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Medical education in Italy: Challenges and opportunities

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ABSTRACT

Italy is a country of 60 million citizens with a high life expectancy, an increasing prevalence of chronic multi-morbidity and a public healthcare system. There are 61 medical schools and more than one thousand postgraduate programs for 50 different specialisations. In this article, we describe the Italian medical educational system and its most recent evolution towards a process of internationalization, alongside pedagogical and cultural changes. The main challenges are in the process of students' selection, which is still only based on the assessment of basic knowledge, and in the reform of the post-graduate education, which lacks an official, formal definition of the learning outcomes and the aligned methods of assessment. The opportunities come from the increasing awareness of the importance of faculty development programs. The pandemic itself acted as a catalyst of innovation, pushing toward more student-centered teaching-learning activities. Finally, an increase in international collaborations in medical education research could be effective to foster the development of medical education in the country.

KEYWORDS

International medical education; general; undergraduate; postgraduate; continuing

The Italian context of medical education

Italy has about 60 million citizens, irregularly distributed across the territory, with a higher density in the plains and around industrial centres. Italy is divided into 20 regions, each having its own local government system, and each having autonomy on topics like healthcare provision, public transport and education. The mean age of the population is presently 45.2 years and the life expectancy at birth is relatively high: 81.1 years for men and 85.4 years for women. These indices have been constantly growing over the last 20 years and this puts a heavy burden on the healthcare system, with the increasing rate of disability and multi-morbidity (ISTAT 2021).

While the wide cultural difference (languages and dialects, cooking, customs) among the regions is perceived as a richness, the economic, infrastructural, and social difference is a long-standing issue since the unification of the country 150 years ago. The population in the southern regions has a mean lower income, a higher rate of unemployment, a lower rate of graduate than the population of central and northern regions. These differences are rooted in the geography and history of Italy, and they ask a still unanswered political question, having an obvious impact on health, for example with a lower life expectancy at birth in the south of the country (ISTAT 2021).

The healthcare system

Italy established the current national health service (Servizio Sanitario Nazionale – SSN) in 1978, explicitly modelled on the British National Health Service. According to the Italian Constitution, the 20 Italian regions manage the provision of healthcare, while the State has the power to

Practice points

- Italy has a public healthcare system and most of the Italian doctors are employees.
- Italy has 61 medical schools, only 5 private.
- Medical schools are moving toward a more student-centered approach.
- Postgraduate education just started a process of reform.
- The internationalization of the educational system is a primary goal.

set the basic rules, like the 'essential levels of care' (France et al. 2005)

The SSN is funded by the government through taxpayers' money. The access to emergency, hospital care and family medicine are free, while for medications and outpatient services a fee is due, based on the citizen's income. About 60% of Italian doctors are employees of the National Health Service or receive their salary based on an agreement with the SSN, such as the general practitioners. The other doctors work in their private practices or have a contract with a private healthcare company.

Every year, a commission consisting of a representative of every region of the country and the Ministry of Health assesses the need for new doctors for the next six years and determines the number of positions allocated to the Italian schools of medicine. This is why the number of positions is correctly indicated as a 'programmed number' and not as a 'closed number' (i.e., a fixed number of positions determined by the available facilities or by an academic political choice).

The educational system: Undergraduate and Graduate Medical Education (UME, GME), and Continuous Medical Education (CME)

Most of the 96 Italian Universities are state universities (about 75%), but this percentage is higher for medical schools since only 5 private universities have a medical school and offer a medical curriculum. The access to a degree course is granted by any type of high school licence, and it is possible also for graduates with nonmedical degree, provided that they pass the admission test. For these students, some of the exams of their past curriculum could be acknowledged, after a specific consideration of the program. The fee is proportional to the family income and grants are provided on the base of merit. At present, the available statistics do not show any imbalance of geographical or socio-cultural distribution of students (ISTAT 2021) and we are unable to provide evidence that supports students' diversity. More research is needed to address this issue. Italy was one of the promoters of the 'Bologna process', an intergovernmental initiative to produce more coherence among higher education systems across Europe (Patrício and Harden 2010). As a by-product of the Bologna process, Italy adhered to the European Association for Quality Assurance in Higher Education (ENQA 2021).

The Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR 2021) oversees the national system of quality assessment for universities and research bodies. It is responsible for the quality assessment of the activities carried out by universities and research institutes, recipients of public funding. The ANVUR is also in charge of providing an assessment of the scientific products of every researcher and professor, as a criterion to drive career progression.

Undergraduate medical education

The current common national undergraduate medical curriculum was established in 2004 by the Ministry of University and Research, to align and integrate Italian courses within European medical curricula. In the academic year 2000–2001, there were 43 medical school degree programs, with 7533 positions available for students throughout the country. In the academic year 2020–2021, there has been an increase in the number of active medical schools, now numbering 61, evenly distributed throughout the territory, with 12,266 student places. This is a consequence of the increased demand for more doctors to compensate for the high turnover.

Despite the increase in the training places, the overall national student/teacher ratio, weighted by teaching hours, remains stable, since also the number of teachers increased. Data from the academic year 2013–2014 (9897 positions available for students) to the academic year 2019–2020 (11,568 positions available for students), (national database, at <http://ava.miur.it>), show the stability of the average student/teacher ratio, around 27.4 ± 0.7 in the seven analyzed years.

The national admission tests

The mechanism of the programmed number of positions in medical schools – described above – was introduced in

Italy in 1999 (Law 264, 2 August 1999). The admission to the medical undergraduate curriculum, at state universities, is regulated by a national admission test set by a commission from the Ministry of Health. Private universities can use their own admission test, but they must fulfil the obligation of the programmed number of positions.

Up to 2012, each University gave its local test of admission but starting from the academic year 2013/2014 (Decree 449, 12 June 2013), the unique national ranking was introduced. Currently, the test evaluates logical reasoning and knowledge and consists of 60 multiple-choice questions on logic and general culture, biology, chemistry, mathematics, and physics. At present and because of the large number of participants who take the admission test every year, there is a strong social pressure to abolish the programmed number for admission to medicine or to find a different method of selection. A different way to approach the problem of the excessive number of participants to the admission test would be to offer more orientation programs at the high school level to provide better guidance to students who might want to pursue a medical career. Recently, some health sciences schools developed vocational and orientation programmes in collaboration with high schools (Falaschi et al. 2013; Eleuteri et al. 2016). These programs are delivered via e-learning, using a self-directed learning approach and reflection (Barbaranelli et al. 2017; Familiari et al. 2019). For example, Sapienza University of Rome offered the self-assessment questionnaire 'Get to Know Yourself', created and validated by G.V. Caprara and C. Barbaranelli in 1997 and used to date by about 30,000 Italian high school students. The questionnaire supports student's decision-making process in choosing their future training and career. The questionnaire investigates personality profiles (self-esteem, emotional balance, readiness for interpersonal relationships, motivation, leadership and open-mindedness), academic and professional orientation (<https://www.uniroma1.it/en/pagina/student-orientation>).

Curriculum, instructional strategies, and assessment

The Italian medical curriculum lasts 6 years and is informally divided into three segments: basic sciences, preclinical, and clinical sciences. Italy adopted the European 'Bologna process' framework, measuring the amount of student's activity with credits, according to the European Credit Transfer System (ECTS).

Since the Italian standard medical curriculum is compliant with the European rules of the Bologna process and of the ENQA system of quality, and at least 5500 out of the 9000 h consist of in-person activities (classroom, skill lab, clinical training), the Italian medical degree is valid throughout all the European Union. In the last 20 years, efforts were made to decrease the emphasis on the mere acquisition of knowledge and teacher-centred lectures towards a student-centred and competency-based model of learning. Hence, almost all Italian medical curricula have evolved from a typical Flexnerian structure (Flexner 1910; Boudreau and Cassell 2010), with basic sciences in early years and clinical sciences in later years and they pivoted to a 'double inverted wedge' structure (Figure 1), in which clinical experiences are offered early in the first two years

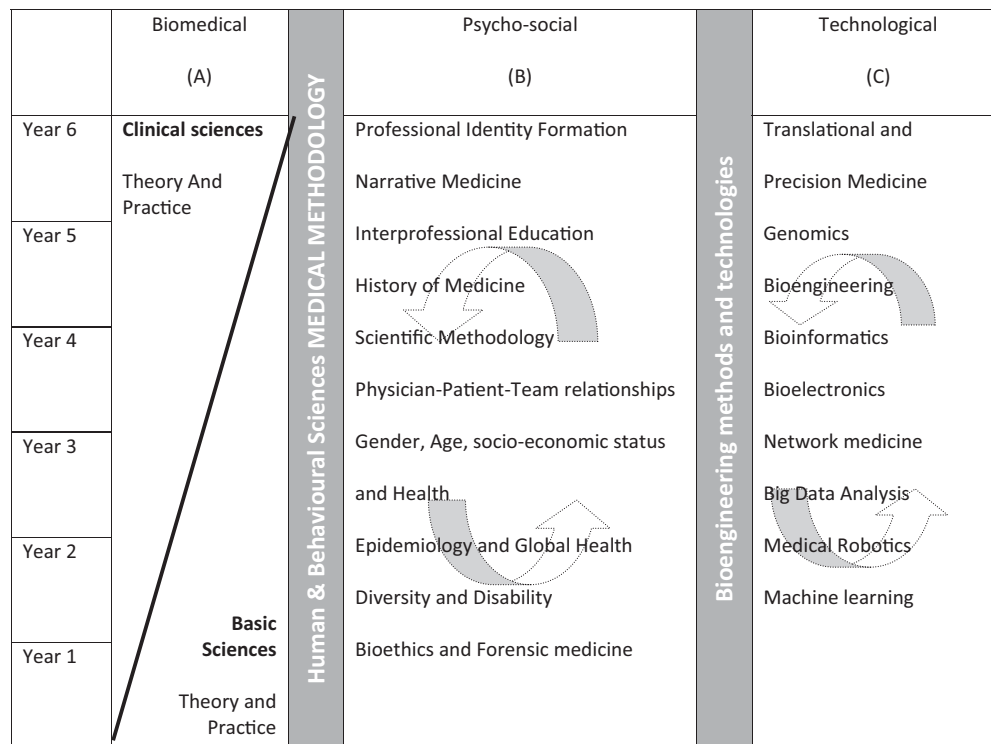


Figure 1. Schematic representation of undergraduate medical curricula in Italy. Biomedical part (A) is shaped like a double inverted wedge where basic and clinical sciences are threaded throughout the 6-year programme. In the majority of the Italian medical schools, the biomedical stream is integrated with the psycho-social stream (B) (Human & behavioural sciences). Finally, the new undergraduate bio-medical technological curriculum, integrates technological topics (C) (Bioengineering methods and technologies vertical course). The curved arrows represent the scattering of topics across the 6 years of the course.

of medical school. In the remaining years, the cognitive part of teaching and learning gradually fades into a more practical and clinical oriented one, through clinical clerkships and learning activities in training facilities such as clinical skills or simulation centres, even though lectures and small group learning activities continue almost to the end of the curriculum (Snelgrove et al. 2009). This structure came with the adoption of a 'bio-psycho-social' model (Snelgrove et al. 2009). This model integrates the biomedical approach with the principles of the bio-psycho-social model (Engel 1978). The aim is the education of a medical practitioner with the best technical, operational, and relational skill and knowledge, rooted in the values of professionalism, to allow the graduate a fair and effective integration in today's complex healthcare system. The intent is to provide students not only with scientific and methodological knowledge and skills but also with the foundations of a humanistic culture that contributes to shaping the critical thinking and the scientific inquiry of future practitioners. Reflective practice and the medical humanities encourage students to recognize the ethical problems that emerge from clinical practice, foster respect for patients, highlight the values of professionalism, and the meaning of 'how to be a good doctor' (Snelgrove et al. 2009). In this educational model, the biomedical component is spread along the six years in basic and clinical sciences, and it is met by a parallel pathway of psycho-social education that emphasizes the importance of humanities, the development of critical thinking and self-directed learning, teamwork and the concept of professionalism in medical practice (Snelgrove et al. 2009). This educational model takes inspiration from the 'spiral curriculum' model (Harden and Stamper 1999) and has been updated several times in

recent years in Italian medical schools. Figure 1 illustrates the model.

The largest part of clinical practice takes place in the hospital setting, yet in the last 5 years educational clinical experiences have been more often offered in the ambulatory setting. Inter-professional educational experiences, however, are still lacking. Italian medical schools use a variety of pedagogies, including lecture, flipped classroom, problem-based learning, simulation, and supervised clinical experiences. Clinical training is offered both in the hospital and in the outpatient setting, beginning in the early years of the medical school. Figure 2 lists the most commonly used pedagogies, aligned with the levels of Miller's pyramid.

Medical students, under the guidance of a mentor, also engage in a research project that culminates in a thesis required for graduation. Research is considered an important part of medical school training; it may include clinical, translational, and educational research on specific topics such as gender medicine, precision medicine, pain therapy and end-of-life care (Biasco et al. 2017), global health issues (Familiari 2015; Ricciardi et al. 2016; Bellini et al. 2017; Familiari et al. 2020).

In the academic years 2019–2020 and 2020–2021, a new degree program with a 'biomedical-technological' profile was activated in two medical schools, one public and a private one (Basili et al. 2021). This program, designed in collaboration between medicine and engineering, aims to train a limited number of physicians who also have technical and engineering skills and know-how to collaborate with engineers in the development of major technologies increasingly in use in the daily practice of medicine. Figure 1 shows a comparison between the bio-psycho-social and the biomedical technological model.

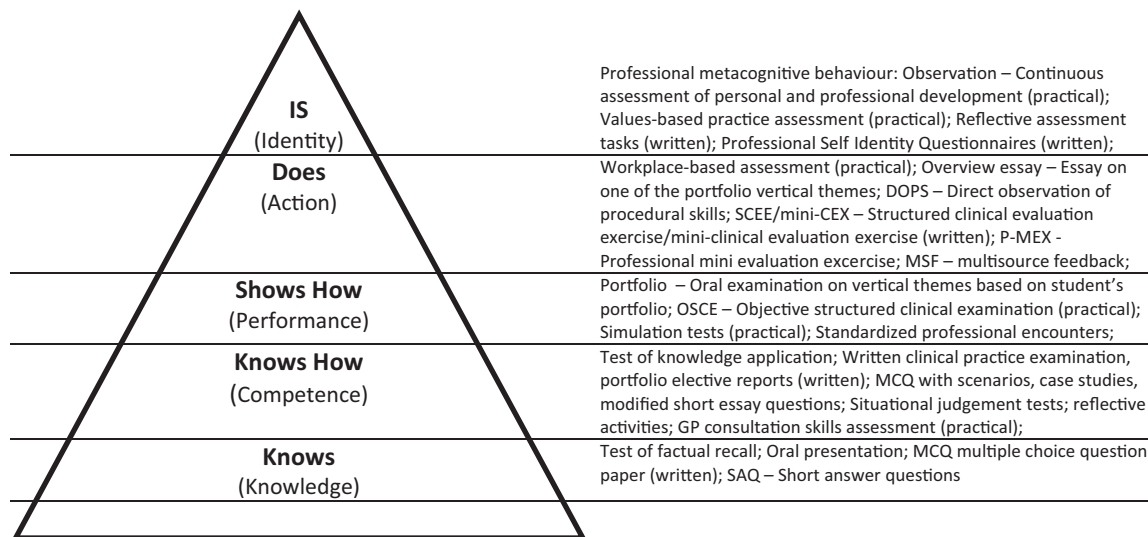


Figure 2. Assessment tools. Oral, written and practical assessment tools mainly used in Italian undergraduate medical curricula, according to the amended version of Miller's pyramid (Cruess et al. 2016).

The assessment is, for the most part, based on a traditional summative system that includes a series of high stakes exams (oral, written and practical examinations) and a final oral presentation of the research thesis to a committee of faculty members. The use of longitudinal formative assessment is not very common, albeit its implementation is becoming increasingly popular, particularly with a more frequent adoption of a flipped-classroom approach. The oral examination remains the main assessment method, according to a long-lasting Italian tradition, but several 'competency-based' examinations have been added, such as clinical reasoning exercises, reflective essays and portfolios. Standardized patients and OSCE are also increasingly utilized. Figure 2 shows a summary of assessment methods, according to Miller's pyramid (Miller 1990; Cruess et al. 2016)

The role of the Italian Permanent Conference of Directors of Medical Schools

Italian schools of medicine are coordinated under a national organization, the Permanent Conference of Directors of Medical Curricula. The Conference was established in 1985 to support the Directors in interpreting and applying the evolving national regulations of medical curricula. In the subsequent years, the Conference has become an agent of change to share best practices of evidence-based medical education and increase the awareness of the role and responsibility of directors of a medical school. The Conference is a self-managed and self-funded organization, publishes the Journal of Italian Medical Education (<http://www.quaderni-conferenze-medicina.it/>) and holds four meetings a year. Two of the most successful outcomes of the Conference are the national core curriculum for undergraduate medical students (Della Rocca et al. 2017) and the administration of a national progress test (Recchia and Moncharmont 2019) from 2006.

A relevant stakeholder in the promotion of the best practices of teaching is the Italian Society for Medical Education (SIPeM 2021). The SIPeM was established in 1984 and soon became the official consultant of Conference of Directors for innovation in teaching and to offer the directors a program of faculty development.

The process of internationalization

A rather recent addition to the educational structure is the development of internationalisation in medical schools and their curricula, opened to an international audience, but also to Italian students seeking to share their learning experience with classmates from all over the world. The first undergraduate degree program in medicine and surgery delivered in English was activated in Pavia in 2009 with 70 positions. In the current 2020–2021 academic year, there are 16 active international medical schools, with an offer of 806 positions, mostly distributed in northern Italy. The students at these schools come from many different European and extra-European countries. In medical curricula delivered in Italian the mean rate of the first-year students qualified abroad is 8.6%, while in the international medical curricula 58.1% of the students comes from abroad (surveys in 2019 – <http://ava.miur.it>).

The admission test to these curricula is the IMAT (International Medical Admission Test), which has the same format as the Italian national admission. However, the questions, language and date of administration are different, and the test can also be taken at the Italian consulates abroad.

In the international curricula, lectures and other training activities are delivered in English, while during the later clinical years, students are expected to be able to interact with patients and other healthcare professionals in the Italian language. The curriculum is similar to that of Italian schools, yet with less emphasis on Italian health care policies and regulations. At the end of the curriculum, a student can choose whether to sit for the licensing exam as an Italian medical doctor.

The increasing number of International medical curricula is an answer to the need for the Italian Universities to accept the challenge to compete with all the other European Universities in the open European market, in the provision of high-quality medical education, overcoming the language barrier. An increased attractiveness for international students is also a reaction to the fact that more and more Italian medical graduates every year go abroad to look for a position: the estimate is about 1800 per year. This fact has economic and social reasons: in the last 10

years, the National Health System has been underfinanced and – despite the need to assure the turn-over – fewer positions are offered to young doctors. Moreover, the perspective of working abroad is particularly attractive for those Italian students who have had an educational experience abroad and are interested in pursuing a different learning experience in other countries. The fact that young Italian doctors migrate abroad is not a problem per se, this movement is a normal dynamic in the European Union, and it is not perceived as a betrayal of the commitment to serve the national community, especially by the Erasmus generation (Ieracitano 2014). However, it is a factor that could contribute to further reduce the workforce needed to meet the nation's health care needs. This brain drain must be balanced by an increase of the attractiveness of educational and working positions for young people in the national academic and healthcare system.

A relevant driver in the process of opening to a more international dimension of undergraduate medical curricula has been the Erasmus program, an EU funded program supporting teachers' and students' exchange. Many Italian medical students move every year for 6–12 months stay in one of the EU countries as well as European students come for a stay at the Italian medical schools. Erasmus students are engaged in all the learning and assessment activities as if they were local students. A particular type of Erasmus stay is the Erasmus Traineeship (European Commission), that is intended to provide young people with an experience in the workplace setting or in research environments. Many medical students take advantage of the Traineeship to complete their mandatory clinical clerkship abroad.

Graduate and postgraduate medical education

In Italy, there is not a formal common graduate program, like the Foundation Program in the UK (Grant 2007), and after the degree, a doctor can directly access any residency program for a specialty. Postgraduate medical education is planned and implemented by the Ministry of University and Research. Medical doctors are admitted if they pass a national test composed only of multiple-choice questions, aimed at the assessment of basic and clinical knowledge. The final score for the admission to postgraduate programs also includes the final overall graduate degree grade and the mean score of all exams during the medical school curriculum.

There are 50 specialties, with more than one thousand certified schools and each program lasts from 3 to 6 years. Residents are paid as young doctors and their intended learning is through shadowing and 'learning by doing'. Because of this informal instructional design, at present, the focus of the Ministry of the University for postgraduate medical education is based mainly on the availability of clinical facilities that are able to provide an apprenticeship type of learning experience. There are currently no national standards for the design of a post graduate competency-based curriculum, supported by a constructive alignment of learning and assessment activities.

However, recently, a post graduate competency framework was designed and developed by a group of seven pilot Italian medical schools, under the guidance of national and international medical education experts. The

Italian competency framework for Post Graduate Medical Education is an adaptation of the UK framework to the Italian context. After a series of meetings and discussions among educators from the seven medical schools, a general competency framework for post graduate medical specialties was presented to the Ministry of Health and the Ministry of the University (Amore, Bartalucci, Lotti, Riforgiato, Sartini, et al. 2020) together with the specific frameworks for 4 out of the seven involved schools (Amore, Bartalucci, Lotti, Riforgiato, Sartini, Garibotto, et al. 2020; Amore, Bartalucci, Lotti, Riforgiato, Sartini, Giordano, Altini, Annunziata, Bauckneht, et al. 2020; Amore, Bartalucci, Lotti, Riforgiato, Sartini, Murialdo, Pende, Pontremoli, Ghezzi, et al. 2020; Amore, Bartalucci, Lotti, Riforgiato, Sartini, Quattrone, De Vita, Priviter, et al. 2020). At present these documents are still under consideration.

Continuous medical education: the ECM system

In 1999, continuing education for all health professions in Italy became mandatory by law. Every medical doctor, and healthcare practitioner from about 50 different health professions, have to gain 50 credits, approximately corresponding to 50 h of training each year.

Continuing Medical Education (ECM is the Italian acronym) is planned and delivered according to three formats: face to face (seminars, workshop, conferences), fully online, or utilizing a blended approach that combines face to face and online learning. On field training is more and more used. Continuing Medical Education can be planned and delivered only by providers accredited by the Ministry of Health. The whole program is monitored by the local sections of the National College of Physicians (OMCeO), and supervised by the Ministry of health, through the national commission for ECM (Agenas 2020). A stringent regulatory system with constant monitoring prevents possible conflicts of interest between the organizers of the training events and the pharmaceutical industries.

Challenges and opportunities

Italian medical schools are facing some relevant challenges that can be classified as structural, functional, and cultural challenges.

From a structural point of view, the architectural inadequacy of the teaching facilities of many medical schools is becoming more and more evident, as soon as medical curricula move toward a student-centred approach. The relevance of the physical environment cannot be undervalued anymore (Nordquist and Laing 2015) and facilities like the skill labs and rooms for small groups of students are mandatory for effective medical education.

From a functional point of view, there is too high a ratio between students and teachers and mentors. The National Health System, and the academic medical education system – which is almost entirely public – has been underfinanced in the last 10 years. As a result, while the need to educate new doctors increases, the number of faculty members decreases. A generational gap is now evident, and it will take time to fill it. The challenge of including non-academic aptitude factors in the admission process is still an open issue. A multi-centric national survey started

6 years ago, to explore the correlation between a set of psychological and cultural factors and the academic success, but the breakout of the pandemic slowed down the end of the study, even if there are the first preliminary results demonstrating the contribution of personality traits and of self-efficacy beliefs in shaping empathy in Italian undergraduate medical students during their first three years of the undergraduate course (Barbaranelli et al. 2021). Open issues are also the diffusion of the competency framework for Post Graduate Medical Education and the promotion of the sparse local initiatives of longitudinal integrated clerkship that some medical curricula started (Hudson et al. 2017).

From a cultural point of view, we must consider the strong influence of the Italian idealistic philosophy in teaching practices and healthcare provision. Teaching in Italian high schools and universities is still influenced by the theories of Giovanni Gentile, the idealistic philosopher who was Minister of Education in 1923. The dominance of spirit and knowledge over experience, and the idea that if you know, then you can find by yourself the way to use that knowledge are deeply rooted in the Italian educational system (Vertecchi and Agrusti 2008). This cultural trait can also be responsible for the enduring paternalistic approach to healthcare (Lamiani et al. 2011).

An important development of the overall situation of the Italian academic environment has been the beginning of a process of legitimization of the idea of 'faculty development'. Faculty development programs are more frequently offered by Italian universities in collaboration with national and international group of experts and two national faculty development conferences have been held in the past 2 years (Lotti and Lampugnani 2020).

Nevertheless, the awareness of these challenges can be a driver for change, under the leadership of a new generation of young medical educators engaged in faculty development programs and international collaborations. Paradoxically, the pandemic itself acted as a driver of innovation, speeding up the process of adoption of student-centred pedagogies like the flipped classroom and technology-enhanced case-based learning (Consorti et al. 2021).

The medical schools, through the Italian Permanent Conference of Directors of Medical Schools, have an increasing role as a stakeholder, in partnership with the Ministry of the University and Research and the Italian College of Physicians, in the elaboration of strategies for the development of medical education at all levels. The Conference is also an agent of promotion of best practices, in partnership with the Italian Society for Medical Education.

Currently, in Italy, the progression of the career in the three roles of the University System (Researcher, Associate Professor, Full Professor), is based on the achievement of national scientific qualifications, granted by a national commission that is renewed every three years, under the control of National Agency for the Evaluation of Universities and Research Institutes (ANVUR). Unfortunately, there are not yet indicators to consider the quality of teaching in career progression.

A slow but constant process of turn-over of faculty members finally begun, however, the ANVUR has not yet established the rules to value the quality and quantity of teaching activities nor that of educational research. Such

regulations can demotivate young educators in the pursue of a medical education career.

Given the current underestimation of teaching and educational research, it is not surprising that the Italian contribution to the most important journals in the domain of medical education is not relevant, despite the strong contribution that Italian scholars give to many other medical and biological domains. An important opportunity comes from the opening of the Italian community of medical educators to partnership and collaboration with other medical institutions in Europe and around the world. The support of a wider community of scholars, to share ideas and experiences and collaboration in research projects can be a fundamental driver for further development of medical education in Italy (Harden et al. 2018; Harden 2018).

Conclusions

The current status of medical education in Italy is evolving toward a more student-centred approach, both at undergraduate and graduate level. In this article, we acknowledge the limitations linked to the cultural and structural legacy of the Italian educational system, but we are confident that the Italian academic scholars can find their way to lead their students to the acquisition of a wide and deep base of theoretical knowledge joined with the ability to use this knowledge in the contemporary professional context. Humanistic culture is embedded in Italian history, we just need to add more updated pedagogies for the transfer and the assessment of knowledge and skills. The current positive trend toward faculty development initiatives and international collaborations in medical education research can be extremely effective to foster the development of medical education in the country.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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