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TECHNOLOGIES, EDUCATION AND TEACHING METHODOLOGIES IN ITALIAN SCHOOLS IN THE 1980s. THE CONTRIBUTION OF THE *SCUOLA ITALIANA MODERNA* JOURNAL

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ABSTRACT

The *Scuola Italiana Moderna* specialist journal made a significant contribution to the debate that was underway in Italy in the 1980s on the introduction of technology in the classroom. The journal published articles on how AI (Artificial Intelligence) works, on its inclusion at school both as a subject of study and as an innovative teaching method. Especially in the Education Ministry's New Programs for primary schools of 1985, computer science was seen as a formative resource to be promoted, albeit without losing sight of its potential risks to pupils. The introduction of computer science in Italian schools was in line with other experiences of computers being adopted as "teaching machines" in schools elsewhere in Europe.

KEYWORDS: History of education, Artificial Intelligence, Scuola Italiana Moderna, teaching methodologies, Europe

1. INTRODUCTION

Scuola Italiana Moderna (*SIM*) is an Italian specialist journal that has existed since 1893, and is still published today by the *La Scuola* publishing house in Brescia. It quickly became very popular right from the start, with a huge readership of primary-school teachers as well as head teachers and school inspectors[1].

[1] *SIM* was first published as a professional journal in 1893 for the *Editrice La Scuola* publishing house. Contributors to the journal, some of them well-known names, included education theorists and cultural figures on the Catholic scene, and also from other backgrounds. Articles in the journal discuss the main problems experienced in the sphere of schools, teaching and learning, and the content is always up to date with the historical and cultural changes under-

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In this contribution we examine the journal's stance in the second half of the 1970s and during the 1980s regarding the concept of technology, computer sciences and their application to teaching at a time when "intelligent machines" begin to find a place, albeit slowly, in Italian homes and schools.

In Italy the 1980s coincide with a period of full-blown industrialization and profound social change after the economic boom of the 1960s, the 1968 socio-cultural revolution, and the "years of lead" in the early 1970s, when the political and social turmoil gave rise to episodes of terrorism. The economic conditions begin to improve for many families and industries express the need for an automation of their systems, not only on the mass production line, but also in their business management.

Given a chronic shortage of funds to purchase teaching aids and materials, it is still difficult for Italian schools to gain access to computers. It is only with the publication of the New Programs for primary schools in 1985, which envisage the teaching of computer sciences, that the situation seems to change.

2. New Technologies: Science and Science Fiction

Already towards the end of the 1970s, there are articles in *SIM* that attempt to define the meaning of an education in science and technology. As regards the latter, the articles introduce the new technologies either by dealing with the topic directly or, more indirectly, by presenting science fiction novels for young people that imagine a different relationship between man and machine.

In outlining the problems relating to the sciences, the philosopher Dario Antiseri (a highly-respected contributor to the journal) writes an article in 1979 entitled *The world of ideas and language analysis*. He discusses how to establish what we mean by scientific knowledge. After an introduction drawing on Popper and Eccles (the Nobel prize-winning neurophysiologist), in which Antiseri recalls the term *World 3* for the world of culture and ideas[2],

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way in Italian society at the time.

[2] "Popper (and many biologists of his time) gave the set of products of cultural (or exosomatic) evolution the name of *World 3* to distinguish it from *World 1* of material things, and from *World 2* of subjective experiences. Taking a sort of census of this World 3, John Eccles (the Nobel prize-winning neurophysiologist) identifies the following inhabitants: evidence of intellectual, philosophical, theological, scientific, historical, literary, artistic and technological enterprises; theoretical systems; scientific problems; and critical argumentations. In short, World 3, or the cultural world, is the world of religious faiths, legal systems, moral norms, institutions, myths and fables, philosophical theories, concepts of the state, proverbs, superstitions, and works of art. It is the world of the products of the human mind: the world of ideas." (Antiseri, 1979a, 1, p. 11).

the Author goes on to suggest that *World 3* "has a logical province: and this is the province of problems, theories and scientific arguments; it is the province of the history of science. […] Scientific ideas have contributed, to an unimaginable degree, to changing the face of the Earth" (1979a, 1, p. 11). In issue No. 5 of the same year, Antiseri returns to this topic in an article entitled *Is science natural?* Going against an increasingly widespread irrationalism that strives to combat scientific rationality, he suggests that to describe a scientific theory as objective is by no means tantamount to saying that it is *incontrovertible* and *absolute,* or written for eternity. It only means that, given the background knowledge available at the time, and the test methods that can be adopted on the strength of that knowledge, the theory can be publicly either disputed or confirmed. No scientific theory, even when confirmed, is incontrovertible. A scientific theory "is not irrelevant to our values, or to our views of the world […] and our political actions" (1979b, 5, p. 14). The science that produces technical advances and technology is constantly developing, and the journal is likewise open to constant change.

In 1978, Alfio Zoi (a regular contributor to the journal and important reference on language teaching) writes an article entitled *What technological training?* Returning to a discourse begun already in the 1960s, and putting what Antiseri said into practice, Zoi warns readers that "in the work plan that *SIM* has been proposing for some time, there is an aim that has sometimes been called 'practical training', sometimes 'technical or technological training', and sometimes 'education on making and producing'" (1978, 10, p. 17). Zoi claims that, whatever it is called, this is a type of teaching that concerns a fundamental aspect to be developed and trained in an individual, and that is:

> a capacity to intervene in the natural world to modify it for certain purposes. More in general, it is a case of making the active presence of mankind on Earth evident, marked by the appearance of tools and products capable of modifying the world and, in turn, the human condition (p. 17).

In other words, technological development concerns not only a specific human capability, but the way in which humans inhabit the Earth and interact with the environment. This foreshadows all those problems, and related educational issues, that will come to our attention in the increasingly frequent and profound interaction between man and machines.

According to Zoi, schools have always done little and poorly in the field of technology. They have restricted their action to proposing playful activities or pointless little jobs, and never taken a technological education seriously. His recommendations therefore go in two directions towards: a practical and tangible understanding of the technological process in its essential stages; and an understanding of environment-related technological issues, and the questions they pose. The schoolwork must be interdisciplinary, and demands both logical and practical skills because its implementation involves the need to study matter and its properties, to devise a project and bring it to completion, in order to test how things change at school. This will make it easier to see just how much "technology produces a series of objects and tools that, for better or for worse, change before our eyes the way in which we live and nature itself." Zoi thus places the accent not so much on the content, but rather on the educational value of technology, and on how we can reflect on its evolution.

The journal hosts two interesting articles by Nino Stillitano entitled *The video recorder in schools* published in issue No. 5 of 1980 (1980a, pp. 26-27), and *The video camera in primary school*, which appeared in issue No. 7 of the same year (1980b, pp. 19-20). Stillitano discusses this audiovisual equipment, which still seems a novelty in the classroom, but will very soon be supplanted by computers. He mentions how the video recorder is gaining ground in schools, listing the reasons for its growing success: the simple steps involved in its use; an initial not inconsiderable cost that is soon amortized because any broadcast can be recorded and canceled; the opportunity to connect a video camera to produce television programs. This teaching aid thus makes available a large quantity of audiovisual material. With the aid of a video camera, it can also be used to produce genuine television programs, such as interviews with elderly people on what schools were like in the past, or newsreels for young people, or films about school life. It can also be used for refresher courses for teachers. Using the video camera is important for another reason too: by creating video images, the pupil contributes to producing culture as well as transmitting it. That is why the articles contain advice on how to produce documentaries or interviews, and how to convert the classroom into a television studio. The Author explains that, at around two million Italian lira, the cost of purchasing a video camera, a video recorder, microphones and a television is considerable, but it enables a significant change in teaching methodology. This new technical equipment can therefore have a considerable impact at school, paving the way to an even more significant use of other learning tools and machines. Rather than changing the teaching content, they change the way in which this content is conveyed and the chances of creating an active and participative learning experience.

There are also articles on science fiction and its relationship with education theory that contribute to clarifying the journal's stance. There is an awareness of the social and cultural disorientation that the rapid development of the sciences has caused and, by reflecting on the literature for young readers, the articles reiterate the call for a type of education and training that takes into account the needs of "technological man."

The journal publishes two articles by Antonino Scacco in 1981. In *Science fiction novels for young people* (19, pp. 9-11), Scacco writes that such novels stem from a sense of malaise with which humanity is struggling as a result of technological and scientific developments. The optimistic 19th-century view saw in the sciences the perfect tool for establishing a "new order" of peace and justice, consigning hunger and ignorance to the past. In the ensuing 40 years, however, this view has faded, replaced by a scenario overshadowed by looming environmental, nuclear, demographic and social catastrophes. Scacco writes:

> *Homo technologicus* lives in a state of confusion and anxiety. He lacks adequate strategies, institutions or organizational formats to protect him from the disease of the century that Toffler describes as the *shock of the future*, and that is 'the dizziness-inducing disorientation triggered by a premature arrival in the future'. Science fiction fills this gap because it […] prepares young people to live and survive in a world in constant flux, teaching them that the world changes (p. 9).

Returning to the topic in 1983 in a more pedagogical-educational key, in *Science fiction and education theory* (3, pp. 22-24), Scacco writes that the science fiction literature accompanies "the mind of young people on an imaginary exploration of the jungle of political, social, psychological and ethical problems that they will face as adults" (p. 22). Science fiction tries to warn us of the tremendous responsibilities that we have in relation to our own species and our natural habitat, and to emphasize the urgency of finding a remedy for our errors, before it is too late: "so what stands out in the literature is the topic of machines, electronic brains, prodigious inventions that enable us to transform the most arid and farthest-away asteroids into an artificial paradise, to rise into the air over the city traffic, to instantly translate other people's languages into our own and vice versa" (p. 24).

The novels also return to the topic of technological education, or rather to the relationship between man and his environment, and how it changes with every new invention, presenting a different future that is both fascinating and hazardous at one and the same time. There is an ambivalence in relation to a future in which machines will have a decisive role in people's lives: while it attracts us, offering hitherto unhoped-for opportunities, it also obliges us to engage in reflections that go beyond science, and pose ethical questions. Scacco thus concludes: "Science fiction rightly deserves our appreciation for having built a bridge between scientific culture and humanist culture, as demonstrated by the storylines of so many science fiction novels, based not only on the natural sciences (physics, astronomy cosmology, and so on), but also on the human sciences (anthropology, ethnology, sociology, linguistics, etc.)" (p. 24).

This introduces an issue that serves as a prelude to the debate in the 1980s, by which time computer science has become a teaching subject, and must find its place in the educational project of primary schools.

3. Computer sciences: a new subject to learn

In 1985, Italy's New Programs for teaching in primary schools – enshrined in law by presidential decree (DPR n. 104 of 12 February 1985) – introduce computer science as a part of the teaching program in the sphere of mathematics. On the pages of the *SIM* journal, however, various authors' interpretations would suggest, that computers should also be considered as a tool for use in applications across all study subjects.

The articles on computer science written in the 1980s can be divided into two categories: one includes those explaining in detail and in technical terms what computer science is, and what computers do; in the other, authors discuss computer science in relation to teaching and education. The former type of article explaining computer science to teachers can be exemplified with three consecutive contributions from Francesco Romani at the Information Processing Institute of Italy's National Research Council in Pisa. In his first article, *Computer science/1 Informatics, science and teaching* (1985, 8, pp. 34-45), Romani explains that computer science is information science in its theoretical and practical aspects, i.e. a set of theories rooted in traditional scientific disciplines such as mathematics, physics and electronic engineering. He moves on to the theoretical foundations of automatic calculation, and the history of calculators, recalling Leonardo Torres, Konrad Zuse and the Z3 machine, the Harvard MARK II calculator, the first completely electronic EINAC processor developed in Pennsylvania, and the work of John von Neumann. He then suggests that subsequent developments in electronic technology have been essentially of two kinds. On the one hand, the use of ever faster, less costly and more compact electronic devices has enabled a reduction in the cost and size of processors, while improving their performance by several orders of magnitude. On the other, advances in the information sciences have enabled us to extend the applications of these processors to practically every field of civil life, simplifying their use so that even non-specialists can exploit them and understand how they work.

Romani then proceeds to explain algorithms, programs and programming languages: the translation of an algorithm into a language is called a "program," and these programs constitute the "software," while the "hardware" is the physical appliance. He lists the top-level languages

(FORTRAN, BASIC, COBOL, and later ALGOL 60, PASCAL and ADA) and explains the structure of a computer, starting with the memory and terminals, and arriving at computer networks.

Romani explains that the main areas of development in computer science are: meta-mathematics and computational theory; AI and programming languages; computer engineering; the structure of data and the management of databases; computational complexity theory; numerical mathematics; information theory; and transmission. The practical applications envisaged are numerous, and include: instruments that can be used in modern life; instruments for digitizing bureaucracy; the administrative management of businesses; word processors to facilitate writing; instruments replacing machines such as typewriters, televisions, motor cars, and household appliances. All this, Romani claims, also carries inherent risks to the efficiency and safety of the related activities.

A brief conclusion to his article concerns the relationship between computer science and teaching methodology. At middle schools and high schools, computer science should be taught by a specific teacher, or by a math teacher who has received the necessary additional training. This will enable an instrumental use of computers in graphic processing and a new approach to teaching math. In primary schools, on the other hand, we can speak of teaching computer science, but this should become a teaching methodology applied to all subjects, such as the teaching of traditional languages using computer-based assisted learning techniques. Romani adds that young people already know and play videogames.

In a follow-up to his first article, and still on a very technical level, Romani writes in 1986 on *Computer sciences: programming languages*, in collaboration with Bruno Codenotti. The two Authors explain that, given the vastness of the topic, they will only describe in detail and in a layman's terms the concepts relating to programming languages, their syntactic structure, the analysis of algorithms and computer programming, seeking to give readers some insight on the potential of computer science. The third article, appearing in issue No. 11 of the same year, is also concerned with languages, data analysis, and flowcharts.

The *SIM* journal's editors clearly consider this type of article a good way to provide some, albeit limited training for the primary-school teachers among its readers. The publishers assume that such articles, written by experts, can help to introduce teachers to the world of computer science.

4. Computer science, teaching and primary school education

Already in 1984, in view of the imminent arrival of the New Programs, and in the light of a provisional text, articles begin to appear in *SIM* on the topic of computer science from the point of view of teaching methodology. What emerges, and will become a constant feature of the journal, is a careful consideration of its educational value, but also of its potential risks. At school, as elsewhere, the role of computers is seen as ambivalent: they create great opportunities, but can also pose a health risk if, in the sphere of cognitive and educational processes, the relationship between humans and machines is not kept along the right lines.

In an article entitled *Computer science: a new educational resource* (1984, 9, pp. 12-14), Fresolone (a primary-school head teacher) suggests that the New Programs should be interpreted with caution because they introduce a new type of literacy, but also pose new problems:

> Primary schools are thus also committed to an entirely new alphabetization, or computer literacy, the presence of which is legitimized in the New Programs by the expectation of a near future characterized by ever more sophisticated scientific and technological advances, and by a growing diffusion of electronic machines. […] Faced with this *presence*, we may run two parallel risks, that of overemphasizing the nature and functions of computer science and its instruments (computers); and that of failing to consider carefully enough the multiple problems emerging from the diffusion of computer science, telematics, robotics – problems that are before our eyes and that affect us all in some way (p. 13).

To contain the risks, we need to concentrate our attention on a broader interpretation of the introduction of computer science in schools that goes beyond learning how the technical instrument functions to become a genuine teaching-learning method:

> Computer science acquires a formative value and, while technical instruments have amplified mankind's physical capabilities, computers tend to engage and amplify his *mental* capabilities. It is not just a case of teaching computer science, but of leading to an understanding of the logic that lies behind the technological instruments. Computer science is not a teaching subject, but a teaching method that moves along a path founded on informatic concepts of combining and separating parts, deciding which data to analyze, identifying the relations existing between different elements, attributing each part its rightful value, distinguishing between constant data and variable data (p. 13).

Another recurrent topic concerns the development of creative capabilities through the use of machines. Some believe that using the computer makes people learn technical skills, but does not nurture creative and imaginative abilities. Others make the effort to consider all their potential, and demonstrate how computers develop inventiveness too. Fresolone seems to be of the former opinion when he claims that the machine is structured from the outside, whereas humans are structured from the inside by means of a continuous educational process. There are operations that cannot be entrusted to computers because they demand creative spirit and heuristic abilities. The intelligence of computers is an AI, developed and programmed by humans so that the machine can perform only certain operations. The virtually unlimited potential ability of machines to manage something raises doubts that the increasingly sophisticated evolution of these instruments can threaten the primacy of humans in mental activities. That said, the Author takes a more intermediate and conciliatory stance, writing that the total dependence of the AI of machines on human intelligence should have overcome and distinguished between the problems relating to the electronic processes of machines, and to the anthropological processes of humans. In fact, he writes: "the real relationship between man and machine lies in the moment when humans program and use the machine to modify their own behavior, for instance to integrate and improve a pupil's learning" – as in the case of a machine answering a pupil's questions with individualized sentences.

In 1986, a year after the New Programs came into force, Roberto Leoni writes an article entitled *New Programs and informatic alphabetization. The computer as* (4, pp. 17-18) that takes a much more favorable stance to computer science, judging it capable of alphabetizing the new generations, and thereby enabling them to live in the society of tomorrow. It is the field of

> the freedom-guaranteeing rationality that gives pupils – adults beyond the year 2000 – the chance to fit positively in a given society and culture that will certainly be characterized in an informatic sense. Anyone who is not computer-literate will unavoidably be illiterate and, as such, will be marginalized, and liable to manipulation and massification (p. 17).

Pupils must therefore: be able to express themselves in flowcharts, with limited ramifications in all school subjects; have an understanding of binary code; learn notions of electronics and how a computer functions; make use of this medium as a database and for graphic or musical processing. The New Programs of 1985 mention the computer vertically in all school subjects, and horizontally in the specific context of mathematics. They therefore prescribe a degree of computer literacy. According to Leoni, however, in addition to these first two goals – computer literacy and an optimization of basic learning – the use of computers should have a third aim, and that is to thoroughly explicate the cognitive potential of the "left hand." This potential, grounded in fantasy and imagination, initially becomes manifest as an intuition, and subsequently develops into originality and creative spirit. The computer makes reaching these goals more practical, easier and more dependable.

At this point, Leoni introduces another problem that, over the years, everyone will come to agree over: the most important obstacle to the introduction of computer science in schools is the level of teachers' computer literacy, which varies and is often fragmentary. Combined with the limited presence of computers in classrooms, and the very limited availability of teaching software, this can hardly lead to good results. According to the Author of the article, it would be necessary to develop databases suited to the potential of the pupils, and – more importantly – to establish a computer-based system for the Ministry of Education.

The article by Luigi Intrieri entitled *Computers in schools, functions and limitations* (1984, 1, pp. 17-18) goes along the same lines. The Author makes the point that we are seeing a revolution comparable with the invention of the printing press. He claims that the computer has huge potential as a teaching tool, but it is up to the teacher to make the best use of it, and to assign it a subaltern role in relation to the needs of education. Intrieri underscores the issue of our interaction with the machine:

> Its real importance derives not so much from the number of its functions, but rather from the characteristics of its usage: far from being a passive and inert instrument, it is capable of interacting with operators and giving them that instant feedback and reinforcement that is considered an important element of learning nowadays (p. 17).

So we need to concern ourselves with an instrument that people will use every day. We need to teach people to program the computer to facilitate the improvement of children's analytical abilities, and their creative and critical skills. We need to construct personalized self-correcting tests for pupils. This new tool can also help teachers to keep records of their pupils' activities. It can store lesson content and present it again if pupils need it repeated. It can be used to prepare customized exercises for small groups. It is a flexible tool that can be useful in teaching every school subject, making a genuinely programmed teaching possible.

> One thing the computer can do is free teachers from the time-consuming and boring work of recording, repeating, doing exercises, correcting – in a word, anything that is repetitive and mechanical. Released from these tasks, teachers can spend more time on those more specifically human aspects where nobody will ever be able to replace them, and wherein lies the essence of education (p. 18).

In an article entitled *Let's invent the new school* (1985, 3, pp. 45-48) on the goals of teaching computer science, Umberto Eco suggests that – even though the idea of introducing it in schools is costly – it would be best to adapt our teaching methods and provide children with an early computer literacy. This calls not only for money, but also for teacher training on the use of computers as a general teaching tool. According to the Author, however, the problem should not be posed in terms of "galactic" pedagogical theory (i.e. how to teach and develop computer science as much as possible). Instead, we need to establish whether the computer as a problem-solving tool teaches children to think, because it takes little training to learn how to use it. Using numerous examples, Eco demonstrates that its merely instrumental use can shorten the time it takes to find information or learn, but it does not have the effect of teaching people to reason. He also says that the paper-and-pencil school will never disappear, partly because the alternative would be too costly, and partly because spending hours in front of a screen would be harmful to health. What we can do is "conceive a human-friendly classroom": this classroom would have a normal television near the teacher's desk, preferably with a larger than normal screen, plus a video recorder, an overhead projector, and an episcope. From one to three computers in each classroom would suffice, or else a number of Olivetti M10 portable minicomputers, to be used on certain days of the week, and a printer. If the computer is interfaced with a documentation center, children can be taught how to collect data and find reference material. Eco concludes:

> In short, this "quasi-telematic," people- (or child-) oriented classroom would have nothing "galactic" […] It would be great fun, and leave plenty of space for traditional teaching aids, be they books or sheets of drawing paper, […] But it would be very "costly" in terms of university teacher training. In other words, for electronic brains to function properly and in a "human-friendly" way, we need to work a great deal on human brains (p. 48).

5. Conclusion: a look at Europe

Towards the end of the 1980s, *SIM* published an article written by the comparativist Gianleonildo Zani entitled *Computer science and compulsory education in Europe* (1987, 4, pp. 19-20). As often happens, the journal extends its gaze towards the rest of Europe to investigate the pedagogical problems experienced in other countries, and the solutions adopted.

Zani refers to the seminar held in Marseille in 1983 that established computer science above all as an applied science (inasmuch as computers enable problems to be solved), an instrument (that users must know how to use properly), a social phenomenon (that increases the volume of information available, and is capable of modifying the conditions for conducting research). Attendees at the seminar also discussed how advances in the sciences also engender certain problems: together with access to more information we have acquired new social and political concerns (are the emerging technologies a threat or an efficient way to protect our private lives and democracy?), and economic demands (the workforce must receive training in order to gain the expertise needed to use the new instruments).

At school, the presence of the new technologies in education processes is now oriented in two complementary directions: the teaching of computer science (i.e. as a form of knowledge); and teaching supported by the computer (using teaching materials). On the international scene, various documents are published in rapid succession: a European Community Resolution in 1979; a report made by Schwartz to the EEC in 1981; two other EC resolutions in 1983 on the introduction of computer science in education; a three-year European Commission program for 1985 to 1987; and four more seminars between 1984 and 1986. The OCDE publishes a far-reaching project and recommendations for establishing national centers for the study of computer science in schools.

Zani looks at the Schwartz report, which sets the goals for teaching primary-school children about computers. This machine is a learning tool (pedagogical instrument) and a cultural element (pedagogical goal) capable of making learners sensitive to the technical domain, to the sphere of computer science, and to the treatment of information. On the positive side, computer science is:

- part of a vaster phenomenon that imposes new educational objectives on schools. The emerging technologies incorporate "logical" abilities, and thereby change the relationship between man and machine, creating new "control" needs (whereas they make abilities once considered essential less important);
- part of a new "world of cognitive stimuli," a "universe of experiences that stimulate the child and influence their mental capabilities;"
- and a teaching aid, an opportunity to teach new things or to teach traditional things in a new way.

On the other hand, an acritical use of computers can also have negative effects on children's education, such as a gradually more severe limitation of the investigative capacity of their intelligence, and increasingly sterile language skills due to an excessive use of their "dialogue" with the computer. In Europe too, the value of computers in school is appreciated, but there are also reports of its risks and limitations.

Zani goes on to outline the situation at school in several European states, and notes that some have adopted an organic strategy of intervention, while others' approaches are poorly coordinated. Some countries give priority to professional teaching, while others have a "global" policy, inasmuch as they do not give one sector of learning precedence over another. Teacher training, according to Zani, has only just got underway all over Europe, so Italy has much the same problems as the other European countries.

This albeit brief look at the international picture places the Italian situation in a wider context, showing that – approximately 20 years on – the creation of international organizations like the UN, UNESCO and the Council of Europe is beginning to bear fruit in terms of investigations and reports. In subsequent decades, what will carry the most weight – in Italy, at least – is the economic issue: the costs of the equipment required (like computers, and the more recent interactive multimedia blackboards) make Italian schools slow to introduce computer science and the use of the related technology.

On the issue of "teaching machines," in the same way as for other teaching aids, the educational and methodological aspects are debated in the national and international specialist literature, but the material culture of Italy's schools, including teacher training colleges, tells the usual story: faced with a lack of political interest, a passion for teaching and learning has often prompted teachers and pupils to make up for this negligence as best they can.

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