get used to, and make learners getting accustomed to, the confrontation with complexity, the necessity of asking questions. It is also crucial to abandon simplifications, the fear of facing the error, the distrust in the leaners' abilities so that one should always resort to a systemic approach, to challenge canons and to codified knowledge. Abandoning evolutionary narratives that lead to think that there are more or less evolved peoples, and replaced them with a comparative approach, enhancing at the same time the element of interdependence and co-responsibility.

Open educational resources can contribute to gaining awareness of stereotypes through a process of co-building knowledge with different social players. On the contrary, free but proprietary digital resources risk reducing the issue of stereotypes to corporate policy issues, jeopardizing the guarantees of data protection. Alongside the "traditional" teaching, laboratory experiences centered on expressive modalities linked to the body should also be promoted.

The emphasis on performance evaluation restricts the access possibilities to complexity. It is necessary to find ways in which each learner can develop their own personality, from a trans-disciplinary point of view as well.

It is essential that all social players do their part, families included. Among the publishing houses, Zanichelli has adopted a self-regulation code on stereotypes.

It is not useful to seek the ultimate cause of the presence of stereotypes in textbooks: the authors who write them, the publishers who publish them, the teachers who choose them. We need to recognize the presence of stereotypes within ourselves.

It is necessary to re-evaluate the relationship, the interdependence. The metaphor of triangular inequality prompts us to reflect: sides that are too short cannot create a meeting area.

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