Looking at the new digital school: didactics 2.0 and school 2.0

Paolo Di Sia

University of Padova, School of Science, Department of Chemical Science,
Via Marzolo 1, 35131 Padova, Italy
University of Padova, School of Medicine, Department of Neuroscience,
Via Giustiniani 2, 35128 Padova, Italy
Free University of Bolzano, Faculty of Science and Technology,
Piazza Università 5, 39100 Bolzano, Italy
E-mail address: paolo.disia@gmail.com
ORCID number: https://orcid.org/0000-0002-6405-0483

Abstract

Aim. Today we have the need to develop more effective teaching methods, where the student is no longer just a user, but becomes an integral part of the training process by creating, selecting and processing experiences in a personal way. Digital teaching has become/is becoming part of the school scenario along with the wealth of digital technologies and tools that have spread over the past decades. Today's society has changed and even the school must be able to exploit all resources that social networks make available for capturing the attention of "digital natives".

Methods. The student becomes an active constructor of knowledge, integrating it in a personal way. We talk about "didactics 2.0", i.e. the study and improvement of teaching activity achievable with the use of ICT tools. To create a learning environment, we must take into account the collaboration of several parties (teachers, experts in the field, students, parents), not forgetting the complexity and multiplicity of the surrounding reality. This learning environment can profitably use social networks; students show to learn better if they find meaningful the subjects they are studying.

Results. The paper illustrates tools and forms of collaboration achievable with the digital educational school environment. Social networks are used by students to the point of becoming a real language for "digital natives". When we talk about digital culture, we want to highlight the participation and digitalisation of traditional cultural processes, from which the educational environment does not escape. In the "school 2.0" approach there are some peculiarities leading the school system towards the new generations.

Conclusions. The need to "digitise" the school is a current hot topic, also if in everyday reality the work to do is still a lot: non-existent or obsolete computer labs, teachers who do not consider computers as a resource. Digitised teaching can be realised according to multiple channels that have different characteristics and purposes.

Key words: didactics 2.0, school 2.0, new technologies, teaching methods, ICT tools, digitalisation, social networks, culture.

Introduction

Digital technologies have radically changed the present society and with it the uses and customs of people. Consequent to the social evolution, also didactics and the scholastic universe have been involved in a process of restructuring the teaching and learning system, which has emphasised the integration of digital technologies and tools for the transmission of knowledge. With the digital culture that introduced the digitalisation of cultural processes, technology is permeated in the various social sectors, modifying all traditional aspects (Greenfield, 2015; Di Sia, 2017a).

The main role in the transmission of culture and knowledge is entrusted to the scholastic institution; there is the need to reorganise the old system based on the transmission of knowledge only through texts and lectures, for integrating digital technologies into the new educational system. This paper aims to provide a guide to the analysis of new tools available to students and teachers, able to provide support also to students with psychomotor difficulties and learning disorders. For this purpose the concepts of "didactics 2.0" and "digital didactics" are introduced, with a look at the so-called "school 2.0".

Didactics 2.0

Didactics is the discipline that exposes teaching theories and practices. It takes care of the general knowledge of educational techniques and characteristics of individual subjects of learning. The main idea of didactics 2.0 is to consider the web evolution, passing from an initial static not user-interacting phase to a more dynamic one, using the tools of "Web 2.0" and more generally the new technologies (Figure 1) (Anderson, 2012; Di Sia, 2018).
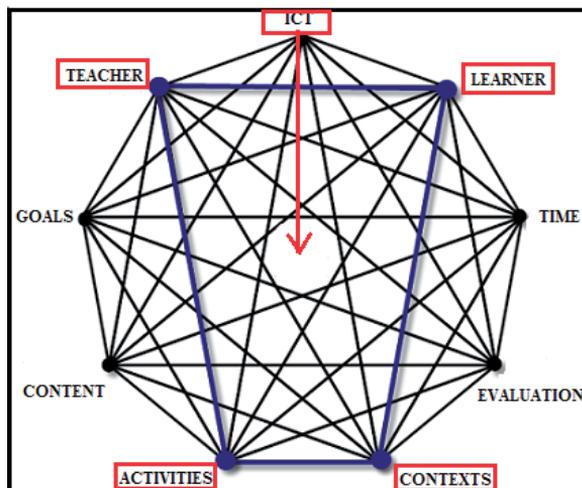
Fig. 1. Realities involved in didactics 2.0.
Source: own drawing.

It is a process of teaching and learning that overcomes traditional teaching methods based on the centrality of the teacher and on the transmission of content, promoting the active role of students and the acquisition of new skills. It embraces the most broad concept of *digital learning*; with it we do not indicate a different school from the traditional one, but a school that focuses on the innovation of the school system (Gordon, 2000; Ferri, 2011; Rossi, 2010).

DIGITAL CULTURE: NEW TECHNOLOGIES FOR DIDACTICS

Digital culture was born with the Internet and developed thanks to practices linked to new technologies that brought changes in terms of individual and collective action. It is characterised by three elements:
- participation;
- digitisation;
- re-use of information.

The participation of users implies their active role; people participating in the culture are no longer simply users of a message or a content, but become authors and actors of the information society. In this way the relational model is transformed from "by one to many" into "by many to many".

Digitisation concerns the content conversion into digital format, thanks to new technologies and data homogeneity. Images, texts and sounds can coexist on the same device, be easily archived and transported.

The re-use of content consists in the possibility of facilitated access to information that, thanks to technologies, can be shared, consulted and reused.

These features have modified the way of learning and introduced the concept of *e-learning*, i.e. the complex of technological means made available to users for the distribution of educational content multimedia (Flew, 2014; Di Sia, 2016a).

Technological delay has always characterised the scholastic environment and the reasons are of an economic nature and in the lack of basic personnel training on web technologies and languages. The integration of technologies in the world of learning is tiring because the education of teachers often does not follow a fixed pattern but is lost among the many novelties of a context in continuous change.

The "Digital School Project" aims to modify the learning environment by introducing the use of technologies as daily teaching support. The world of school must benefit from the innovation developing outside it (Wolf, Bobst & Mangum, 2017).

The project shows a series of objectives to be achieved:
- with the use of the *MIW* (Multimedia Interactive Whiteboard), an object similar to the traditional blackboard but with innovative functions, with the aim of helping teachers and students to become familiar with the new technologies, without upsetting traditional habits (Figure 2);
- to make available to students and teachers technological and multimedia devices for *internet connection*;

- the *electronic register*, which is progressively replacing the paper version, with all old elements and with new ones. Its adoption has been made possible by the extension of the Wi-Fi network in the school environment;
- *staff training*, complete digitisation of school administration, definition of the competences of teachers and students in the use of the web and information technology will be the goals to be accomplished in next years (Di Sia, 2015; Di Sia, 2017a).

Fig. 2. LCD smart interactive whiteboard in the classroom.
Source: www.multi-touchkiosk.com.

Tools and forms of collaboration

Students live today within a social context in which the use of technology is linked to all sectors of everyday life. For motivating learning and making it more incisive, it is necessary to exploit the opportunities offered by the network, to integrate ICTs in the school tradition and to create a virtual environment for facilitating the exchange of ideas, materials and information. To meet the needs of the new school, there are multiple platforms structured and connected to textbooks and different software applications.

G-Suite: Google apps for education
This is a set of software offered in hosting by Google to schools for communication and collaboration. The set of available products is usable with every device; it includes Google web applications such as Gmail, Google Drive, Google Hangouts, an instant messaging software, Google Document, Google Classroom, a service exploiting the potential of other existing services to simplify the class life and improve organisation and work within the school (Figure 3).
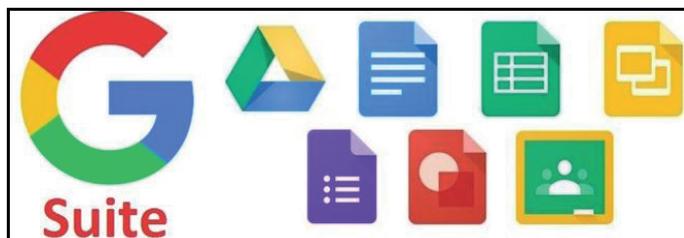
Fig. 3. Google Suite.
Source: https://blog.gruppotmstore.it.

It is an entirely online tool which is easy, intuitive and reachable from any device, at any time and place; it allows teachers to create and manage a virtual class by adding students to it. Once the class has been created, it is possible to assign tasks to the students, check deliveries, record grades, set up notifications, messages and reminders to send to students. The use of the Google Suite offers many advantages such as the guarantee of security and privacy, entrusted to modern security systems, connection and interoperability, which enable saving documents directly onto the web (making them available online) and a simplified and efficient communication (Deng, & Yuen, 2009; Deng & Yuen, 2011).

Inverted teaching: the flipped classroom

The flipped classroom is an innovative teaching method. It proposes itself as a model of experimentation that overturns the traditional system based on explanation in the classroom by the teacher onto a phase of individual study of the student at home and on verification in the classroom.

The tool used in this teaching mode is mostly video, both in the form of tutorial and of video-lessons. The didactic activity starts at home; the students are entrusted with the task of obtaining information on a given topic established by the teacher through tools provided in digital way, such as maps and interactive documents. Students are prepared to arrive at the class with questions and curiosities to address to the teacher and companions. At school the teacher proposes a dialogue with students, taking up the proposed themes and stimulating discussion, proposing collaborative activities and deepening what has been learned at home (Reidsema, Kavanagh, Hadgraft & Smith, 2017).

Digital laboratories

The strategy for the innovation of the educational system incites the activity carried out within laboratories for the development of digital skills. The proposals concern the integration of the use of ICTs in the development of all educational activities. Digital laboratories cover the whole spectrum of teaching and include different levels:
- *communication*, for the development of transversal skills;
- *learning*, for strengthening basic skills and enhancing methods of learning;
- *thinking*, for developing computational thinking and enhancing design skills of students;
- *exploration*, for the development of digital creativity.

BYOD: bring your own device

This is an expression describing the company policies that allow employees to use their personal devices in the workplace. The appeal to BYOD policy is also present in the educational area for providing a new innovative teaching strategy. The BYOD action refers to each device and not only to smartphones; under the guidance and control of the teacher, students will be able to access the web during the lesson in the classroom, to join social networks for teaching and to answer quizzes and surveys directly using the own device.

The added value of BYOD compared to traditional teaching is the possibility of working in school with all tools that the student can use at home. BYOD policy tries therefore to overcome the idea of using a software with a school-specific license (Rajendran, 2018; Endberg, Rolf & Lorenz, 2018).

Digital Storytelling

Storytelling is a teaching practice that exploits the narrative expedient; remembering a story or a romance is easier than remembering an explanation. The effectiveness of the narrative resides in the use of strategic schemes through a language placed on the same level of the daily one. The didactic use of storytelling includes:
- a *first phase* during which the grammatical structure of the narration is taught;
- a *second phase* that involves the creation of stories as a tool for the development of new skills.

Digital storytelling is the new frontier of story creation and is based on the combination between the art of inventing a story and use of multimedia tools (graphics, audio, video and web). The narration through digital tools requires a detailed planning of the operations to be carried out and the need and the capacity of using different technological tools. The steps for the realisation of a digital storytelling can be identified as:

1. *Define* the initial idea through a short description, a diagram, a question;
2. *Research*, *collect* and *study* information on which the story will be built;
3. *Write* the story by defining the style of the narration;
4. *Translate* the story into a screenplay;
5. *Record* images, sounds, videos;
6. *Assemble* the material;
7. *Distribute* the product;
8. *Collect* and *analyse* feedback.

Through these phases, storytelling has a strong impact on the cognitive and educational level, showing itself as a valid tool for approaching a topic and increasing in the meantime transversal, digital and linguistic skills (Ohler, 2013).

TEAL: Technology Enhanced Active Learning

TEAL is a teaching methodology that combines frontal lessons, simulations and computer lab activities for a learning experience enriched by technologies and based on collaboration. The protocol contemplates a classroom with a central location for the teacher, around which some tables hosting groups of students that work cooperatively (Figure 4).

Fig. 4. TEAL.
Source: www.scuolaetecnologia.it.

The TEAL teaching plan uses platforms for the transmission of knowledge and covers not only the field of the humanities, but also that of scientific and mathematical disciplines, helping in this case to overcome the problem of abstractness of some concepts (Shieh, 2012).

E-Learning: MOODLE platforms
Moodle, acronym of "Modular Object-Oriented Dynamic Learning Environment", is an environment for modular, dynamic, object-oriented learning. It is a learning platform designed to provide teachers, educators, administrators and students with a single, robust system, integrated for creating personalised learning environments (Figure 5).

Fig. 5. E-learning environment.
Source: https://elearning.unipd.it.

It is built for global level learning, designed for support of both teaching and learning, highly flexible and customisable. It is usable anytime, anywhere and with any device. The basic idea is to give space to technologies for overcoming

space and time limits. The teacher can view all students logs and their connection. The tools available for each course are forums, blogs, chats, glossaries and quizzes (elearningnc.gov, 2019; Chimenti, 2010).

Digitised inclusive education and digital compensatory tools

About "Special Educational Needs" and "Learning Specific Disorders", there is the need to take an educational approach aimed at the total integration of all students (istruzione.it, 2019). The diagnostic plan recognises and classifies the cases of need for special individualised education, in consideration of the person in her/his totality, in a psycho-social perspective.

Each student can express special educational needs or disturbances in learning techniques, which occur when the subjects of teaching incur in any evolutionary transitory or permanent difficulty, in the field of education or learning. These disorders come in the form of difficulty in developing specific skills like reading, writing and calculation skills and do not allow complete self-sufficiency in the context of school life.

The area of disadvantage is much wider than that relating to the presence of physical deficits; in each class there may be students needing special attention for different reasons. Three major sub-categories of special needs have been recognised:
- disability;
- developmental disorders;
- socio-economic, linguistic and cultural disadvantage.

The right to education is guaranteed by the opportunity to create an individualised path managed with a personalised teaching plan, with which a learning strategy and teaching criteria useful for the needs of each individual are programmed. The guidelines for the right to education allow also measures and compensatory interventions, that allow the student to receive support in performance of services that, due to a disturbance, can be particularly difficult.

Compensatory tools are part of a technique of teaching based on the articulation of active, participatory, constructive and affective methodologies, arousing the interest and igniting the motivation of students, triggering active and autonomous learning processes.

Seven dimensions of the didactic action have been identified on which it is possible to act for increasing participation levels:
1. *Classmates*: they are a valuable resource for stimulation and incentive about the collaborative work.
2. *Adaptation*: adapting means changing materials and activating multiple channels of elaboration with respect to the different skill levels and to the different cognitive styles of the students.
3. *Logical-visual strategies*: stimulating the use of schematisation forms, in particular diagrams, time lines and illustrations for proposing an alternative and effective storage methodology.

4. *Cognitive processes and learning styles*: executive functions such as memorisation and planning allow the development of important psychological skills.
5. *Metacognition and study method*: for structuring an effective processing method it is necessary to develop personalised cognitive mediation strategies.
6. *Emotions*: psychological variables play an important role in the development of learning motivation, stimulated by good levels of self-esteem and belonging to a peer group.
7. *Evaluation and feedback*: a student's assessment must be aimed at the training because the student's requests must not become a censorship element (sondriocts.it, 2019).

Digital tools play a central role in managing the personalisation of the school path. The settings for the accessibility of the tools make available a series of functions for audio and video support, for interaction and learning. In the case of subjects disturbed by motor or sensory disabilities, the use of tablets and smartphones makes possible the adaptation of the font size of the text or the insertion of an enlargement lens function, the use of a voice over and the connection of electronic and digital devices.

In the field of dysgraphia and dyslexia, ad hoc fonts improve the readability of text and supports for automated writing with spell checker help in writing a lexically correct text; the electronic dictionary, books in digital format and the vocal synthesiser facilitate management and execution (Zappaterra, 2016).

Technology allow students and teachers with many applications, programs and services for many activities: drawing, photography, notes, writing, presentations, file archiving, audio and video recording, creation and consultation of texts, timelines and mappings (youreduaction.it, 2019).

Files and documents illustrate how to use innovative tools, supports and innovative teaching methods. These materials are important for teachers, constituting valid guides to be taken into consideration for the setting of school lessons. Equally important is the voice of students who live at the school everyday, who have witnessed the change and are taking part in it. Important is also the expedient of *gamification*, i.e. the use of play applications for educational purposes (Di Sia, 2016b).

About the "School 2.0"

About the differences of 21st century teaching, we underline five realities that are leading the school system towards the new generation; they are the challenges of today's school. Novelties are helping to make the classrooms a place of welcome, a search for professionalism, curiosity about differences and integrated communication.

Multimedia: the need for the school 2.0

The changes of the new generation towards the increasing use of PCs, smartphones and tablets has led the school system to have to try new learning channels of communication between teachers and students. In recent years multimedia have entered classes dramatically, helping to carry the school made of paper and chalk towards the new digital generation.

Interactive multimedia boards (IMBs), designed to enter the classrooms without being perceived as something external, are a support for educational activities able to integrate the classic concept of blackboard with a multimedia language made of sounds, images and videos. The use of IMBs can be closer to students with special educational needs who cannot find stimulation and support in traditional teaching.

Inclusion: the need of today's society

A school which is the mirror of a different society, if compared to that of the past, cannot ignore the evolution towards a didactics defined as "inclusive". By inclusive teaching we mean a training process aimed at all students in such a way that everyone can express her/his potential; the purpose is that of integration, comparison, participation and support. Children and teenagers learn also from the relationship with friends with special educational needs and specific learning disabilities; it is a class that in the eyes of children without malice appears as heterogeneous, full of curiosity, interesting and stimulating.

Canteen: to each her/his food

In a country, millions of children and young people take advantage of the canteen service. The presence of celiac or Muslim children, vegetarians or lactose intolerants has meant that the canteen services offer students many menus: without pork, without beef , without meat (but with fish), without food of animal origin (vegan), without meat and fish (vegetarian), for celiacs, lactose intolerants, with food allergies (such as eggs and shellfish), etc.

The health needs and ethical practices of students must be followed and encouraged; the canteen can thus become a strong vehicle for inclusion. Unlike in the past, the fact that the menus are commissioned to external companies of professionals makes a real possible choice.

School-work alternation: new professionals wanted

Unlike in the past, when work and school represented two different and irreconcilable worlds, today they tend to unite. Specifically, we talk about many hours in high schools dedicated to internships in companies, public institutions or museums, both in winter and in summer.

Teachers: trained, updated and organizers

What makes the school system modern and up-to-date are the teachers. An important dictate is the rehabilitation of the role of teacher, with mandatory in--service training and professional updating through books, texts, digital tools,

admissions to exhibitions and cultural events, purchase of hardware and software. Only truly motivated and adequately trained teachers can bring the desire to learn, to get involved, to grow (Kali, Baram-Tsabari & Schejter 2019; Voogt, Knezek, Christensen & Lai, 2018).

Conclusions

Digital teaching has entered into schools through multimedia tools at the service of students and teachers. This educational methodology can be implemented according to multiple channels that have different characteristics and purposes; in this sense it is necessary that educators and teachers develop in-depth knowledge on the subject for transmitting them also to students. Modifying a national institution rooted in society is not a simple task to carry out, but this operation becomes necessary when the educational methods are not more adaptable to the needs of those who participate.

In a social context in which digital culture plays a leading role, even the school world must benefit from the innovation that develops outside it and must include in its instruments all means considered necessary.

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