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of the Journal Scuola Democratica**

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**Pandemic and Post-Pandemic
Space and Time**

ASSOCIAZIONE "PER SCUOLA DEMOCRATICA"

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Pandemic Space and Time**

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The Art Ecosystem. Promoting Innovation, Inclusive Learning and Active Citizenship

Tiziana Faitini and Erik Gadotti

Istituto Pavoniano Artigianelli per le Arti Grafiche, erik.gadotti@artigianelli.tn.it
Università di Trento, tiziana.faitini@unitn.it

ABSTRACT: *This paper describes some aspects of the integrated model for research, education, innovation and development devised and experienced at the Artigianelli Institute in Trento (IT), in cooperation with the University of Trento (IT). The model, which draws on systems thinking and complexity theory, sets out to build a learning ecosystem which includes different actors and partners, and transcends the dualism of school/business, education/innovation, learning/development. The model grew out of a research project which was initially designed to explore new modes of integrating students (14-18 years old) with disabilities into Italian high schools. It has proven to work, both in terms of helping all the students to develop their cognitive, emotional and relational potential, and also as a resource for partner enterprises, in their endeavours to innovate and generate new business opportunities. The elimination of the division of knowledge into subjects and students into age determined classes is key to this innovation, which opens the way to new teaching methods capable of promoting active citizenship and better valorizing the different potentials of every student. The diversity of the students' capacities and interests thus effectively becomes a value.*

KEYWORDS: *Learning ecosystem, Personalized curriculum, Competence-based education, Problem solving, Active citizenship*

Introduction

Contemporary society is characterized by constant transformation and acceleration – technological, economic, social, existential –, and more and more extensive interactions, in which knowledge plays a key role (Lévy, 1994; Rosa, 2013). To cope with this transformation, the capacity to see oneself in relational terms as part of a dynamic reality is required, as are the constant recreation of relationships and meanings. An articulated set of competences for active citizenship and employability is needed. This cannot lead merely to the adjustment of existing practices or theories, and entails the redefinition of the psychological, cognitive, relational, social and even spiritual constructs that drive human activity.

While education and training systems are a crucial piece of the puzzle in facing this transformation, they, too, need major innovation, first

redefining the anthropological and pedagogical foundations of the models to be adopted and then going on to rethink the organizational and school management models in their entirety. The strategies for implementing and developing educational innovation should also involve a combination of centralized/decentralized and top-down/bottom-up strategies in order to ensure scalability (Murray *et al.*, 2010; Kamylyis *et al.*, 2013).

Although there is general agreement on the need to reimagine educational systems and strategies in pursuit of these objectives, no clear, coherent model for this pursuit has yet been established. The various experiments that have taken place, while adopting innovative methodologies often inspired by the EU Council Recommendation on key competences for lifelong learning (EU Council 2018), have tended to deal with quite narrow didactic questions and to remain within the bounds of traditional pedagogical and organizational models. However, a systemic change requires a radical innovation of the model of schooling, starting from its basis. If we really want to create a new model and to promote active citizenship, the anthropological vision that underpins it must first be clarified. This can then be followed by the choice of a pedagogical approach consistent with the appropriate teaching methods and – no less importantly – of an organizational and managerial model that will best support the new pedagogical model.

This article is intended as a contribution to the development of a coherent way forward: it describes the integrated model for research, education, innovation and development which, beginning in 2007, has been devised and implemented at the Artigianelli Institute (*Istituto Pavoniano Artigianelli per le Arti Grafiche*, a high school in the field of graphic design based in Trento, IT), in collaboration with the University of Trento (IT). The model has proven to work, both in terms of helping all the students (14-18 years old) to develop their cognitive, emotional and relational potential, and also as a resource for partner enterprises, in their endeavours to innovate and generate new business opportunities (for some data see Faitini *et al.*, 2019). The article begins by recalling the contribution that systems thinking and complexity theory can make to understanding contemporary society, then briefly describes the pedagogical approach which, if adopted skillfully and sensitively, allows us to build a new model for schools, and, finally, outlines some of the teaching and organizational systems that can enable the realization of this vision.

1. Why Do we Need a Holistic Vision of Learning Processes?

The model grew out of a research project which was initially designed to explore new ways of integrating students with disabilities – particularly those with Autism Spectrum Disorder (ASD) – into Italian high schools. The choice to integrate young people with Special Educational Needs

(SEN) by mainstreaming them is, in fact, problematic, particularly in terms of how emotionally dependent on their support teachers they often become, and how frustrating the experience of being integrated into educational settings in which their difficulties and inadequacies are constantly in evidence can be; such settings, indeed, frequently provoke inappropriate social and relational behaviours (Gadotti *et al.*, 2018).

Close analysis of these dynamics revealed an opportunity (and, arguably, the necessity) to reorganize the education system by overturning traditional structures based on the division of knowledge into disciplines and the grouping of students into classes and thus allowing students to interact in learning environments that enable them to fulfil their own unique potential. Peer interaction in situations which permit young people with SEN to experience their own strengths and competences has been shown to be a crucial factor for their psychological and educational development (Gadotti *et al.*, 2016).

These initial observations set us on a journey which led to trialing a new educational model, and to joining the Italian movement *Avanguardia Educative* promoted by INDIRE, a national research institute that has been involved in educational innovation since its foundation in 1925 (INDIRE 2014). We were prompted to interrogate the theoretical assumptions underpinning the construction of such a model. There is a growing recognition that this construction necessitates the adoption of systemic, more holistic approaches (Joseph, Reigeluth, 2010), and coherence between anthropological vision, theoretical constructs and pedagogical/didactic activity. As a matter of fact, the acquisition of competences linked to problem solving, creativity and innovation requires an education system that focuses on the capacity to interpret the complexity of reality. This process requires each person to perceive themselves in relational terms and to be actively involved in a continuous redefinition of relations and meanings (Watzlawick, Weakland, 1977).

Theories which take inspiration from constructivist, systemic approaches and complex systems theory are good at helping us in this regard: general systems theory (Bertalanffy, 1968), the ideas of the Palo Alto school on complex systems and the constructivist approach to knowledge (Watzlawick, Weakland, 1977; Bateson, 2000) are particularly valuable guides on this journey. Then there is Edgar Morin, who has, in fact, had a more direct impact on theories about learning. He established an approach to education consistent with the abovementioned paradigms, a holistic approach that meets the challenge of complexity and the new aspiration for a non-sectorial and non-reductive knowledge (Morin, 1990, 1999). Other authors, thinking along the same lines, have underlined the importance of complex systems theories when redesigning learning systems (Romei, 1995). Recent developments in the use of design thinking as a method to support governance and advanced problem solving also provide us with powerful tools (Brown, 2009; Dell’Era, Verganti, 2013).

At the heart of the proposed model lies a vision of the world as a constantly evolving network of related elements, and the perception of each person as an integral part of this relational flow. An anthropological vision in harmony with these premises must first dispense with any residual self-referential and solipsistic tendencies, and instead place humans in structural relationship, constantly drawn beyond themselves, beyond their immediate – singular – surroundings and, thus, transcendent. Humans are, in other words, to be viewed as the constituent nodes of a network of constantly shifting relations (Weick, 1988), a network which is made up of each and every element of reality. In this vision, diversity becomes a crucial factor for the co-construction of meaning, in a process firmly rooted in a sense of mutual responsibility.

Through this holistic relational lens, teaching and learning activities take place within an integrated network of different, but tightly interconnected, experiences and actors: an ecosystem. The self-referentiality so often found in the traditional school can thus be avoided: in fact, the students' development of the competences and meta-competences they need is fostered by their interaction with a diversity of actors in education, research and productive settings, all of whom share a common project. This by no means entails denying the value of teaching practices aimed at developing knowledge through theoretical study and personal exploration. The aim is to combine these latter with others, which focus on the goal-oriented exercise of knowledge in real-world environments. The development of these competences is intrinsically linked to how harmonious, holistic, fluid and dynamic the integration of these different experiences can be.

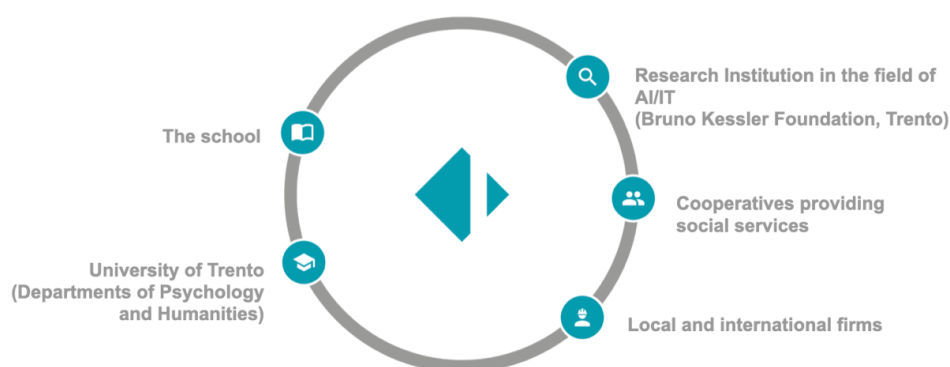
2. From School to Learning Ecosystems

The Artigianelli Institute has created a network of settings and actors which – both singly and together – are contributing to the students' development of the competences they need. Until 2007 the Institute offered a standard professional curriculum in graphic design. Now, it is better defined as an ecosystem (the 'ART' ecosystem) dedicated to development, innovation and applied research in the broadest sense, where different partners and actors interact (Fig. 1).

The Institute provides both a professional education curriculum that enables its (380) students to obtain a professional qualification and the state high school diploma, and a higher professional training path in graphic design. It also runs lab projects, some involving product/process innovation for partner firms, others focusing on more experimental work. Both high school and university students participate in these laboratories, which are supervised by researchers from the Bruno Kessler Foundation (<https://www.fbk.eu/en/>, Trento). The ecosystem also includes two cooperatives which manage the bar and a student canteen, a student cooperative which packages and markets organic products, and a 2D and

3D graphics lab run by an international cartoon studio which produces cinema cartoons. Another actor is Contamination Lab Trento, co-sponsored by the University of Trento, an interactive – physical and digital – space designed to foster entrepreneurship, where participants can work and problem solve together. As a matter of fact, problem solving is a keyword to this ecosystem, both as a method and a general goal. Business development and support for start-ups are important themes considered integral to the ecosystem, which offers new businesses (usually started by students or former students) frequent opportunities to collaborate on projects, orders and commissions. Last but not least, systematic research is being undertaken against this backdrop, in collaboration with the University of Trento, into how young people with SEN and those most likely to drop out of school can best be supported in their learning.

FIG. 1. *The ART Learning Ecosystem*



Source: Artigianelli Institute

In the meeting of all these initiatives and actors, a synergy is generated which optimizes resource use, know-how and business opportunities. This organized ecosystem allows the dualisms of knowledge/action, education/innovation, school/business, learning/development to be overcome, thus freeing businesses to become training places and training places to become spaces in which businesses and young people can together generate new ideas and projects.

3. Transcending Divisions: The School Subject and Class Group

If young people are to be given the opportunity to learn in different environments within a complex ecosystem, our entire teaching system must be reimagined. In our experience, key to this is the overcoming of division: that of knowledge into subjects and of students into classes. These divisions are grounded in a principle which is both deterministic

(the subjects are clearly defined, organized and divided in each year of the curriculum) and linear (subjects are studied according to a rigidly predetermined sequence). However, these divisions fail to adequately develop the competences necessary for an individual to participate actively – as a professional and as a citizen – in today’s society.

The experienced model, in contrast, takes a competence-based approach and involves a teaching framework structured around ‘courses’, learning units which develop specific competences. The competences to be developed on each course are decided collectively by the teaching staff, on the basis of the cultural and professional profile envisaged as the learning path objective. Other courses are intended to strengthen competences linked to creativity, innovation and problem solving or to develop meta-competences. Particular attention is paid to the use of different methodologies, frequently adopting the design thinking approach (Institute Artigianelli, 2021). Some courses are specifically oriented to creating innovative solutions for businesses, while others focus particularly on entrepreneurship. The courses can be taken in any of the different settings within the ecosystem or externally (as part of a joint initiative). The assessment of competences is carried out through standardized tests and shared scoring rubrics, either established collectively by the relevant teaching staff or devised by external experts. The evaluation of soft skills is carried out by all Institute staff through shared rubrics.

Some examples follow, in order to explain how the model works. The (roughly) 60 students enrolled in the third year (i.e. 11th grade) are divided into three ‘literature’ courses and five ‘writing’ courses. Each group is different – in both composition and size – and works with different teachers, in line with both the workshop methodology of ‘writing’ (which necessitates smaller student-teacher ratios), and the particular learning needs of students with SEN. Two of the ‘literature’ courses are designed to allow participants to obtain all the competences covered by the curriculum, and one focuses on acquiring the minimum competences required in order to pass (and includes alternative methodologies such as drama workshops). The ‘writing’ courses, focused on reading, comprehension and writing of texts in Italian, are organized as follows: three are working to acquire all the relevant competences, one is endeavouring to obtain the minimum necessary competences, and using the most appropriate methods for young people with a range of SEN (learning difficulties, or social disorders). The last group is made up of students with the most severe SEN and is not working towards any quantifiable goal; at times some students from the other groups interact with them, in peer education activities. A similar organization applies to courses developing linguistic and logical thinking competences.

The 60 students are also divided into 4 year-long ‘graphics’ courses. These run in parallel with 3-month course cycles, each course made up of a small, diverse group of students (rather like the learning station approach). One particular girl, for example, with the same group of 8

peers, participates (on a 3-month rotation) in courses in 'AI/IT', 'video' and 'printing processes'; it would also, however, be possible for her to participate in only 2 of these, and take a third course in a research laboratory at one of the partner institutions, with students older and/or younger than her, working on a multi-channel graphics project involving AI. This same girl also participates in some elective annual courses that make up the 'START' project (packaging, creative graphics, photography), which are open to all students in Years 1-4 (9th-12th grade), including those with SEN. It would also be possible for her to take the year-long mindfulness course and a 3-month course in public speaking.

As this example indicates, the model does not include class groups – or rather, does not entail a single group of the same students following the same path. Each learning group varies from course to course, and age is not a factor in its composition. The students are brought together in course groups according to the following criteria: each student's personal capacities and learning style, their attitude to entre-/intra-preneurship, and the particular sectors to which they are most strongly drawn.

The way in which the courses are planned and the elimination of class groups allow each student to follow a learning path specifically designed to optimize their own particular capacities. Each customized path is designed to foster the individual student's educational attainment and to allow them to experience educational environments that promote the development of whichever competences they can realistically acquire at that particular stage of their life. Students with SEN, who have to have individually tailored learning paths, all too often feel ashamed and even humiliated by traditional school programmes since they are frequently involved in specific activities which exclude them from their peer group, who are all following the same (standard) learning paths. Learning support in class is no less embarrassing, particularly for teenagers. In contrast, the proposed solution allows – if necessary – for each and every student to have their own individual path: group participants change from course to course, and the students experience how important it is to choose those courses which best facilitate the development of their own unique potential. These aspects, for students with SEN, foster an awareness of both their own potential and their own challenges, normalize their individual learning paths and, above all, contribute to the creation of a culture of diversity which emphasizes the value of what *each person* can bring to the community of which they are part. It does not imply ability-level grouping in any strict sense: a student who takes part in a 'writing' course aimed at acquiring the minimum competences could also be participating in a 'mathematics' course designed to develop the full range of competences, and in a 'START' course (alongside both older and younger students), while also attending mindfulness classes.

4. Building a Personalized Curriculum

This course-based educational process requires a careful consideration of how to build personalized curricula. The issue is important because it means addressing both psycho-pedagogical questions and formal aspects such as the official recognition of school qualifications. In order to keep the proposed system on the very 'margins of chaos' (Lanzara, Pardi, 1980; Keene, 2000) – and thus able to foster development and generate genuine learning processes without degenerating into chaos (i.e., a disordered mess deprived of formal recognition) – each student's personalized path must take into account the dynamic equilibrium between how best to teach and the necessary formal procedures.

The teaching method – centred as it is on the creation of personalized learning paths – can be said to be in harmony with human mental functions and the courses are classified into five different areas on the basis of which mental functions they tend in particular to enhance. The courses which foster the development of reflective thought through language use comprise the first area. The second includes courses that develop logical thinking and its use in interactions with our surroundings. The third area covers those courses which develop problem solving and executive functions and creativity, while the fourth includes courses linked to multilingual cognition. Finally, the fifth area comprises courses believed to develop the integrative functions of the mind and awareness of self and others. Each student's learning path is built by including those courses that most effectively enable the harmonious, integrated development of all the abovementioned functions, in light of the personal development and aspirations of the individual concerned.

The formal procedure takes into consideration the competences developed in the included courses and their correlation with the school qualification that each student wishes to obtain. For the purposes of official certification, all courses are categorized as either required or elective. Students have to include the required courses in their curricula because the competences that the latter develop are prerequisites for certification. The minimum required development of the relevant competence(s) has also been established for each course.

This procedure makes the system very flexible and thus enables real openness to the students' needs. If a student requires extra support in a specific area, it is possible to reduce their curriculum so that they can focus on the core competences required for the basic level of certification (professional qualification); this may also involve doing extra courses in the area(s) of concern, or repeating a course. The students with higher potential can take on extra courses run off-campus in collaboration with businesses, or simply higher level course options onsite.

The courses do more than simply develop the competences identified by breaking down traditional school subjects ('literature' and 'writing', for example, in the case of the Italian language). There are also courses aimed at developing mindfulness and self-awareness, or mutual

attention. Some courses involve high school students, university students and researchers in projects that provide support for business innovation, while others aim to develop entrepreneurial competences. This capacity to offer such a wide range of courses is mainly due to the fact that specific courses can be activated by different actors within the ecosystem. Fourth and fifth-year students participate regularly in a product innovation lab for businesses, working with university students and researchers from the Bruno Kessler Foundation and the University of Trento, who are part of the ecosystem. The fact that research institutes are involved means that courses specially designed for the most talented students can also be provided. On the other hand, the onsite restaurant and bar can also serve as training grounds for developing the competences of some of the more practically oriented students.

Conclusion

This paper has described some aspects of the integrated model for research, education, innovation and development devised and experienced at the Artigianelli Institute, a high school in the field of graphic design based in Trento (IT), in cooperation with the local University and a number of partners. The model, which draws on systems thinking and complexity theory, sets out to build a new educational system in which learning takes place within an ecosystem and the dualism of school/business, education/innovation, learning/development are transcended. The implementation of the model has proven effective, in both educational and managerial terms. The elimination of the division of knowledge into subjects and students into age determined classes is key to this innovation which opens the way to new teaching methods capable of promoting active – professional and political – participation and better valorizing the different potentials of every student. The diversity of the students' capacities and interests thus effectively becomes a value, an outcome which harmonizes with EU educational policies for our knowledge-based society, which see strength in diversity (European Commission, 2013).

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