The role of humanities in the teaching of medical students

Carlo Orefice
Josep-E. Baños

DR. ANTONI ESTEVE FOUNDATION

MONOGRAPHS 38

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The Dr. Antoni Esteve Foundation was established to honor the pharmacist, researcher, and entrepreneur for whom it is named, with the idea of focusing on one of the key elements of his personality: love and respect for science. Established by his family in 1982, the Foundation is a non-profit organization, and its activity centers on science, with special emphasis on the field of pharmacology.

Dr. Antoni Esteve i Subirana was born in Manresa, Spain in 1902. He earned a degree in pharmacy, becoming the fifth in a lineage of pharmacists to settle in his hometown, Manresa. However, his professional aspirations would take him far beyond his humble beginnings. Starting out elaborating medicinal preparations in the backroom of his pharmacy, in 1929 he went on to found what would one day become an important pharmaceutical company, thanks to his scientific know-how and entrepreneurial spirit and the enthusiastic support of his wife.

The Foundation fosters communication among professionals by organizing international symposiums, roundtables, and discussion groups. It also helps disseminate quality scientific research by awarding the Esteve Foundation Research Award every two years for the best scientific article published by Spanish authors.

The Foundation also promotes scientific communication in the broadest sense by publishing the Dr. Antoni Esteve Foundation Monographs summarizing the contents of the roundtables, books covering the contributions to the

symposia, Dr. Antoni Esteve Foundation Notebooks focusing on the world of science, and articles in scientific journals. Another special contribution that the Foundation makes to the sharing of scientific knowledge is the book collection "Pharmacotherapy Revisited". Each of these books recompiles thirty-odd articles selected by prestigious scientists to show key developments in different branches of pharmacotherapy.

The Foundation organizes seminars in collaboration with universities, hospitals, and other scientific institutions, with the aim of strengthening competencies that are often inadequately covered in degree programs at institutions of higher learning. These seminars are mainly held in Spain, but have also been done in other countries in Europe and America. Another activity, the "Meet the expert", lies halfway between teaching and scientific communication, and consists of meetings in which a small group of Spanish researchers are invited to discuss key issues in their field with a renowned international expert.

Last but not least, the Foundation collaborates with a wide range of biomedical professionals and it is involved in many collaborative projects with universities, scientific societies, research institutions, or bodies that provide support to research.

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From left to right: Magí Farré, Marta Torrens, Elena Guardiola, Mariano Sentí, Tamara Djermanovic, Fèlix Bosch, Carlo Orefice, Josep-E. Baños, Rosemarie Heyn, Lorenza Garrino, Claudia Vinciguerra, Francesca Bracci, Alessandra Romano, Amàlia Lafuente, Pierpaolo Limone, Albert Presas i Puig, Lucia Zannini, Jordi Planes Bassas, and Valentina Cappi.

Introduction. The humanities and medicine: why do they need each other?

Carlo Orefice[1] and Josep-E. Baños[2]

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In recent decades, medicine has advanced immensely, improving the health of people around the world. Although it can be argued that these advances have disproportionately benefited the wealthy, developments in public health, medical technology, immunology, and pharmacology over the last 100 years have vastly improved health and prolonged life expectancy for most people in the world.

Nevertheless, gains in technology have also been accompanied by losses in other areas. Most importantly, perhaps, the human aspects of the doctor-patient relationship have suffered. Some physicians focus only on disease as a biological problem to be diagnosed and treated while neglecting its repercussions on patients' concerns, thoughts, and social lives. This attitude is exemplified in Gregory House, the physician who is the main character in the popular television series *House, M.D.*, who states that his objective is to treat the disease, not the patient. This view is in stark contrast with that of William Osler, the "father of modern medicine", who a century ago emphasized that physicians should care more for patients than for the special features of their illness. Fortunately, House is not representative of most contemporary physicians, but it is true

that the technological advances in medical imaging, molecular biology, surgery, and pharmacology have improved diagnosis and treatments to the point where the temptation to focus almost exclusively on the biological side of disease is practically irresistible. Although this approach may be less common in primary care and nursing homes, it seems dominant in hospitals, where the time that doctors devote to each patient is minimal and their performance is evaluated according to the number of patients they see, the number of surgeries they perform, or the number of papers they publish. Although recent decades have witnessed various professional movements that aim to correct this imbalance, the truth is that in many hospitals medical care still prioritizes the disease, not the patient. In general, the way hospitals are organized favours the treat-and-discharge approach over the careful consideration of each patient's comprehensive needs as a human being. Perpetuating this approach, the medical profession trains future doctors mostly in hospitals rather than in primary care centres or chronic care institutions where health professionals are more interested in patients' psychological and emotional well-being.

In recent years, concern about this situation has been growing, and some strategies have been implemented to counteract patients' despair resulting from the 'biological' model of medical care. The need for medical students to learn to consider patients' personal and emotional aspects is also being increasingly recognized, and teachers committed to educating students in humanitarian values struggle to help them to better understand the consequences of disease in patients' lives and minds and to make them empathic to their psychological or physical suffering.

The humanities can help students to gain a better understanding of aspects of disease that are not easily considered in traditional medical texts.
An increasing body of medical literature advocates the use of literature, cinema, plastic arts, or music in medical curricula. However, this approach requires a degree of consensus between educators in the medical sciences and academics from the

humanistic disciplines. The meeting whose lectures and discussions are presented here was organized to facilitate cross-talk between these two groups.

Twenty professors from Italian and Spanish universities met last September in Siena for a workshop entitled *Soft skills in medical education: The role of medical humanities in the 21st century* under the auspices of the Dr. Antoni Esteve Foundation, the Università di Siena, and the Universitat Pompeu Fabra. Attendees shared ten lectures and a full day of discussion on how the humanities might help to train better physicians. Various experiences were reported, and those present explored the current role of the humanities in medical students' education as well as how to optimize the contributions that the humanities can make to training better physicians.

First, we need to take a new look at what the medical humanities are. Along these lines, Carlo Orefice suggested that a strict biological approach to disease might be insufficient to understand its complexity. Rethinking the medical humanities might not only help medical students to achieve a better understanding of disease, but it might also help them to provide more holistic and empathic care as physicians. As an educator interested in the theories and methods of education in the sciences, he suggested a critical point to start the discussion: mutual knowledge. From this point of view, the old paradigms are unable to fully explain the concept of disease. Medical sciences' insights into illness pose new challenges that moral philosophy has never considered. Likewise, the availability of new treatments questions our conception of life, its value, and how it should be tackled from the ethical viewpoint. The history of science needs to be continually rewritten as new discoveries make it necessary to reinterpret knowledge. This is why medicine and the humanities need each other.

Josep E. Baños and Elena Guardiola focused on the main question that justified the workshop: how the humanities can help us to produce better physicians. They explained that this movement started in Hershey in 1972 and that a large body of empirical

evidence supports the use of literature, bioethics, and history in training medical students. However, it is not easy to include these subjects in the crowded medical school curriculum. They discussed some strategies for overcoming this obstacle, even suggesting that non-traditional materials from the humanities like feature films might be useful tools. In their opinion, incorporating the humanities can make medical care more human and efficient.

Lucia Zannini talked about reflective writing from a pedagogical point of view. She emphasized the importance of reflection in everybody's life and the power of sharing personal feelings in writing. Writing about an experience enables sufferers to explain and analyze their experiences, and reading about others' experiences can help students to understand them better. She also commented on the importance of the students themselves engaging in reflective writing, and she recommended some ways to facilitate these activities.

Marta Torrens and colleagues explained their experience using literary texts as an additional teaching tool in subjects that form part of the traditional medical school curriculum. This new approach integrates literary texts into other activities such as lectures, seminars, or clinical rounds. They conclude that this easily implemented strategy can obviate the need for new subjects and redesigning the curriculum.

Amàlia Lafuente, a university professor who also writes novels, showed the differences between writing scientific papers and works of fiction. She commented on physician-writers and gave several examples of how writing can help bring about both better medicine and better physicians. Her experience was very illustrative of the difficulties involved in carrying out both jobs, helping us to understand why some physicians continue to practice medicine after they started writing, while others choose to abandon medicine to devote themselves exclusively to literature.

Claudia Vinciguerra and Antonio Federico took the workshop in a different direction, as they talked about the effects of music on the brain and how the neurosciences can help us to

understand these effects. Perhaps the most impressive data they reported concerned how music can help in the rehabilitation of patients with severe neurological diseases, like dementia, Parkinson's disease, or multiple sclerosis. This clearly opens a new role for the humanities in medicine, this time as a therapeutic agent.

Coming back to teaching medical students, Magí Farré and colleagues reported on their extensive experience in using popular movies for teaching pharmacology. They discussed the general use of feature films in medical education and then provided a detailed analysis of how this kind of materials can be used to teach pharmacological principles as well to stimulate discussion about ethical issues related to therapeutic drugs. They also gave some practical recommendations about how to ensure the best pedagogical results with this approach.

Valentina Cappi's talk introduced the topic of trust in the doctor-patient relationship from a historical point of view. To this end, she analyzed this issue through classical writings as well as through contemporary media, such as literature and television medical dramas. She concluded that knowledge of cultural and historical processes and of power relationships might help to improve the practice of medicine.

Rosemarie Heyn presented an interesting pedagogical experience of using visual artworks to help students develop medical diagnostic skills. Under the principle of "The more one looks, the more one sees", she used paintings during museum visits to stimulate students' observational skills and train their clinical eye. Heyn showed multiple examples of how to use this approach to help students to develop abilities that might be hard to acquire otherwise.

Finally, Albert Presas described how he teaches the history of medicine. Although medical students traditionally do not rate this subject very high, Presas showed some strategies to help them to understand the importance of historical facts in understanding the evolution of medicine better. As he stated, the key is not only to explain the benefits of the humanities, but also to stimulate students' interest in how history can help us to interpret current theories.

The workshop made it possible to present many new ideas, discuss different approaches, and empower those interested in the role of the humanities in medical education to move forward. We hope that the readers of this monograph will find these contributions useful for their daily activities. The editors would like to acknowledge the generous contribution of the Dr. Antoni Esteve Foundation to organizing the meeting and editing this publication. The efforts of supporting staff from Università di Siena helped to ensure the success of the workshop and are also highly appreciated.

Why are we here? Rethinking medical humanities through the paradigm of complexity

Carlo Orefice

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Abstract

In recent years –with increasing insistence– healthcare training began to feel the need to overcome (without wanting to counterbalance them) educational models that derived from the rigidly biological approach to the disease, to get to design and analyse training courses in a more "educational" way: this meant, for operators, not just acquiring knowledge and skills, but also to allow the development of "complex" professional identities.

In this perspective, the workgroup here presented questions different conceptions of medical humanities in order to provide a clearer understanding of what they are and why they matter. The proposers defend a conception of medical humanities as a humanistic problem-based approach to medicine aiming at influencing its nature and practice. From this point of view, medical humanities not only help us to understand the real nature of medicine and health, but also allow caregivers to treat their patients with respect and dignity, and to provide more holistic and empathetic care. From this pedagogical perspective, the exploration of such wide range of issues within the medical humanities irrevocably recalls the "complex dimension" of care, as well as the need to systematically explore the dynamics through the paradigm of complexity.

Keywords: medical education, medical humanities, paradigm of complexity, soft skills.

Introduction

These synthetic reflections do not address theoretical research on medical humanities, nor do they deal with the effort of analysing in detail the various possible approaches to which they refer. My goal is to motivate why this meeting entitled *Soft skills in medical education: the role of medical humanities in the 21st century* was organised. These reasons can be summarized through some initial questions that can be the framework of the discussion held at the University of Siena:

- Can we bring back the human being at the centre of the eyes of the doctors and of the formation of future health professionals, and not only his disease?
- How, and under which conditions, medicine can strengthen its relationships with the social and behavioural sciences, and can enter into dialog with the moral philosophy and with the contributions of expressive arts?
- What are the tools and the soft skills necessary for a proper exercise of clinical practice?

Such questions do not appear rhetorical: to govern the various settings of knowledge and the decision-making processes of care, a professional requires complex and reflexive training, which respects the dialectic of knowledge, the working and social ideals of professionals, as well as the evolutionary transformations of the same medical thought.

Each of us knows, not only for disciplinary membership, how the different diagnostic, therapeutic and care practices, put into act in the healthcare, are characterized by different shades, intentionality, attitudes and methodologies, so strongly to be considered sometimes –wrongly– conflicting or even incompatible.[1] So addressing the theme of "health" and "care", in its broadest sense, implies a comparison according to a paradigm of network and in the perspective of a job methodologically "intertwined" (meticciato), between different disciplines and the respective theoretical guidelines, cognitive premises and experimental procedures. That's why, at the meeting, took part professionals coming from academic

and medical professionals communities from Italy and Spain, experts of practices of educational innovation, and patients who are living particular experiences of disease.

As I have discussed with the various colleagues in organizing that meeting, one of the "data" of greater interest, in my opinion, concerning the relationship between medical humanities and training of health professionals, and doctors in particular, is that this question has important consequences not only (it's more than obvious) on the way to "make theory", but has a weight –not always recognized– on the deep destiny of professions related to the educational field: on the way, i.e., in which the education, in the different locations in which takes shape, is being conceptualized and acted; on the role of educational professions; on the deep sense that education has in our culture, in a historic moment particularly complex and dense of contradictions such as the current one, where the excessive overspecialization of medicine is running the risk to form exclusively competent technicians and not professionals mindful to the needs of people and of communities that they will serve. The reasons are therefore multiple, and are related to epistemological, theoretical, educational and organizational issues.[2]

Not just "evidence": towards a convergence of knowledge

The present historical time can be called, rightly, as the time of relationships and interweaving-interconnections that sustain and give meaning to human lives.[3] Such connections characterize, in a positive or negative form, all living systems: biological, natural, cultural, scientific, linguistic, technological and media information. For pedagogical science, such relations are declined in the educational and training sense, and are articulated in every area of life and experience, including those affecting the health and disease of individuals. Therefore, pedagogically speaking, outside the dimension of the relationship, the care loses strength, leaving space for the classification, standardization and depersonalization of the existences. So, it is necessary to think about the care, and the

relationships to which it refers, in its complexity sense; but also to review it critically in relation to the other sciences of education (biology, anthropology, psychology, sociology, etc.) and in relation to the many (formal and informal) scenarios in which it manifests itself.

In the meeting I highlighted the need –along with other colleagues– that pedagogical research broaden the scope of its relations and disciplinary collaborations, thus overcoming limitations and self-referential closures. This need for disciplines in recognizing them "in relation" to each other is an indispensable challenge for contemporary research, whatever is the scope from which it draws out.[4] Without losing the specificity of their viewpoints, the meeting was, in my opinion, worthy of starting a reflection (which we hope to repeat) through which the various disciplines involved began to de-construct and re-construct the process of knowledge through which they interpret the concepts of health, disease and care. This awareness in a sense forced the various participants to answer the questions they asked for the meeting, trying to clarify what the medical humanities are, what is the nature of their field of action and what is their contribution to medical practice.[5]

These easy insights have highlighted, transversally to all the proposed interventions, that caring –before being a praxis– is a reflection on knowledge; that is, a search for multiple perspectives and a prefiguration of the broad possibilities that come into play in the minds of the caregiver and the patient: ultimately, no discipline can run out in itself all of the most important aspects of health/disease experience.

Which soft skills for a proper exercise of clinical practice?

The themes faced inevitably lead to transit through "border territories", characterized as places for exchange, contamination and conflict. Setting a reflection in a multidisciplinary and shared perspective allows us to think both to the theory, to the empirical research and their interconnections (as I have just mentioned), but also to a concrete applicability in formative, communicative and organizational terms with respect to the social

community in which such reflection is cultivated and practiced. From this viewpoint the University of Siena, through the Santa Chiara Lab*, has created and is supporting a laboratory and dialogical space aimed to the acquisition of soft and digital skills, in order to support the employability of its students and graduates, and to enhance the professional profile of its faculty and technical-administrative staff. In particular, through the project of the Teaching & Learning Centre, have been aggregated within a single hub all the initiatives of this University related to the training of the "soft skills", addressed to students and teachers, as far as to the business world workers.

In this context, the soft skills to which the title of the meeting invokes looked like as a "cap" under which to collect skills of communication and empathy, problem solving, ability of analysis and understanding of ethical dilemmas related to the professional practice, capacity of collaboration with other professionals (not only therefore those of care) and of delegating. Therefore, those are diversified competences, which have emotional and cognitive components.[6] From these assumptions, it appears evident that the place of knowledge is not to be identified either in the subject or in the object, but in the relationship between these two realities. The problem of knowledge, as the various disciplinary perspectives invoked have shown, it is not a question of marginality, since its quality and breadth orient the various interpretations on man and the various fields of its activity, including that of health care. Admit the relevance and importance of the coexistence of different approaches to reaching knowledge, means to promote points of view that retrieve the meanings of all the singular, contingent and unrepeatable aspects that are expressed in the course of health care and in the interpersonal relationship between caregiver-patient. Definitely, the dialogue between different disciplines that the workshop

* www.santachiaralab.unisi.it

promoted, has allowed to unveil –beyond the inevitable differences between the disciplines– the reciprocal epistemological connections and any common methodological guidelines, in order to indicate interesting prospects of cooperation for the production of research methods, concepts and models of reality.

Conclusions: connections and horizons of reciprocity

As briefly highlighted, drawing a path to providing educational reflections on the relationship between medical humanities and training health professionals is not the answer, but the challenge that leads us to look to the phenomena of health itself and of the disease within "complex" determinants and, therefore, to think about the difficult training of doctors and health workers in a different way: not opposite, but broader, and especially not in a simplified way. This is the true challenge of complexity, as emerged from the discussions that animated the workshop: to relate to the disease through a multidimensional thought, that accepts the general and the particular, the necessary and the accidental.[7]

The experiences that the different colleagues have reported from an academic, professional and personal viewpoint, in their heterogeneity, can contribute to outline the frameworks of this challenge, also in a comparative perspective from not only the point of view of the different disciplines represented, but also from the countries from which they come from. In the complex question of how, and under which conditions, to introduce the medical humanities in the training of doctors and health care workers, we believe that has to be stressed that the problem is not, therefore, as we often hear people say, to make "the medicine more lovely" or "humanize it", but is about learning to look to the sick and to the disease in a broader perspective, creative, and at the same time uncertain (i.e. less full of certainties); at the same time, to create a cultural and global training context in which the medical humanities are conceived as essential activities to understand the human experience of illness.

In a recent study, in course of publication,[8] carried out with professor Josep-E. Baños and another colleague of Universitat Pompeu Fabra, we analysed all the internet websites of the faculty of medicine in Italy (n = 42) and Spain (n = 39), both public and private, to see how much and which space was given to the medical humanities in the Degree in Medicine. It comes out a framework, for both countries, quite inhomogeneous, segmented and ultimately poor; it's the evidence in our opinion not only that the positivistic paradigm (which considers worthy of knowledge only what can be observable and measurable) still has an absolute priority in the training of health professionals, but also that (it's a direct consequence) one of the critical aspects within the world of medical humanities is the evaluation of these special training activities*.

It is therefore a long and complex road, but already the fact of having created such a confrontation opportunity, shows us that it must be tackled.

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* On this specific aspect, read the following contributions to this publication.

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How could the humanities contribute to better training of physicians?

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Abstract

The development of modern scientific medicine in the 19th century and the therapeutic advances in the 20th century shifted the interest of many physicians from the patient to the disease. This situation has worsened as a consequence of the success of evidence based-medicine, the increasing availability of technology and the increasing costs of medical care. One of the most important consequences of such scenario is the drastic reduction of the time that physicians can devote to their patients. As a consequence, the doctor-patient relationship is deteriorating, as many patients believe that their physicians are only interested in treating the disease and not in their feelings as sick persons. Worries have appeared about the need of 'humanizing' medicine by recovering the role of physicians as professionals who cure diseases but also take care of patients in a wide sense as well. A needed step to reach such a goal is to train medical students in the values of professionalism. Humanities may enhance their full understanding of the disease and not only of the underlying biological processes. We need to come forward to convince medical educators of how literature, visual arts, history or philosophy may help students to understand better the patients' feelings on their own diseases. Humanities are not a cultural curiosity in the field of medicine. They will help to train more empathic physicians by showing the need of treating patients, not only diseases.

Keywords: bioethics, history of medicine, humanities, literature, medical education, professionalism.

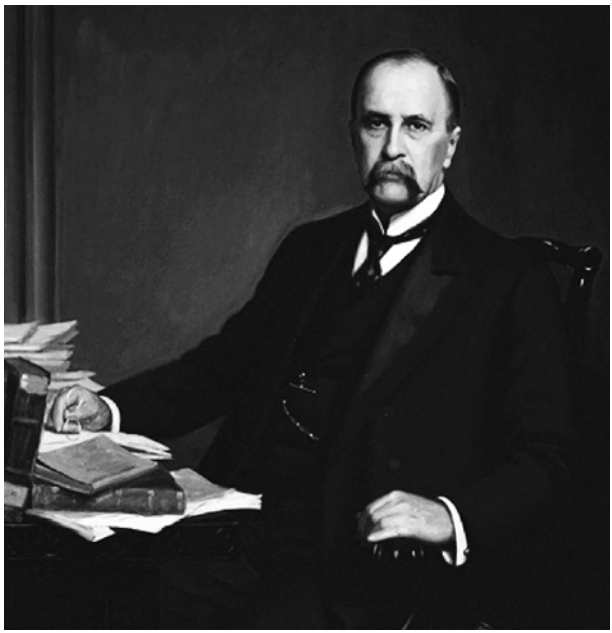
A short historical approach

Humanities have been a cornerstone in the higher education of Western societies during centuries. In Medieval universities, the knowledge of humanistic disciplines was compulsory for all students, but the development of scientific and technological disciplines, first in the Renaissance and later in the eighteenth century, focused their training in technical subjects rather than in a broad education.[1] In the current century, there is a general loss of awareness of the value of humanities in the education of young people. Some authors have recently written against this situation, as Martha Nussbaum in *Not for profit: why democracy needs the humanities* (2010) or Nuccio Ordine in *L'utilità dell'inutile* (2013). Other authors have also suggested that science, and medicine too, need of a cultural context to get a better understanding, and that a cultural vacuum may hinder its rational advance.[2] Humanities may help to understand the interaction between cultural and clinical issues, as they are the backbone of modern societies. To ignore them may greatly impoverish the education of citizens. Clearly, this is a challenge in our profit-oriented world.

In recent years, it has been stated that humanities also are an important tool in the training of physicians, as they may help the promote empathy, professionalism, and medical student self-care.[3] This is not a new idea; at the beginning of the twentieth century William Osler (Fig. 1) was a strong defender of the use of literary texts in medical education.[4] He also considered that history of medicine was essential to better understand the conflicts in the practice of medicine as well as the role of the professionalism in medical practice. Probably, the success of medicine in allowing better diagnoses and treatments during the last hundred years has contributed to the fact that the education of medical students has been more focused in the biological aspects of disease than in the humanistic side of medicine. This, in turn, might create the assumed opinion that the education of medical students should be exclusively focused in biomedical and clinical sciences.

In the last decades, however, it has been suggested the need of changes in the medical curricula to allow the inclusion

Figure 1. *William Osler (1849-1919) by Thomas C. Corner, 1905. Source: The Alan Mason Chesney Medical Archives. Image of public domain as stated in: https://es.wikipedia.org/wiki/William_Osler*



of humanistic disciplines as a part of the training of students.[5] In fact, some of them, like bioethics, now seem out of discussion and it is a clear example of how moral philosophy may help physicians to make adequate choices in their clinical activities. It's good to remember that bioethics started its modern path with the Declaration of Nuremberg (Table 1) after the criminal research practices in Nazi concentration camps during the Second World War. Nevertheless, its value in medical practice was not fully recognized until the problem of allocation of patients to dialysis treatment and kidney transplantation appeared at late 1950s. The first specific bioethics committee was created to solve this situation in Seattle Artificial Kidney Center in 1961 and was composed by a surgeon, a theologian, a lawyer, and four further lay members. This committee developed a list of selection criteria, named "social worth criteria", that were not exclusively based in medical grounds. Later on, the role
of such committees to solve ethical problems from many areas (clinical research, brain death, abortion, withdraw of ventilation) has been unanimously accepted and many hospitals have ethical committees to deal with research topics or for clinical conflicts.[6] The term bioethics was first used by the American oncologist Van Rensselaer Potter in an article published in 1970 entitled *Bioethics: the science of survival*.

Table 1. *The ten points of the Nuremberg Code**

1. Required is the voluntary, well-informed, understanding consent of the human subject in a full legal capacity.
2. The experiment should aim at positive results for society that cannot be procured in some other way.
3. It should be based on previous knowledge (e.g., an expectation derived from animal experiments) that justifies the experiment.
4. The experiment should be set up in a way that avoids unnecessary physical and mental suffering and injuries.
5. It should not be conducted when there is any reason to believe that it implies a risk of death or disabling injury.
6. The risks of the experiment should be in proportion to (that is, not exceed) the expected humanitarian benefits.
7. Preparations and facilities must be provided that adequately protect the subjects against the experiment's risks.
8. The staff who conduct or take part in the experiment must be fully trained and scientifically qualified.
9. The human subjects must be free to immediately quit the experiment at any point when they feel physically or mentally unable to go on.
10. Likewise, the medical staff must stop the experiment at any point when they observe that continuation would be dangerous.

*The complete Nuremberg Code can be found at: https://history.nih.gov/research/downloads/nuremberg.pdf

Bioethics, or medical ethics, is now an important component of medical activity and nobody considers its use in clinical medicine as useless. This success recognizes the fact that scientific medicine also needs principles of other disciplines to make the best choices.

Humanities were first introduced in medical studies with the appointment of Joanne Trautmann Banks (Fig. 2) as professor of literature in 1972 at the recently created Milton Hershey College of Medicine of Pennsylvania State University. In the following years new

Figure 2. *Joanne Trautmann Banks (1941-2007).*

subjects, such as history of medicine, bioethics or anthropology, were also introduced. The experience was quickly extended to other countries and universities. For example, in U.S. almost a third of universities had positions in literature and medicine in 1995.[7]

Boudreau and Fuks[8] have recently summarized the evolution of the involvement of humanistic disciplines in medical education. Studies on philosophy have changed their interest in epistemology and metaphysics to bioethics, and some authors now consider that philosophy will be completely engulfed by bioethics in medical campuses.[9] The initial interest of using literary texts has moved to include new possibilities, as the narrative competence, patients' narratives or the use of literature as therapeutic adjuvant, the so-called bibliotherapy. In the last step, many other disciplines have been included, like gender studies, cinema, music, religious studies, or visual and performing arts. Some authors have claimed that, beyond enthusiasm, evidences on the positive long-term impact of integrating humanities in undergraduate medical students are still sparse.[10]

What are humanities?

There is no general agreement about what are humanities and its definition has changed along the time. For example, one of the best Spanish dictionaries, *Diccionario de uso del*

español by María Moliner (1979), defines humanities as "Knowledge or studies that enrich the spirit, but are not of practical and immediate application; like classic languages, history or philosophy". The same dictionary defines science as "Set of knowledge that somebody has and that has been acquired by study, research or meditation. Also, set of knowledge that can be applied to any activity".
We believe that the analysis of both definitions shows some kind of "complex of inferiority" of humanities versus science. In a profit-oriented world we believe that this feeling has greatly contributed to the lack of credit of humanities and the decreased interest to follow such college studies (at least in our country). We also believe that at least part of the responsibility of this situation comes from some people working in this field. They rightly consider that literature, history or philosophy are essential for human life and they also consider that humanities do not need to be connected with everyday problems or questions of scientific nature. Therefore, for them the current lack of credit of humanities is only a consequence of the ignorance of scientists, who cannot recognize the intrinsic value of the discipline. We think this is a big mistake. Humanities should explain why they are important, and this should be made by conveying to general public why their knowledge would help to understand the behaviour of people, how societies work or how to avoid the same mistakes of the past in similar circumstances in the present.

But what subjects may be included in humanities? Most authors have considered in the past that philosophy, classical languages, literature and history are the disciplines covered under the name. However, we prefer to consider humanities in a wide sense. Therefore, we consider literature, narrative medicine, history of medicine, cultural studies, medical anthropology, ethics, philosophy, and arts (cinema, music, visual arts). However, the experience of its use in medical studies is very different from one to another. For example, there is a huge amount of papers on literature, bioethics or cinema, whereas it is more limited in the case of other visual arts, anthropology or cultural studies. In consequence, we will focus our paper

mainly to the first three, with occasional comments on the latter ones.

The importance of humanities in medical studies

Perhaps, the best summary of the interest and importance of humanities in medical humanities has been written by Evans.[11] He stated five reasons to justify such point. First, he maintained that the first goal was to help students to develop skills of interpretation and communication; second, to encourage them to develop their personal values; third, to convince students to take experience and subjectivity seriously; fourth, to assist the move from a technical training to a complete university education for medical students, and fifth, to develop in medical students a feeling of wonder at the natural universe, the human nature and embodied consciousness.

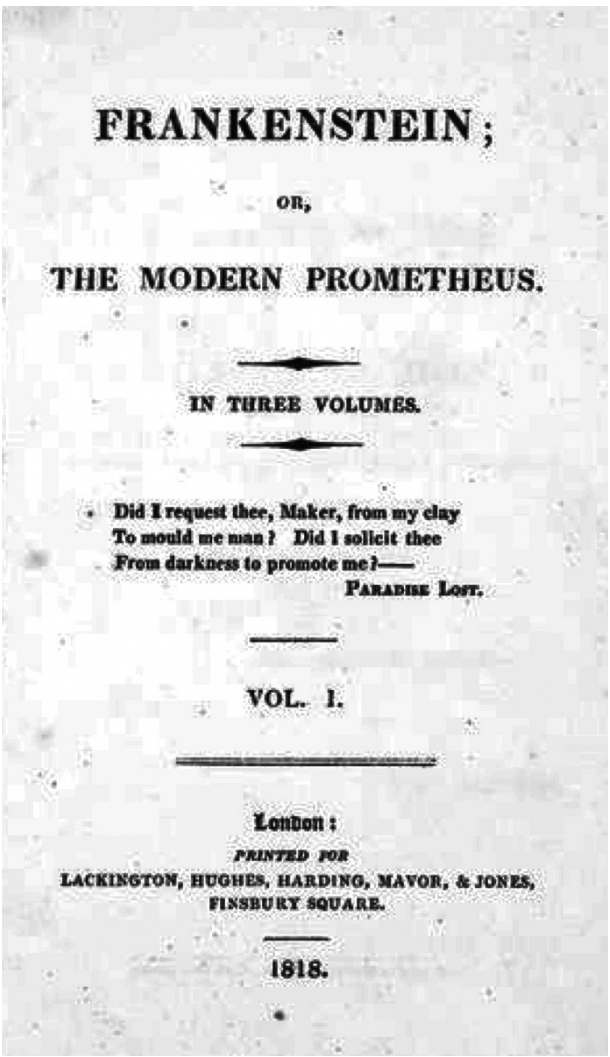
Shapiro et al.[12] reviewed the critiques and misunderstandings about the use of humanities in medical education. They consider that cross-disciplinary, collaborative recontextualization of medicine needs that medical humanities should be placed close to the core of curricula rather than in the periphery, as only "adjuvant" disciplines. They concluded: "We will able to use humanities' intricate and sympathetic knowledge about the human condition as well as its ability to examine particularistic, experimental knowledge to help ensure a morally sensitive, narratively sound, and deeply professional clinical practice."
However, an effort is needed to obtain empirical evidences of how humanities may help to improve medical education after its theoretical interest has been clearly established.[10]
However, this recommendation has been not unanimously accepted. For example, Jones[3] asked himself that "Why is proof that the arts and humanities make better doctors seemingly required, while similar demands for justification are not made on the traditional components of medical education? Most medical school courses have not been subjected to pre- and post-test evaluation."

Some examples: on the importance of literature, bioethics and history

Literature gives us a clear example of the educational opportunities of the humanities in the training of medical students. It may strengthen and focus this training towards a better understanding of human care of patients, but it is also a source of moral education. In recent years, the importance of literature has increased by the recognition of the value of the narrative of patients, the use of literary texts as an adjuvant treatment of some diseases and the possibility to learn specific experiences in medicine (aging, disability, death). Perhaps the best way to understand the importance of literature for medical students and physicians was summarized by Bolton[13]: "Literature is an essential study for medicine. It deepens the awareness of issues and experiences one cannot or will never have. It offers first-rate material for ethical study (ethical dilemmas generally make a plot fizz). An understanding of narrative can help clinicians develop a dynamic relation with everyday complex stories of medical situations." But perhaps one of the strongest defences of the usefulness of literature in medicine comes from Shapiro et al.,[14] who have recently written: "We suggest that literature is an essential element of medical education that, through the method of close reading, contributes intellectual inquiry, emotional awareness, sociocultural context, and a countercultural perspective to questions regarding medical professionalism. Narrative and storytelling broaden and make more complex the ethical context of care provided by students and faculty […] Literature can deepen the understanding of medical professionalism as many educators desire".

Additionally, literary texts may have a symbolic value to discuss, analyse and understand polemic issues that reappear during years. Jurecic and Marchalik[15] have recently published an interesting analysis of the value of *Frankenstein or the Modern Prometeus* of Mary Shelley published in 1818 (Fig. 3). They consider that the book is the first study of ethics in biomedical research and justify this assumption with many examples. Frankenstein has been

Figure 3. *Title page of first edition of Mary Shelley's* Frankenstein or the Modern Prometheus*, published in 1818.*



FRANKENSTEIN;

OR,

THE MODERN PROMETHEUS.

IN THREE VOLUMES.

Did I request thee, Maker, from my clay
To mould me man? Did I solicit thee
From darkness to promote me?—
PARADISE LOST.

VOL. I.

London:
PRINTED FOR
LACKINGTON, HUGHES, HARDING, MAVOR, & JONES,
FINSBURY SQUARE.

1818.

invoked to show the fears about medical technologies and advances such as organ transplantation, in vitro fertilization and animal cloning. More recently, Frankenstein has also been used to advice against the uses of the gene editing technology CRISPR. In our opinion, however, the main message of Shelley's novel is the lack of responsibility with the own decisions and facts: Frankenstein rejected his creature and it was the beginning of the tragedy.

It is generally acknowledged the essential importance of bioethics to develop professionalism in medical students.[16] History of medicine has been losing its importance in training of medical students and this is a worrying and undesirable situation. However, the recovering of its old place as an important and separate subject in medical students' education seems to be a difficult issue in current times. Therefore, it has been suggested to act differently to promote the exposure of students to their critical contents with strategies such as to include the history of medicine in faculty development programs, to identify the members of

medical schools interested in the subject or to consider the introduction of related contents of the history of medicine in each major topic course.[17] The strategy is, therefore, to mix and melt the contents of history of medicine as a natural part of each course, not as a separate course.

Studies on the effect of humanities in medical education

Empirical studies show very interesting results. For example, an investigation carried out in a German university asked students who were in their first year about the importance of the teaching of ethics and history of medicine. This study showed that they considered the first as significantly more important than the second but that they thought that the testability and teachability was considerable worse in ethics than in history of medicine.[18] These results noted the prejudices of students in accepting the value of the different subjects and should be considered when planning medical curricula. A preliminary experience on the implementation of a course of medical anthropology has also been published; it showed positive results in the opinion of students related to the stimulus of the awareness of specific local settings in the medical thinking and acting, the subjectivity of those involved in doctor/patient relationship and the need of using medical terms adapted to individual needs of patients that are context dependent.[19] Another study with Indian medical students in their third and fourth year showed that an elective module on medical humanities was welcomed and enrolment was done by most students.[20] Most of them considered that the module was useful to improve their motivational behaviour and to motivate them to learn more about core medical subjects; continuation of the course in the future was positively considered by 85% of students.

Some strategies to implement humanities in medical curricula

Evans[11] gave some important clues of how to enhance the role of humanities by giving some suggestions on how to implement such programs. We mainly agree with him and we would like to discuss them briefly. The first point is to

avoid that literature means the study of theories or methodological analyses. Rather than that, he recommends to focus on examples, insights or reflections that link with medicine. The second is that humanities should not try to colonise areas of curriculum. In practical issues, this means —in his words—: "What I mean by this is that humanities perspectives may be better accepted, and hence may be or more value and influence, if they are drawn upon to illustrate ways of thinking about a clinical or scientific problem that is being considered in the course of a clinical or scientific module studied by all students, rather than in the course of specially selected humanities modules which may be chosen by only a minority of students".[11] The third is, perhaps, the most important from a conceptual point of view. It refers to the assumption that teachers are not instructing the students in what they should think but showing them other ways in which they might think. Other proposals, like the one suggested by Chiapperino and Boniolo,[21] should also be considered. These authors proposed an approach based on a method they called Triangular Reflective Equilibrium, that could better accommodate inputs coming from medical decision-making in socio-psychological as well as narrative and rational terms. This application of the traditional biopsychosocial model with the adding of narratives may draw a frame to easing the integration of medical humanities in medical practice.

It seems difficult to accept that the crowded curriculum of medical students would accept new specific subjects on humanities. Instead, a new approach has been developed in some universities in the way of including humanistic contents in the basic and clinical sciences subjects, like in Vanderbilt University.[22] This approach is based in metacognition and has three specific goals: first, to develop students as flexible thinkers with essential cognitive and emotional skills for coping with medical uncertainty; second, to elicit their awareness of the diversity of human emotion and cognition; and third, to allow the integration of basic and clinical sciences. This may be a good approach in the medical schools where faculty is sensitive to these needs. In Harvard

University a pilot study to improve physician performance by using visual arts has also started.[23] In this case, they have used three courses: *Training the eye: Improving the art of physical diagnosis* for first year students, *The Brigham and Women's Hospital Internal Medicine Humanistic Curriculum* for interns and internal medicine residents and *The Multidisciplinary Teambuilding Curriculum* for those in general medicine rotation. In this case, the program is interprofessional and is attended by physicians, nurses, residents, interns, medical students, pharmacy students, physical therapists, and care coordinators. Georgetown University has also a similar program in which medical students read novels to "examine cultural conventions and conflicting perspectives, and reflect on our own preconceived notions about life and work".[24] Another example, in Northeast Ohio Medical University, is the program on humanities throughout the five-year curriculum that is required for all medical students.[25]

Another area of interest is the definition of how humanities may be implemented in medical education. In this direction, Kumagai and Wear[26] have suggested that literature, films or art may use the model of "making strange". The strategy is to portray the events in a way that disrupts the students' assumptions. This allows avoiding the "automaticity of thinking" and challenges personal opinions in front of completely different behaviours. In fact, humanities aim to educate medical students rather than only to train them with technical issues, that are needed but that are not exclusively the only ones they need for their future career. Some initiatives, like The Project to Rebalance and Integrate Medical Education (PRIME), of the National Conference on Medical Education, held in 2012, allowed the discussion among the experts on medical education and representatives of humanities fields. As a result of their first meeting they also concluded that the development of professionalism is based on the knowledge, attitudes, skills and behaviours that can be acquired from training in medical ethics and from humanities education.[27]

Concluding remarks

More than one century ago, Osler[28] remembered that physicians should "care more particularly for the individual patient than for the special features of the disease". Humanities may help to complete and to improve the knowledge of patients and therefore to make medical care more human and efficient. To finish, we would like to quote a sentence of an address of Fitzgerald[29]: "Scientific findings are information; knowledge is awareness of what can be done using this information; and wisdom is deciding whether or not to do it." We firmly think that humanities can help to act in this way.

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First open discussion

Tamara Djermanovic: I would like to comment that that the incorporation of humanities such as philosophy and art into the curriculum of the sciences was already being defended in antiquity. Aristotle was a great scientist, as well as a philosopher. Plato advocated the study of music, philosophy, and gymnastics in his Academia, where everyone shall study social and natural sciences. In this line, I think that students of medicine should have a universal view of patients and disease. For this reason, apart from subjects that are specific to medicine, philosophy and art should be taught as complementary disciplines. Doing so would be crucial in aspects that sciences do not deal with, for example, pain, disease, and death. Furthermore, I propose that a basic canon of literary and philosophy texts should be incorporated into studies of medicine and of science in general as a complementary subject. Texts from Plato, Aristotle, and Spinoza are clear examples of how this approach can help students understand life.

Loretta Fabbri: Other contributions of incorporating the humanities into scientific studies that deserve mention include their capacity to foment a multidisciplinary perspective and critical spirit in future professionals.
In medical studies, this would help produce physicians who are sensitive enough to understand and deal with the special situation and environment of oncology patients, for example. For this reason, our university defends this kind of education, which we consider fundamental together with the technical training that all professionals need.

Josep-E. Baños: Both of you have mentioned two different strategies to introduce humanities in medical studies. The old strategy is to introduce humanistic subjects in the medical curricula. The second one is to introduce elements from humanities in every medical discipline. For instance, using literary texts on oncology to understand the feelings of a patient with cancer. We are using this kind of approach in our degree programs at Universitat Pompeu Fabra, through films and TV series. I am also very much in favour of the second option, introducing humanistic elements in all

the subjects, mainly because the curriculum of medicine is cramped.

Albert Presas i Puig: I think that it would be a mistake to try to incorporate classes in humanities subjects in firmly established medical schools. I would be in favour of trying to redefine what medicine is and promoting the use of different academic strategies. The idea should be to create a need to tap these sources of knowledge that have historically been excluded. On the other hand, this approach should also be applied in the humanities. I believe the humanities themselves should also serve other fields of knowledge; to this end, there is a need to foment utilitarianism in the humanities.

Valentina Cappi: The use of TV series, films, and literature are part of an alternative approach to learning that is very useful in the field of medicine. They can help students to see how people act in situations that they have not yet experienced, but that are possible situations in their future career. Students can then ask themselves how they could react to that situation. They are also useful for understanding the patient's perspective.

Pierpaolo Limone: I am a passionate supporter of including the humanities in any kind of training. Nevertheless, one of the main issues on that is to find enough evidence to support that traditional training can be improved by including elements of the humanities in the curriculum. In the University of Foggia, we train teachers from all departments to introduce this kind of strategies. And they always ask about the evidence of using humanities compared to traditional methods. I think there is a real need for research about the actual outcome of these new strategies, and all of us should contribute to meeting this need.

Josep-E. Baños: I am very happy to hear there is a need for evidence to improve our learning strategies in the future. I would like to make a loose analogy with clinical trials. Not everybody learns in the same way, not everything will work for everybody, and there is no evidence of the effect of the new methods. And it would probably be useful to apply the same question to the old methods of teaching.

Lorenza Garrino: I totally agree with the need to redefine what medicine is

today. I understand that this is an umbrella term, because it does not only refer to training physicians, but rather to all healthcare professionals. In Italy, the curriculum for nursing schools includes subjects like anthropology, pedagogy, psychology, and sociology. This leads us to wonder why nurses should be the only ones to benefit from this background in human sciences. It forces us to reflect on how we define a physician, on the role of other healthcare professionals, and how healthcare professionals should collaborate with each other. We should understand medical training as a model of interprofessionalism, with transversal competencies in all the specialties, not just in physicians. Therefore, we need to question the current reality of the medical curriculum.

Jordi Planes Bassas: Most of us are thinking about helping people when we decide to study medicine. Nevertheless, as soon as we start medical school, we focus only on the final evaluation exam, called MIR in Spain. So, the rest of the training seems unimportant. When a doctor is dealing with a patient, the patient expects the doctor to understand what is happening, and patients don't care whether this understanding comes from a medical book or from a humanistic book. We, as a doctors, should know the disease, but also what having that disease means to the patient.

Reflective writing and medical humanities: some pedagogical remarks

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Abstract

Literature has shown increasing interest on reflective writing as a strategy that can enhance communication skills, empathy and overall professionalism in healthcare professionals in general and in medical doctors in particular. These aspects are considered pivotal goals in medical humanities courses/electives. Reflection is considered a deliberate and conscious activity allowing the individual to contemplate his/her/others' behaviour and events, and responses to them. Reflection is about cogitating one's own lived experience of thinking, which includes not only thoughts but also ideas, representations, prejudices, emotions, and values. Writing an experience, instead of simply telling about it, allows the writer to put on the paper what he/she could reflect upon. This allows to take a distance from an experience and to analyse it in a deeper and more comprehensive manner. While mandatory reflection is growing in education and reflective accounts are re-viewed and marked in some universities, there has been a general concern that "the requirement for reflection has distorted the original intentions of meaningful reflective practice". In this paper I will discuss the role of reflection in learning from clinical practice, with a particular focus on undergraduate medical education. I will attempt to explain why writing is intended as a core strategy for developing meaningful learning from one's own experience. I will then illustrate general features of reflective writing in undergraduate medical education and report some writing prompts. Finally, I will convey

some medical students' reactions to those activities and results of reflective writing experiences, as reported by the literature, concluding with some pedagogical remarks.

Keywords: clinical practice, medical education, medical humanities, narrative medicine, pedagogy, reflective writing.

Introduction

In the last two decades, there has been increasing interest on reflective writing as a strategy that can enhance communication skills, empathy and overall professionalism in healthcare professionals in general and in medical doctors in particular.[1] These aspects are considered pivotal goals in medical humanities courses/activities, which can be held in undergraduate, postgraduate and continuing education. Besides, as shown by Pennebaker and Segal,[2] writing can also enhance wellbeing.

Promoting wellbeing is crucial in increasingly demanding contexts such as those of medical care. Healthcare professionals' burnout and depression have been related to their incapacity of remaining "connected" to the patients, the others, and them-selves.[3] Medical humanities in general, and reflective writing in particular, may play an important role in the ability of "remaining connected" by expanding the physicians' awareness of the meaning of illness and doctoring.[4] It has been suggested that, through this process of awareness and therefore personal growth, physicians "can realize their full potential for healing".[5]

In this paper I will discuss the role of reflection in learning from clinical practice, with a particular focus on undergraduate medical education. I will attempt to explain why writing is intended as a core strategy for developing meaningful learning from one's own experience. I will then illustrate general features of reflective writing in undergraduate medical education and report some writing prompts. Finally, I will convey some

medical students' reactions to those activities and results of reflective writing experiences, as reported by the literature, concluding with some pedagogical remarks.

What is reflection?

Reflection is a deliberate and conscious activity allowing the individual to contemplate his/her/others' behaviour and events, and responses to them. The philosopher and educator John Dewey placed reflection at the very heart of education, which was essentially conceived as "the reconstruction or reorganization of experience".

Reflection, therefore, is essential to learning from experience, particularly in those situations in which the issues are ill defined, multi-layered and complex, as clinical practice is.[6]

It should be noticed that reflecting and thinking are two different acts of mind. Thinking is about analysing a situation in order to solve a problem and/or to plan future actions; it develops starting from a current situation. Reflecting, on the other hand, is about analysing the processes (cognitive, emotional, ethical, etc.) underlying some behaviours and events. It develops starting from an occurred situation. We reflect on an experience in order to analyse it in more detail, "which requires some degree of elaborating on or interrogating that experience".[7]

Reflection is not about thinking about a person/an event, but it is about cogitating one's own lived experience of thinking, which includes not only thoughts but also ideas, representations, prejudices, emotions, and values. In fact, when reflecting on an experience "it is important for learners not only to replay the experience but also to attend to how they felt during its occurrence".[8]

Charon and Heimann[9] define reflection as "an active interior state", which uses not only cognitive and affective means, but also creative resources to go through one's lived experience. The reflecting self "is one with the attentive self, the present self, the feeling self, the self with a sense of story".[9] This kind of reflection is pivotal in constructing professional identity,[10] which is considered the highest purpose of medical education.[11]

Moreover, in educational contexts, reflection is aimed at developing ideas for transformative actions, which could allow the student/practitioner to resolve things differently in the future. As highlighted by Wear et al.[7], "this emphasis on transformative action also shifts reflective practice from a solitary act to a social one, a practice in which individuals look outside –to others– as well as inside themselves".

Therefore, reflection can be understood as "the core of a mindful practice, which includes self-awareness, regulation and monitoring, clarifying values, and recognizing the affective domain of medical care".[12]

Although Mann et al.[13] have pointed out that there is no evidence on the role of reflection in improving learning, research has shown that the physician's reflective practice is associated with the generation of more accurate diagnostic hypothesis in complex cases, whereas it does not affect the diagnosis of simple cases.[14]

Writing an experience to reflect on it

Rita Charon has affirmed: "Without writing, I would not have realized the illness experience of my patients. Representing those interior events enabled me to see what goes on within myself as a clinician, as patients no doubt write illness narratives to make visible aspects of their own situation".[15]

Writing seems to render visible aspects of our experience that would otherwise remain invisible or hidden. The use of language facilitates the act of representation of a certain experience. For example, the act of representing the morning in words is what enabled me to see it, declared Rita Charon.[16] Yet, verbalizing an experience is not the same of writing it. The latter is a more difficult task, which enables people to represent and recognize "complex events and states of affairs".[9]

So, why to write an experience, for example within the clinical training? Writing an experience, instead of simply telling it, allows the writer to put on the paper what he/she could reflect upon. This allows to take a distance from an experience and to analyse it in a deeper and more comprehensive manner. Furthermore, writing allows to scaffold an experience and to connect different aspects of it.

Reflective writing helps in maintaining a distance from the clinical experience, promotes the ability to grasp its complexity and to learn to tolerate the ambiguity and uncertainty embedded in the clinical practice. This is particularly important in medical education, if we consider that "medical students are awash in ambiguities –intense competition, derogatory humour directed at patients, inequities in care".[7]

Therefore, what is reflective writing? reflective writing is a practice in which the writer describes an event, an interaction, a passing thought, a memory or an observation, in either essay or poetic form, adding a personal reflection on the meaning of the item. Hence, while reflective writing starts from the description of an event, it cannot be considered an act of reporting events objectively. It is a process related to personal "perception" of a certain experience, which, of course, prompts for a description of it.[17]. In Table 1, I explain, through an example, the difference between perception and description.

A seminal example of reflective writing is the "parallel chart",[16] a method aimed at enabling healthcare professionals to recognize what patients endure and to examine their own journeys through medicine. This exercise was implemented by Charon with residents, and consisted in writing about patients and clinical experience in an ordinary language. Residents were asked to write their lived experience in first person. In Table 2 I report an example of parallel chart.[10]

Why reflective writing in medical education?

While in evidence-based medicine the randomized clinical trial is considered the gold standard, it also has increasingly pointed out the limitations of this research model in the (medical) education field. Nevertheless, experimental research suggests that reflective capacity may improve communication skills, empathy, collaboration and, more generally, professionalism.

In particular, reflective writing has be shown as a means to:

- Increase students' observational and reporting skills.[18]

Table 1. *Descriptions and perceptions.*[17]

Description	Perception
• The nurse administered the bolus injection, controlling the speed at which the drug was administered	• It seemed foolish to pretend to the family that this tumor carried a good prognosis
• *Factual description:* describing facts objectively	• *Perceptual description:* linking facts with their perceived meaning
• Giving evidence about clinical practice	• Grasping meanings from clinical practice
Clinical competence / Professionalism	

- Develop the critical metacognitive skills needed to effectively analyse and integrate clinical concepts.[14]
- Allow students/professionals to recognize changes in their performance.[18]
- Vent their feelings in relation to clinical experiences and to foster self-understanding and coping.[4]

Shapiro et al.[19] found that students who completed a "Point of View" writing exercise were able to express more empathy and insight, if compared to a control group. "Point of View" is aimed at teaching "how to write from a patient's emotional and social perspective about his or her illness and its consequences".[19] Nevertheless, the authors advised that empathic skills developed through writing may not translate into future professional behaviour.

In a recent systematic review on the impact of reflective writing on students'

Table 2. *An example of student's reflective writing.*[10]

So excuse my English because this is my second language so there is a problem. Um during a call in obstetric rotation I was called for a delivery of baby at 11 pm. As routine, when a pregnant woman comes to the ward the resident on call will take the history and physical exam and then, later on, the nurse can call the resident into the delivery when it's the time. This time I had no idea who is the pregnant woman. Not knowing her, I entered the room and saw a young and pretty lady in the delivery bed trying to push out the baby. I introduced myself and asked her if anyone is accompanying her. She said, 'No'. I could not see joy, fear, pain or even sadness in her face. The nurses were encouraging her to push harder. By this time my staff on call arrived. After about 10 minutes of labour, the baby's head was out. I was holding the baby's head, everybody saw the baby's head…cranium and…could not breathe. An on-call gynecologist shouted at me to raise the baby's head. I did, to suction the nose and mouth. The baby cried. We pulled the rest of the baby out of the mom's body. It was a boy. The Apgar score was not that good. It took about 2 minutes until the baby's color was a little pinkish but his cry, but his, but his cry was weak and raspy. I was worried. Everybody was, except the mom. She turned her head and looked at the other side. When she was asked if she wants to hold the baby, she nodded no. The nurse took the baby to the NICU [neonatal intensive care unit].

At that moment I had two different feelings. On one hand, I was proud of myself to deliver a baby. On the other hand, I was sad of seeing a new mom with flat emotion in her face and not wanting to even look at the baby. The gynecologist asked the mom if there is anyone you could call to come to the room. She said, 'I came by myself'. She said that she doesn't want to keep the baby and wants to put him for adoption. The gynecologist agreed to call the social worker for that matter. When he left I couldn't help myself asking more questions: 'Who is the father of the boy and does he know you are pregnant?' 'How come no one is with you?' She got pregnant after having a date. They broke up after. And the guy had no idea she was pregnant. She said, 'I think for adoption I should tell him about the baby' She was living with her parents at that moment. Her mom questioned her a couple of times about her big tummy. She denied the pregnancy. She had no prenatal care at all. That was, that day was the first time seeing a doctor for pregnancy, had no feeling for the baby and wasn't sure if she wants to tell her parents about the baby. I ask her, 'If, if you did not, if you did, didn't want the baby, why didn't do abortion?' She said she had talked to someone in supporting group for unwanted pregnancy and was told if she had an abortion she was facing more psychological consequences. I comforted her and came out of the room.

All the nurses and the staff were talking about her. I was very upset. Being a mom, I couldn't understand how come a person can let her baby go for adoption. I had to talk to someone. I called my husband. Almost tearful, but I was telling him this slowly, but it wasn't enough. I told one of the medical students about her. He is from India, with close contact to mine. I told him that I have hard time understanding one, why someone could ah be so irresponsible to let get pregnant in the first

time and then go through whole pregnancy and then put their own blood and flesh for adoption. He understands me, understood me. I always think of the worst scenario. What if the adopting family are not good enough for the baby? What if they abuse him, sexually or physically? How he would feel when he grows up? How long he would wonder about his mom and asking himself why his mom didn't keep him. For sure he always would wonder why his mom didn't like him because if she did she would not abandon him and one million more questions went through my mind at that night and the following day.

Two days later I saw the girl walking into another unit. She was changed. She was more energetic. I noticed a couple of people surrounding her. I heard somebody said to her, 'That is the best.' What was the best? A few hours later I saw her again, this time face-to-face. I ask her why she was still there. She said, 'The baby is in the NICU and we have problem feeding him'. I looked at her and asked, 'What do you want to do about the baby?' She proudly said, 'I will keep him'. I could not believe what I heard. Not thinking that this isn't professional, I hugged her and told her that was the best thing she could do. Obviously, she called her parents. They all supported her and wanted to keep the baby.

A few days later, we, the residents and students, were talking about interesting cases we had. I told them this story and how I felt when I knew the baby was going for adoption and how I preferred to have abortion than adoption myself and why not her. One of the female residents commented, not very friendly: 'You can't judge people. You don't know why she did that. She had her own reasons. Did she? I thought about what she said. She was right. I never had unwanted pregnancy and I never did abortion. I did not know about her family situation, religious, culture, or economical situation. Not everybody had financial and emotional support. Why did I think that she had no feeling for her baby? Of course she had. She was suppressing it. I learned my lesson. I'm not going to judge a person based on what I observe. You always see the tree, not the roots. I will pay more attention to the roots.

empathy, Chen and Forbes[20] stated that very limited quantitative data prove that reflective writing has an impact on clinical skills or future wellbeing. On the other hand, the aforementioned study from Shapiro et al.[19] found improvements in students' empathy, ability in self-reflection, cultural competency and communication skills. Yet, it should be noted that these research papers were different in study design and type of intervention (reflective writing), and used different instruments to measure empathy. Chen and Forbes[20] concluded that further research is

needed on the empathy outcomes following reflective writing interventions, which are likely to have a profound potential in developing physician wellbeing and, therefore, patient outcomes.

Reflective writing: essential steps, examples, and common errors

Shapiro et al.[4] proposed a two-phase model of reflective writing in medical education, composed of a writing and a reading phase. The authors state: "writing is a solitary act", therefore students/professionals should be initially invited to write alone, after their (clinical) experience, undertaking a disposition that allows questioning and uncertainty. In the process of writing, learners can go back to their experience and look at it in a wider manner and/or according to other perspectives. In this practice, students/professionals may "become more confident about exploring the voices of patients, patients' family members and others".[4]

At the same time, in the process of writing, learners have a chance to fully express their emotions. This task can be very challenging. Accordingly, Wear et al.[7] suggested to start the process of writing with a "pre-writing exercise" prior to any formal pre-clinical/clinical writing. For example, first year medical students can be asked to reflectively write about a person, an episode and/or an experience that had an influence on their choice of applying to a medical school. Even so, Wear et al.[7] have pointed out that reflective writing should involve a certain degree of interrogation of students' experiences; furthermore, the experiences students write about should be puzzling and promote broader understanding and possibly transformative learning.

Therefore, students can be invited to write[17]:

- What they think/understand about a meaningful episode / a meaningful experience.
- What they believe about that experience.
- What they feel about that experience.
- What competing perspectives or accounts exist about the experience they wrote about.
- What they have learned.

Table 3. *Examples of reflective writing prompts in medical education.*[21]

- Record the chief complaint of a memorable case. Then, recall the case from the patient's perspective.
- Reflect on the scene the first time you saw someone diagnosed with a serious illness.
- Describe something you know now that you wish you had known at the beginning of the year.
- Describe a time that you saw a tense situation diffused.
- Describe a time someone trusted you during clerkship.
- Reflect on a lesson you were taught by one of your patients.

I report some examples of reflective writing prompts in Table 3.

The second phase of the writing process consists of reading and listening.[4] In order to develop all the potentialities of that process, learners should share and discuss their writing with peers and/or a mentor, choosing a level of self-disclosure that is not excessively embarrassing or painful. In fact, as Mann et al.[13] stated, mentors are "key to reflection and are factors that learners perceived to be beneficial". In this sense, as suggested by Charon and Hermann,[9] "writing is not a solitary act". Mentors should never be judgmental and should promote a learning context characterized by peer learning, teamwork, trust and care. They should also advise students, in order to avoid some common errors in reflective writing such as:

- To think about possible subjects and opportunities for reflective writing only after placements.
- To write too informally (just because it is based on experience, it does not mean they should ignore the academic context in which writing will be shared).
- To write in too little or too much detail (students need to analyse and evaluate the events, while the reader

needs to be given just enough detail allowing to understand the situation).

- To write trying to guess what the listener would like to hear.
- To be judgmental (e.g. moralizing about people's behaviour).

In order to support students in their reflective writing, some fundamental rules can be set, as part of a shared learning contract. For example:

- Reflections are neither right nor wrong. Writing is simply a space for reflection and self-expression.
- Everyone is encouraged to write using his/her own voice and style. The writing style will be not corrected.
- Everyone will share the writings he/she feels safe to share, confidentiality will be strictly regarded.
- The shared writings will be discussed in a respectful and non-judgemental tutorial.
- Students will not be penalized for weaknesses or lapses in their reflections.
- Feedback will be provided on the writing process and not on its contents.

Sharing such rules can be a fundamental strategy to create a "safe" and supportive learning environment, where students can feel free to disclose their sense of vulnerability and, therefore, to empathize with patients' vulnerability.[4]

Medical students' reactions to reflective writing

While some studies have pointed out that medical students/residents appreciated reflective writing,[22] others have revealed that students often consider such activity as irrelevant or a waste of time.[18] Nevertheless, even if opinions on reflective writing effectiveness may be contrasting, advice from the UK General Medical Council is clear: doctors should regularly reflect on their performance. Therefore, the issue under discussion is not the utility of reflective writing, but how it should be implemented and supported.

It has recently been highlighted that some applications of reflective writing have taken an excessively instrumental approach to the evidencing of reflection and, while they have provided useful

templates or framing devices for recording individualistic reflective practice, they potentially have distorted the original intentions.[9] Furthermore, as reported by Daniel Furmedge,[23] a British MD, a misuse of reflective writing has been registered when a trainee had been asked to release a reflective log from his/her portfolio for use in a legal case. This falls in contradiction with the basic rules of reflective writing, in which confidentiality should be strictly regarded. While mandatory reflection is growing in education and reflective accounts are reviewed and marked in some universities, there has been a general concern that "the requirement for reflection has distorted the original intentions of meaningful reflective practice". Furthermore, no study has yet demonstrated any effect of reflection on learning,[13] nor, therefore, on the medical practice or in the improvement of patient outcomes. This might be the reason why, in the US, reflective writing is actually incorporated to the formal curriculum in only a few cases.[18] Many scholars advocated for further research, which will "help identify whether there are long-term effects from such instructional activities".[18]

Conclusive thoughts

In 2012, Charon and Hermann[9] wrote: "The field of reflective writing in medical education is at a most productive and perilous stage. Those who study and teach reflective writing hover somewhere between epiphany and proof, knowing they are on to something important for medical education but having yet to establish what, in fact, the field can do or how it does it."

Educators, who have practiced reflective writing with students and/or professionals, may have experienced that "something important" happened in those situations, especially when students and professionals clearly demonstrated to have fostered their subjectivity and professional identity.

Nevertheless, the value of subjectivity is hard to be recognized in a world where objectivity and evidence is the mainstream. Educators should not adhere to that mainstream, transforming reflective writing in a new discipline, which adds further work to the burdened medical student. Furthermore, they should avoid an

assessment of students' writing based on checklists or strictly pre-defined categories.

Quite the opposite, reflective writing activities should value the process of writing in itself, that is crucial for the development of professional identity. As we can see in the example reported in Table 3, the resident is searching for "a kind of narrative coherence in her stories to live by, in effect, for her professional identity".[10] In light of the evolution of medicine and the relieved incapacity, especially of doctors, of remaining connected to the patients, the others, and themselves, I think it is pivotal to foster spaces in which students/professionals can deliberately tell and share their stories, finding differences and resonances, a process that Bateson considered the basis of wisdom. More importantly, students/professionals should not be forced to participate in those activities, since this may create disappointment and rejection of reflective writing.

Reflection is a vital part of adults' lifelong learning and it deserves to be taught properly rather than used as a "box-ticking exercise". This is a new pedagogical challenge in medical and healthcare professional education and I hope all of us will be able to take up this challenge.

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Literature as a teaching tool for medical students

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Abstract

In recent decades literature has been seen as a tool to improve the knowledge of the human aspects of the disease and medicine. Although the relationship between literature and medicine is not new, recently the number of medical schools providing these subjects has increased. In this chapter we will present the experience of the Universitat Pompeu Fabra-Universitat Autònoma de Barcelona Medical School in the introduction of literature as a teaching tool in some subjects of the studies. We will focus in the subjects "Patient-Doctor Relationship" and "Psychiatry"

Keywords: literature, medical education, medical humanities, patient-doctor relationship, psychiatry.

Introduction

The practice of medicine has become increasingly centered on the technical aspects of treating disease. In recent decades, medical educators have begun to observe that medical students are lacking perspective on the human aspects of disease and medicine. Literature has been seen as a tool to improve the knowledge of the human aspects of the disease and medicine.[1]

A number of optative and elective subjects and courses on medical humanities have been offered in some universities and schools of medicine to

reduce the gap between scientific medicine and humanistic medicine. One of the most used is literature and medicine. Since the first course on literature and medicine was started at the Pennsylvania State University in the early seventies, the number of medical schools providing these subjects has increased. In Spain, the first course was offered in the Universitat Autònoma de Barcelona[2,3] and a growing number of medical schools have accepted the inclusion of literature over the past few decades. Interest in the topic has been demonstrated through the founding in 1982 of a specific journal devoted to this relationship (*Literature and Medicine,* Johns Hopkins University Press, Baltimore, US).

Literature and medicine: a long and close relationship

The relationship between literature and medicine is not new. On the one hand, many medical doctors have written good and famous books including some bestsellers. Arthur Conan Doyle and Anton Chekhov in the past, and Michael Crichton and Robin Cook more recently, are just some examples of medical doctors that developed a brilliant career as writers.

On the other hand, medicine, and medical sciences in general, is a frequent topic in literature. From the role of the medical doctor (e.g. *That none should die* by FG. Slaughter, or *A taste of my own medicine: when the doctor is the patient* by E. Rosenbaum), to the description of situation or a crisis created by specific diseases (e.g. *The Plague* by A. Camus), or stories in the treatment context (e.g. during war as in *The English Patient* by M. Ondaatje).

Academic goals

Literature can contribute to at least five different aspects of medicine[1,4]:

- Literature enhances understanding of the emotional component of the disease and allows a holistic approach with the additional consideration of social and situational factors.
- Literature allows us to contemplate medicine completely, not only as an 'abnormal' biology. It is obvious that, in most situations, the semiology of patients can be explained by specific pathophysiological mechanisms.

- Literature brings students closer to human experiences that may take time to live first hand.
- Literature contributes to the understanding of the conflicts of medical activity in different contexts and historical situations
- Literature allows us to explore the ethical commitments of the profession in its most diverse fields.

Clear definitions of the objectives for the use of literature in medicine are needed, as in other subjects. The main academic goals for the introduction of texts as a teaching tool in medical education can be summarized as follows:

- To facilitate and increase knowledge of the psychological aspects of being ill: to increase empathy.
- To increase critical thinking skills, the ability to assess different types of evidence: to gain a humanistic perspective of the disease.
- To promote ethical reasoning advances and multicultural perspectives: to increase self-consciousness on the part of medical practitioners.

As an example, Shapiro et al.[5], in a review about how the study of the literature can contribute to medical professionalism, summarized that the main areas that could be improved through literature are:

- To consider different perspectives about what it means to be a doctor and to be a patient.
- To think critically about the profession of medicine.
- To better understand the dynamics of the doctor-patient relationship.
- To engage in the analysis of particular professional dilemmas.
- To critically consider personal assumptions, patterns and biases.
- To be aware of and know how to manage the different emotions that arise in patients, families, and healthcare providers, in response to diagnosis and treatment.
- To recognize that professional training is a continuous process that often shifts from situation to situation rather that a set of rules.

The selection of the literary texts

The exact choice of literary texts will depend on the educational objectives/goals. If the aim is to facilitate the students focusing on the lived experience of disease, the works covered will present different scenarios of people living with the selected health condition. Classical examples include mental illness in *King Lear* by William Shakespeare, and terminal illness in *The Death of Ivan Ilych* by Anton Chekhov. In contrast, if ethical discussion is the goal of the literature and medicine course, then texts will reflect ethical dilemmas —such as medical research ethics in *Frankenstein* by Mary Shelley. The focus of medical school literature courses is on the instrumental value of the text in teaching the subject.[6]

The experience of the Universitat Pompeu Fabra-Universitat Autònoma de Barcelona Medical School

The introduction of literary texts as a teaching tool in the degree of medicine in the Universitat Pompeu Fabra-Universitat Autònoma de Barcelona Medical School began as a pilot study in the academic course 2014-15. The texts were introduced in one subject per academic year. The subjects selected were: "History of Medicine" (1st year), "Doctor-Patient relationship" (2nd year), "Pathological Anatomy" (3rd year), "Neurology" (4th year), "Psychiatry" (5th year), and "Bioethics" (6th year). Each subject selected one literary text to be read by the students. In this paper, we will focus on the experience of two of the above mentioned subjects: "Doctor-Patient Relationship" and "Psychiatry".

Subject: Patient-Doctor Relationship

In this subject, the main objective of the inclusion of literary texts as a teaching tool was to actively engage the students with questions about the human condition, providing a larger context within which to consider professional identity formation. The specific academic goals were related to facilitate, and even increase, empathy, ethical reasoning, and professionalism of the medical students.

La Ciencia y la Vida

For this objective we selected the book *La Ciencia y la Vida* by Valentín Fuster, José Luis Sampedro, and Olga Lucas.

The book describes the experience of Jose Luis Sampedro while he was in New York visiting his daughter. Sampedro, a well-known economist and writer, suffered a severe endocarditis that led to his hospitalization at Mount Sinai Hospital in that city. In the hospital he was treated by Dr. Valentin Fuster. The book summarizes the conversations of both in the presence of Olga Lucas, wife of the writer. They speak of health as a state of physical and emotional balance, of education and personal fulfilment, of the value of effort and the ethic of duty, of love and support of the "other", of the role of youth and of those who are in "the second life", of the desire to transcend, in summary of science and life.

Academic goals:

- To understand the concept of health as a physical and emotional balance.
- To consider different perspectives about what it means to be a patient.
- To facilitate the comprehension of the role of the disease in emotion and health from a holistic point of view.
- To understand the needs and difficulties in the adaptation of the person to the different stages of life, in formation, and health.

Subject: Psychiatry

In literature, the references to mental disorders are not unusual. They range from the description of mental symptomatology to the atmosphere of the psychiatric hospitals, treatments applied, the relationship with family, the social point of view and research, amongst other aspects. Stories about different mental disorders can thus provide a complementary vision for the students about not only the disease, but also the individual, and their familiar and social vision.

The selection of the literary text in psychiatry is especially relevant. Some books show a negative view of the mentally ill person and their environment that is widespread in society and increases the stigma of these disorders (i.e. use of derogatory phrases in reference to the disease, aggressive patients, cruel treatments). Examples are *God's Twisted Rows* by Torcuato Luca de Tena, *One Flew Over the Cuckoo's Nest* by Ken Kesey, and *The Alcoholics* by Jim Thompson.

In our Medical School, the main academic goals of the inclusion of literary texts as a teaching tool in psychiatry were to detect and especially decrease the stigma related to mental disorders. In this regard, we have chosen three books to illustrate this: *The Lost Origin* by Matilde Asensi, *Morphine* by Mikhail Bulgakov, and *The Curious Incident of the Dog in the Night-Time* by Mark Haddon.

The Lost Origin

In this book, written by Matilde Asensi, the protagonist of the novel is Arnau, a computer entrepreneur and skilful hacker. The action begins as soon as Arnau is warned that his brother Daniel, ethnologist and promising student, has been taken to the hospital because his wife found him delirious: he says he was found dead and buried. Doctors diagnose agnosia and Cotard's syndrome. However, treatment to cure the strange disease is futile… (to be continued).

Academic goals:

- To understand Cotard's syndrome.
- To understand psychosis: somatic and bizarre delusions (focus on preoccupations regarding health and organ function). High degree of conviction despite clear contradictory evidence regarding its veracity.
- Discussion between neurologist and psychiatrist.
- Family and social difficulties to understand mental disorders.
- Treatment: admission to a psychiatric hospital, electroconvulsive therapy.
- Stigma of mental disorders.

Morphine

This book, by Mikhail Bulgakov, explains the story of Dr. Polyakov, a rural physician in Russia, who becomes addicted to morphine after starting its use as a pain killer. The novel explains the natural history of opioid addiction, from the more pharmacological symptoms and signs, to the development of personal and social complications related to addiction.

Academic goals:

- Description of opioid withdrawal.
- Description of opioid use disorder (craving, increasing doses, altered behaviors, "I control the situation"…).

- Opioids for pain treatment vs addiction.
- To decrease stigma.

The Curious Incident of the Dog in the Night-Time

In this novel Mark Haddon, the author, describes some days in the life of Christopher a 15 year-old adolescent, with a mind that is different from the other boys his age. He knows by heart the prime numbers until 7507, all the countries of the world and their capitals, and why at night we are in the dark despite having so many stars in the sky, but has difficulty with other things. For example, he does not like to talk to strangers, or that others touch him. It bothers him if you stare at him, or that other people's moods are so complex. A dog, for example, can only be happy, sad, angry or concentrated. Also, dogs are faithful and do not tell lies because they do not speak, so Christopher likes them. Therefore, when he finds the neighbor's dog murdered in the garden of his house, he decides to investigate it as the characters of his favorite novels do.

Academic goals:

- To understand Asperger's syndrome.
- To understand the view of the protagonist.
- To know his relationship with others, his difficulties.
- To decrease stigma.

Conclusions

Medical school curricula have been historically dominated by science-based subjects. In recent years, the inclusion of literature and stories has been accepted and appreciated as complementary learning. Cultural works, including literature, can represent the human experience of disease and the patient-physician relationship differently than purely scientific or clinical teachings. Literature in the syllabus can help to facilitate understanding of the human context of health and disease, to increase professionalism, and to decrease the stigma of diseases.

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Teachers and writers: some thoughts from the both sides

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Abstract

Medicine has traditionally been closely linked to humanism, especially in literature. Great doctors/authors of our times such as Michael Crichton, Robin Cook and Michael Palmer chose to give up their professional career to write their bestselling novels. What should doctors do then, when they feel the creative urge to novels? In this session, training in creative writing highly recommended, since the techniques and strategies that are used in medical practice and research are very different to those used in fiction. When the doctor finally manages to enter the world of publishing it is still necessary to learn how to market their product and also to know the importance of the media.

Keywords: doctors-writers, fiction, humanities, medical novels, medicine.

Introduction

Medicine has traditionally been closely linked to humanism and especially literature, probably through altruism and fascination with the meaning of life and death. The loss of humanistic components not only affects the teaching of Medicine, but also medical professionals. This work aims to give guidance to those doctors who have literary aspirations.

Two professions: doctors-writers

There are many doctors interested in literature and specifically in writing it. Clinical practice, the relationship with patients, ethical conflicts, and biological challenges, stimulate their literary

creativity. They deal with pain, disease, loneliness and madness from a very privileged position of mutual affection and trust.[1-3]

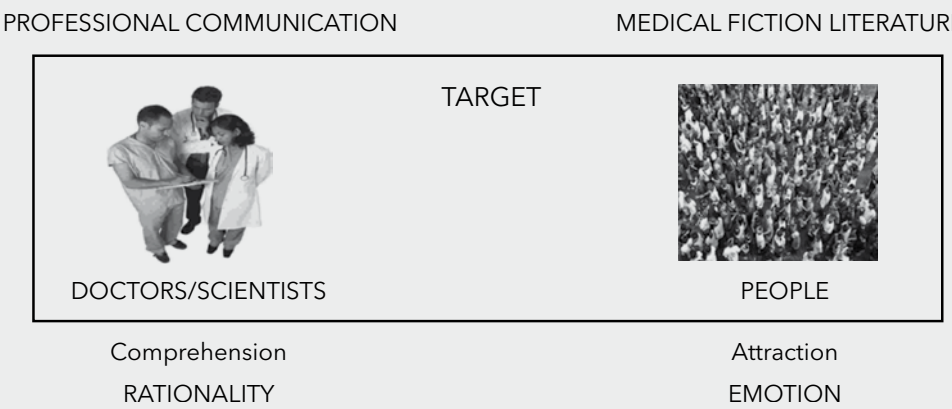
Chejov was a young famous writer, but he was also a doctor and a tuberculosis patient. Therefore, he wrote his novels, tales and plays from all these points of view. He said: "Medicine is my legal partner, but literature is my lover. When I get bored of one, I spend the night with the other." This sentence shows how the two professions can come together. Today, however, the combination is more difficult. Both professions have become more demanding in time and training. On one hand, successful writers as Michael Crichton, Robin Cook or Michael Palmer had to give up their medical careers to write their successful stories. That is because usually they have the commitment (for example) of a new novel every two years, and they need an integrated work with a whole team. On the other hand, modern medicine requires a major investment in training and specialization. Medical studies, years of research and professional advancement take up a lot of time when you start your medical career. These are critical and very demanding times. However, when you have achieved professional stability and maturity, you may start to feel a need to explore the more literary and creative aspects of medicine. It is the case with many doctors with literary inclinations.

The writing learning process

What do we do, then, when we feel this need? The techniques and strategies used in medical practice are very different from those used in fiction, and therefore training in creative writing is necessary.

In any case, the learning process is not easy. First, the targets are different (Fig. 1). In professional communication, the target readers are your colleagues (doctors or scientist), and the way to reach them is through comprehension and rationality. Nevertheless, in medical fiction, your target is everybody else, and the way to reach them is through entertainment and emotions.[4] Therefore, one question rises "Do we have to renounce medical accuracy?" Because our objective is entertainment, not a lecture, we have to explain the

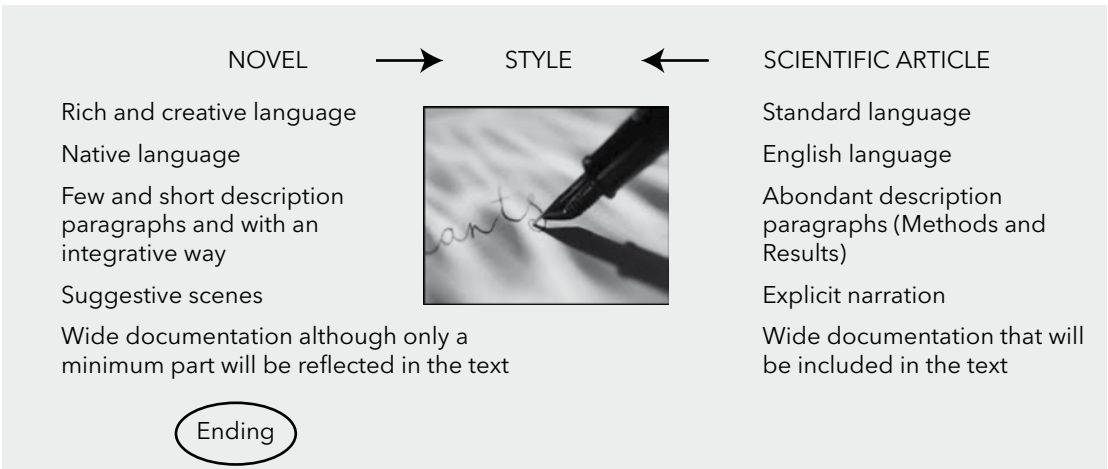
Figure 1. *Different goals.*



technical content in a simple and a concise way.

Regarding style, we can compare the one used in a novel and the one used in a scientific article (Fig. 2). For instance, in a fiction we use a rich and creative language whereas in a scientific paper we write in a standard language. In fiction, we write in our native language whereas in science, we write in English. Fewer and shorter descriptions included in the action are needed in fiction. Nowadays, long descriptions are not allowed (like in the nineteenth century), they must be short and integrated with the action. In a scientific article, abundant descriptions (especially Methods and Results) still appear. Implicit scenes in fiction: you must make the readers work and imagine, you do not have to explain everything. Whereas in science, explicit narration is required. Wide documentation is needed in fiction, although only a small part is reflected in the text, whereas in science, wide documentation is required and entirely

Figure 2. *Style comparisons.*

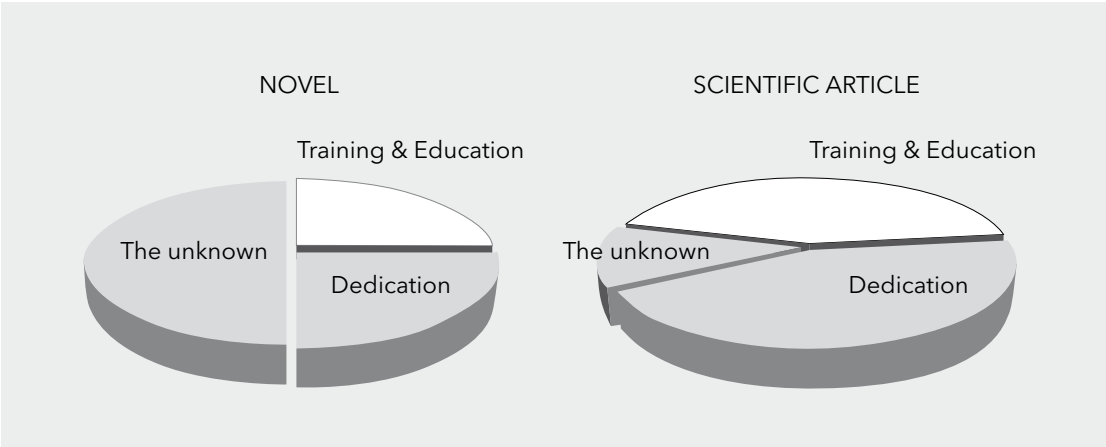


included in the text. In addition, the ending is different: conflicts and mysteries are spread all along novels and finally they are solved with a surprise ending. However, in science, questions are raised but immediately answered with hypothesis and objectives. There is no surprise: the title itself reveals the positive or negative results.

In fiction you need to get used to the solitary work, you are always alone and wondering if your work is interesting or not. Whereas in science, writing an article is a collaborative work, and all researchers contribute towards the final work.

Still in science (Fig. 3), if you have education, training and dedication, the success of your article is almost guaranteed. In fiction, there is an important part of unknown. Inspiration is not linear and comes and goes randomly. The success depends on many factors, the writer of course, but also on external factors like promotion.

Figure 3. Keys for success.



Publication and post publication

It generally takes up to 3 or 4 years to finish your first novel. Then comes the next problem: "Where and how to be published?" In creative writing courses, they encourage you to begin by applying to a literary prize. There are different prizes for different literary genres and writers. This was the case for my first novel *Genetic Code*[5] that won the Badalona Prize and then was published.

When you finally manage to be published, you must still learn other roles as for example, the relationship with the media, how to market your product or how to be involved in the promotional stage. You must go to different presentations and book fairs and you need to know how to communicate the essentials of the novel in an attractive and accessible way.

Medical novels are entertaining but also educational thanks to the technical information included and often during these promotional periods; doctor-writers are invited to talk about the medical aspects of the novel, in

conferences or workshops. Even if they are not specialists, their extensive documentation allows them to give a general speech. This was especially the case for my second novel, *Dangerous Therapy*.[6] It is about antiaging knowledge: new drugs and plastic surgery. Obviously antiaging is a very attractive topic and I did several conferences about it.

Writing to improve medicine

People say that writers write what they wish would happen, or what they fear might happen. In one way or another, they are trying to make the world a better place and improve human relationships. That happens too with medical novels.

The criticism on healthcare in many novels does not have to be detrimental but could help to correct things that are not working. In fact, several famous novels, past and present, have helped introducing significant changes in healthcare. *The Citadel,* for example (Doctor Archibald Joseph Cronin), is a landmark of protest literature.[7] It portrays the young doctor Andrew Manson's arrival in a Welsh mining town in 1924 with his degree under his arm and a willingness to serve society and alleviate the difficult lives of workers in the area. Anyone wanting to know about how medicine was practiced in the first half of the 20th Century in the United Kingdom and the struggle to achieve proper healthcare for workers and their families need look no further than *The Citadel*. The story denounces the social and medical plight of the miners, the corruption of the healthcare system and the lack of professionalism of some of the author's colleagues. The social and political impact of *The Citadel* was so great that it led to the first modern organization of healthcare systems in Great Britain, which enjoyed an impeccable reputation for decades. The National Health Service was the first government healthcare organization in the world to provide universal healthcare to its citizens. All that thanks to a novel.

The second example is more contemporary: The *Constant Gardener* (John le Carré) is an unsettling novel that begins with the murder of Tessa, a young, attractive woman, close to Lake Turkana in northern Kenya, where she

had travelled as a non-governmental organization volunteer. The protagonist of the story, Justin Quayle, is her husband. In this case, he is not a doctor, but a diplomat at the British embassy in Nairobi, a gardening enthusiast. Justin is a man ennobled by tragedy who sets out on an individual crusade to track down the murderers. His investigation leads him into a world of international intrigue in which multinational pharmaceutical companies use Africans as guinea pigs to test new medications that they then sell in the West.[8] *The Constant Gardener* was not just a literary success; it was also a landmark achievement from the point of view of healthcare. In 2013, the Helsinki Declaration, a global guide to ethics in the medical community, was revised to include a paragraph specially dedicated to preventing the events described in the novel from happening.[9,10]

Moral and ethical conflicts related to healthcare are especially stimulating and they are powerful catalysts for the conscience and exercise of emotions from the reader as they come to take a position. Obviously, these positions constitute the first step towards improving failing aspects of the healthcare system. Actually, as we have seen, some of them have led to ground-breaking political action.

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Second open discussion

Tamara Djervanovik: There are different authors who exemplify the contribution of doctors to literature. Chekhov is important because he introduced a new kind of literature: short, concise and a clear cross-section of normal life. Chekhov was a conventional doctor, so he talked about medicine in his novels. For example, in *Ward No. 6* he describes the experience of a doctor from a psychiatric clinic that ends up being a patient interned in the same ward. It is interesting because the character is a patient who is also a doctor, and he explains the experience of marginalization in great detail and from an inside perspective.

Josep-E. Baños: There is no doubt that the use of a literary text may help to promote a better understanding of diseases, not only in general culture, but also in the field of medicine. For example, students will have a very different perspective if they learn about addiction to opioids from a conventional pharmacology book than if they learn about it from a Mikhail Bulgakov novel.

Carlo Orefice: I would like to ask Marta Torrens if you have evidence of the usefulness of literature in fighting against the stigma of mental illness.

Marta Torrens: There is no evidence yet, and it would be important to have it. In this regard, first of all it is important to know what the goal is when you introduce a text in a subject, and it is also important to select the appropriate text. Although our goal in introducing this text in the subject of psychiatry was to decrease the stigma attached to mental illness, some literary texts can even increase stigma. On the other hand, it would also be useful to evaluate this intervention by doing a test before and after the course. In another subject we teach, "Patient-Doctor Relationship", where our goal is to increase empathy, we administer an empathic scale before and after the intervention.

Magí Farré: While in literature you normally need to read several pages to take in the description of a disease, in cinema you have the advantage of obtaining the same information in just one minute. In the case of addictions,

cinema is very useful for showing changes in behaviour, which is not easy for diseases difficult to characterize like hypertension or diabetes.

Elena Guardiola: Marta Torrens, how do you synchronize the reading of the book with the specific theoretical classes and the evaluation?

Marta Torrens: We usually advise the students to read the book at the beginning of the course, although it is not compulsory. Those who read the book get extra credit in the subject. We ask them for a brief summary —less than one and a half pages— reflecting a general idea of what they have read. In the future, I am also thinking about the possibility of statistically analyzing the contents of these summaries.

Albert Presas i Puig: I have a first question for Marta Torrens: what was the reaction of the students, was it good or bad? And a second question for Amàlia Lafuente: how did those activities affect your relationship with your colleagues?

Marta Torrens: The evaluation of the subjects by the students has been good.

Amàlia Lafuente: I was very afraid of my colleagues' possible reactions when I published my book, especially with the first one because it is very aggressive against policies. But it was surprising that a lot of people recognized everybody in the black characters of the book, but nobody recognized himself.

Alessandra Romano: One of the main issues in the professional debate is not just empathy —it is about doctors' ethical commitment in their work. The use of medical humanities in professional development is related to how patient's commitment and the doctors' commitment collaborate in the care of the patient. This collaboration is one of the key aspects in physicians' professional development.

I just want to add something to what has been said. I'm here as a university professor and also as an oncological patient. For this reason, I can say that it is necessary to improve the relationship between patients and physicians with respect to communication. It is not only a problem of empathy, but also it is a

problem of recognising the patient's voice. It is really important to have a broad perspective of patients and illness. This is where the medical humanities can have a very important role –in widening the doctor's point of view and in adding special sensitivity to the approach to different kinds of illnesses.

Finally, I would like to ask some additional questions. Firstly, have you had any feedback from these students trained with medical humanities? Have they changed their medical practice? And, in this case, what about feedback from the patients? And secondly, do you think that patients can benefit from the advantages of bibliotherapy? I mean, the possibility of the patient and oncologist talking about their readings. Probably literature can be used by both separately and by both together as a tool for communication that can also improve the patient-doctor relationship.

Jordi Planes Bassas: From my point of view, because each patient is unique, there are no specific books or movies that would be useful for a whole community. Maybe it cannot help me to treat the disease, but in a way you know what you are dealing with. We have recently started a bibliotherapy plan starting with patients who suffer from anxiety and mild depression. We are going to evaluate how it is developing four times in a year. We will see.

Albert Presas i Puig: Nevertheless, in the Catalan health system, doctors have just 7 minutes to attend each patient. How can you manage to talk about improving patient-doctor relationships with this very short time?

Lorenza Garrino: The sharing of patients' experiences during their diseases could be the first contribution to medical humanities; it would be one of the first possibilities to apply medical humanities in medical practice.

Marta Torrens: I just would like to add a reflection on the changing role of medical doctors due to patients' access to big data through the internet. This could be the next big challenge facing the medical profession, and we will need help in how to manage it better.

Is music useful for the brain? Updates from research to practice and contrary

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Abstract

Between the medical humanities, music is a useful mean for investigating brain plasticity, since it involves multiple sensory, motor and executive systems. Particularly, in childhood, music training can result in long-lasting changes in brain organization. Moreover, in adult and elderly, music activities could protect brain and potentiate the cognitive reserve. During the past 10 years, a growing scientific research showed that Music Intervention plays a very important role among the drug-free treatment and rehabilitation in neurological diseases. We will report the data that are on the basis of all these evidences showing a strict interaction of the music with the brain.

Keywords: brain, cognitive reserve, functional magnetic resonance imaging, music, neuroplasticity, neurorehabilitation, structural magnetic resonance imaging.

Introduction

Music can influence the brain activity in many different ways. It makes you smarter, happier and more productive at any age. Listening music is good, but playing an instrument is even better.

During the ages, many authors expressed their opinion about the relationship between music and brain. Oliver Sacks wrote that humans are programmed to music through an auditory, neurological and emotional

system and that in people's life music is likely to be similar to the language, involving many neural networks.[1]

Anthony Storr, in his excellent book *Music and the Mind,* stressed that in all societies, a primary function of music is collective and communal, to bring and bind people together. The power of sound has been recognized in all cultures and their therapeutic use has gone through the centuries, social and political travails, cultural movements, and scientific discovery without ever being questioned, representing a part of our heritage, genetic and experience, worldwide shared since the prenatal age.[2] Furthermore, music has a great power to involve many aspects of the human life, involving body and soul at the same time.

Music and language

Music represents a form of communication, alternative to the verbal one, appearing universal in all the people.[3] Likewise a language, it is possible to distinguish a phonology (language components), a syntax (the rules for combining components) and a semantic (attribution of meaning to language products). It is common to consider art and culture predominantly in a humanistic rather than a biological perspective, but music is an interesting involvement of neuroscience, from the ability to acquire motor learning to arousing emotions. Even listening to a simple note, requires the activation of complex auditory mechanisms, attention, memory/memory storage, motor-sensor integration.

Where is music processed in the brain?

Music processing is composed by a very complex systems in which each brain area plays a specific role. The acoustic signal is transmitted through and along the auditory pathways, descending the brainstem directly into the primary acoustic cortex in the upper temporal lap with an integration in other cortical and subcortical regions such as thalamus (for the audio-visual phenomena) and limbic system (for the emotional effects). The melody and timbre perception (non-verbal, global, intuitive and synthetic process) take place in the right brain hemisphere, the rhythm , tone and familiarity perception

(verbally, sequentially, logically and analytically information processes) in the left one. On the one hand, temporal lobe (auditory cortex, hippocampus and amygdala) is the most involved in sounds impulses emotional responses and memory aspects processing. On the other hand, occipital lobe provides for visual processing, the frontal lobe facilitates planning to assist in music creation and writing, parietal lobe for the language processing and sound interpretation. Finally cerebellum manages the coordination and the balance needed for playing an instrument, dancing, clapping hands and tapping toes and brainstem is able to determine the location of sound origin and sound reverberation processes.[4,5]

Insight from functional magnetic resonance imaging studies

In the last few years, functional magnetic resonance imaging (f-MRI) allowed to study the different brain areas activation during a musical tasks (from listening to playing an instrument). Thus, music could represent and useful method for studying the brain plasticity, involving multiple sensory, motor and executive systems. Since music and language are closely related, many f-MRI studies have identified some brain areas most involved in both processes, syntactically and semantically (frontal operculum for the musical syntax, right hemisphere for the melody processing and superior temporal sulcus for the musical semantic).[4] Music is also able to produce an intense flow of the emotions in the human soul through the activation of limbic, autonomic nervous system and endorphins release.

In a recent work researchers through f-MRI and positron emission tomography imaging experiments were able to map neural changes under the most popular music *(Gangnam Style)* and light music in healthy controls. Significantly increased f-MRI signals were found in the bilateral superior temporal cortices, left cerebellum, left putamen and right thalamus cortex, left superior temporal gyrus and left putamen, under the *Gangnam Style* compared with the light music condition.[6] Another group of researchers using binaural beats

phenomenon (that occurs within the cortex when two different frequencies are presented separately to each ear) during a visuospatial working memory task demonstrated an increased response accuracy, but also modified strengths of the cortical networks during the task.[7]

Effects of musical training in children

In children music is able to bring benefits in many areas of learning, playing an important role in brain development. In fact, children who underwent to music exposure had higher cognitive skills, showing a higher intellectual quotient and memory scores.[8] Playing a music instrument, mostly starting at an early stage, would significantly improve brain sensitivity not only of sounds but of language as well Music training could induce structural brain changes in early childhood suggesting that long term music intervention programs can promote the neuroplasticity.

Also, in the scientific literature, many MRI study (functional and structural) described same differences between musicians and non-musicians brain. Indeed, some brain regions seem to be more developed in musicians. Among them, worthy of note, the planum temporale, the auditory cortex, the corpus callosum, the arcuate fasciculus and the motor cortex, the latter, being involved in the control fingers during the piano exercises, appear largest in keyboard players.[5]

Music efficacy in the clinical practice

During the past ten year, an increasing number of controlled studies have assessed the potential rehabilitative effects of music interventions, in several neurological diseases.

Generally, music intervention is focused on the relationship between body language and sound, such as interaction between perception and action, but above all it represents a communication form alternative to the verbal one. It also excites emotions by taking into account some sound parameters (height, intensity, duration, and timbre) and others of dynamic type (mode, genre, executive style). A wide spectrum of music intervention programs (interactive or passive) are known: singing songs of the repertoire of light and popular

music, music/movement association (from physical relaxation to free gestures or structured in rhythmic sequences dancing and dancing popular), instrumental improvisation, and listening music tracks.[2]

The goal is not to acquire musical skills, but to use the language of sound to open alternative communication channels.

In a recent review, Aleksi Sihvonen et al.[9] performed a comprehensive meta-analysis and meta-regression of all available randomised controlled trials (RCT) in some neurological diseases, such as dementia, Parkinson, multiple sclerosis and epilepsy, evaluating the effects of different type of music intervention in the clinical practice[9] and summarized in Table 1.

In stroke patients, fMRI studies conducted during music interventions, especially listening, reported connectivity changes in different brain networks, enhancing the motor recovery (gait, balance, rehabilitating arm paresis; 8 RCT) , cognitive and mood functions improvement (memory, attention, executive functions, depression; 2 RCT) and speech gain in chronic aphasia (2 RCT).[9]

In dementia music listening coupled with cognitive elements (reminiscence and attention training) or physical exercises, improved overall cognitive performances (4 RCT) and neuropsychiatric symptoms (6 RCT) versus the standard care. In one clinical trial singing enhanced short-term and working memory.[9] Cognitive benefits were observed only in the early stages of the disease and that might be related to the cognitive reserve, the use of alternative networks and cognitive strategies to cope with advancing impairment.

In Parkinson disease (2 RCT) rhythmic movements and dancing (conducted by metronome beat, rhythmic clapping or stomping, dancing tango and waltz), improved overall motor performances and quality of life.[9]

In multiple sclerosis only 2 RCT conducted, showed an improved functional use of the hand and decreased double-support time (gait parameters) after 2 weeks of music intervention (keyboard playing, rhythmic auditory stimulation).[9]

Only one RCT conducted in epilepsy showed a decrease of the frequency after one year of Mozart sonata exposure.[2,9]

There are numerous mechanism underlying the rehabilitative effect of music. The activation of different brain networks with increases blood flow through the medial cerebral artery should provide favourable circumstances for recovery, leading to functional neuroplastic changes and neural reorganization, also using specific regions not directly affected by the diseases (alternative neural networks).[10]

Conclusions and future perspectives

Music could be very useful for our brain and all data are concordant to indicate that an early music exposure in childhood may influence many intellectual parameters. Small musicians, in fact, boast much more memory than children who are not familiar with notes and violin keys. The educator should provide opportunities for students to sing, play, talk, reflect, write, work in small group, in order to give them opportunities to observe skillful modelling of the targeted task.

In the clinical practice, music intervention could play and important role among the drug-free treatment and rehabilitation of patients with neurological disorders. Moreover, being non- invasive, free of adverse events and not requiring an expensive training, it can be delivered easily and successfully. Indeed, the medical staff should be trained to perform a wide spectrum of music intervention in the clinical practice.

In the future, collaboration with other disciplines and professional figures such as psychology, psychology of art, music therapist, psychotherapists, doctors, and musicians will be mandatory. Consideration should also be given to validation of methods in order to identify global strategies and techniques to apply for each clinical setting. The evaluation must be related to a methodological process that involves common targets, controlled variables, data collection and interpretation, used tools, and interpretation, verifying methods, and performed techniques.

Table 1. *Randomised controlled trials assessing various music-based interventions in neurological rehabilitation. Adapted from Lancet Neurol. 2017;16:648-60.*[9]

	Studies (n)	Participants (n)	Music therapist involved	Blinding
Dementia				
Multisensory stimulation *vs* music listening	1	18	No	No
Music listening *vs* singing *vs* standard care	3	83	Yes	Single

Primary outcome	Overall duration of intervention	Main results
Neuropsychiatric symptoms and cognition	16 h in16 weeks	Multisensory stimulation showed positive effects on anxiety symptoms and dementia severity that were not observed in the music listening group.
Emotional parameters; clinical, demographic, and musical background factors influencing the cognitive and emotional efficacy of caregiver-implemented musical activities; quality of life, mood, and cognition	15 h in10 weeks	Both music listening and singing groups improved in behavioural disturbances ($p = 0.04$, $d = 0.42$) and physical signs ($p = 0.008$, $d = 0.52$) more than the control group. Effects not present 6 months after the intervention; singing was beneficial, especially in improving working memory in people with mild dementia and in maintaining executive function and orientation in young people with dementia. Music listening was beneficial in supporting general cognition, working memory, and quality of life, especially in people with moderate dementia not caused by Alzheimer's disease who were in institutional care. Both music interventions alleviated depression, especially in people with mild dementia and Alzheimer's disease. The musical background of people with dementia did not influence the efficacy of the music interventions; music listening improved the patients' mood ($p = 0.001$, $d = 0.80$), orientation ($p = 0.005$, $d = 0.71$), episodic memory ($p = 0.036$, $d = 0.54$), attention and executive functions ($p = 0.039$, $d = 0.48$), overall cognitive performance ($p = 0.041$, $d = 0.47$), and the quality of life ($p < 0.001$, $d = 0.99$). Singing resulted in additional improvement in short-term memory and working memory ($p = 0.006$, $d = 0.75$), and improved caregiver wellbeing ($p = 0.026$, $d = 0.85$).

Continue

	Studies (n)	Participants (n)	Music therapist involved	Blinding
Music therapy and music listening *vs* standard care	1	98	Yes	Single
Music listening, singing, improvising, and talking *vs* standard care	1	13	Yes	No
Group music therapy *vs* standard care	1	100	Yes	Single
Music therapy (listening and singing) *vs* other activities	3	76, 77 59	Yes	Single
Music therapy (listening, playing and singing) *vs* cooking	1	37	..	Single
Music therapy *vs* standard care	2	50, 50	Yes	Single
Favourite music *vs* standard care	1	52	No	No

Primary outcome	Overall duration of intervention	Main results
Behavioural and psychological symptoms of dementia	10 h in 10 weeks	No significant differences between the groups.
Neuropsychiatric symptoms, well-being, and carer–resident interaction	11 h in 22 weeks	Music group showed improvement in symptoms ($p = 0.002$, $d = 2.32$) and in levels of wellbeing ($p < 0.001$, $d = 3.85$). Staff in the intervention group reported enhanced caregiving techniques as a result of the programme.
Mood and cognition	6 h in 6 weeks	Group music therapy decreased depression ($p = 0.001$, $d = 0.21$) and delayed the deterioration of cognitive functions, especially recall ($p = 0.004$, $d = 0.72$). The effects were present 1 month after cessation of the intervention.
Neuropsychiatric symptoms; agitation; behavioural and psychological symptoms	21 h in 16 weeks 15 h in 16 weeks	Neuropsychiatric symptoms decreased significantly in the music therapy group ($p = 0.01$); there were no significant differences between the groups; music therapy improved behavioural symptoms ($p < 0.0001$, $d = 1.04$), functional ability ($p < 0.0001$, $d = 0.79$), and empathetic behaviour ($p < 0.0001$, $d = 0.61$) compared with the control treatment.
Patients' mood, cognition, behavioural disturbances, and stress experienced by their nurses	8 h in 4 weeks	There were no significant differences between the groups.
Cognition and anxiety; 51 behavioural disturbances	18 h in 12 weeks 6 h in 4 weeks	The music group improved performance in attention ($p = 0.001$, $d = 0.76$) and verbal episodic memory tasks (immediate $p = 0.001$, $d = 0.76$; delayed $p = 0.001$, $d = 0.73$), but not in anxiety; music reduced the behavioural disturbances showed by significant group difference ($p < 0.05$, $d = 0.63$).
Anxiety	6 h in 6 weeks	Anxiety decreased in the music group ($p = 0.004$, $d = 0.06$).

Continue

	Studies (n)	Participants (n)	Music therapist involved	Blinding
Music therapy (playing and listening) *vs* standard care	1	100	Yes	No
Music therapy (listening and playing) *vs* reading	1	47	Yes	Single
Music therapy *vs* resting and reading	1	30	Yes	Single
Parkinson's disease				
Music listening, rhythmic clapping, or stomping *vs* standard care	1	18	Yes	Single
Favourite music synchronised to gait *vs* regular activities	1	22	No	Single
Tango, waltz, or foxtrot dancing *vs* standard care	1	48	No	Single
Tango and waltz or foxtrot *vs* Tai Chi or standard care	1	61	No	No
Tango *vs* physical exercise	1	19	No	Single

Primary outcome	Overall duration of intervention	Main results
Agitation	6 h in 6 weeks	There was no significant difference between the groups.
Mood and quality of life	32 h in 16 weeks	There were no significant differences between the groups.
Anxiety and mood	5 h in 16 weeks	Music therapy decreased anxiety ($p < 0.001$, $d = 2.42$) and depression ($p = 0.002$, $d = 1.05$). These effects persisted up to 2 months after stopping the intervention.
Motor performance, cognition, and quality of life	12 h in 6 weeks	Music therapy improved mobility ($p = 0.006$), UPDRS III ($p = 0.003$), text recall ($p = 0.036$), item naming ($p = 0.033$), performance in Stroop test ($p = 0.007$), and quality of life ($p = 0.031$).
Walking parameters	19.5 h in 13 weeks	Walking to music improved velocity ($p = 0.002$, $d = 2.64$), stride time ($p = 0.019$, $d = 1.76$), cadence ($p = 0.007$, $d = 2.16$), and UPDRS III ($p = 0.002$, $d = 0.50$).
Functional motor control	20 h in 13 weeks	Tango group improved in balance ($p = 0.001$, $d = 2.98$), 6-min walking ($p = 0.001$, $d = 2.50$), and backward stride length ($p = 0.001$, $d = 2.19$); waltz or foxtrot group improved in balance ($p = 0.001$, $d = 3.17$), 6-min walking ($p = 0.001$, $d = 2.24$), and backward stride length ($p = 0.018$, $d = 1.96$).
Health-related quality of life	20 h in 13 weeks	Tango improved mobility ($p = 0.03$, $d = 2.50$), social support ($p = 0.05$, $d = 2.97$), and quality of life ($p<0·01$, $d = 2.09$).
Functional mobility	20 h in 13 weeks	Tango group improved balance ($p = 0.01$, $d = 2.18$).

Continue

	Studies (n)	Participants (n)	Music therapist involved	Blinding
Multiple sclerosis				
Keyboard playing *vs* mute	1	19	No	No
keyboard playing				
RAS *vs* standard care	1	10	Yes	No
Epilepsy				
Nightly exposure of Mozart Sonata K. 448 *vs* no intervention	1	73	No	Single

Moreover, an accurate standardization of music exercises will be needed.[2]

In consequences, the musicologist should be familiar with research activity using the principles of verification and control of the applied methodologies also of innovative choices in relation to patients and the operating techniques used, identifying the specific contribution of music therapy beyond simple effects related to sound exposure.

Finally, further studies are needed, including those involving larger sample sizes, stratified by a single cognitive deficit through a specific

Primary outcome	Overall duration of intervention	Main results
Hand function	7.5 h in	The music group improved in the functional use of the hand significantly
	2 weeks	more showed by time × group interaction (p = 0.003, d = 0.60).
Gait parameters	2 weeks	RAS significantly decreased double-support time (left: p = 0.018, d = 1.61; right: p = 0.025, d = 1.46).
Seizure occurrence	Every night for 1 year	Seizure frequency in the music group decreased significantly during the treatment phase (17%, p = 0.014) and 1 year after treatment (16%, p = 0.027).

neuropsychological assessment. It could be useful to identify new intervention strategies and implement rehabilitation programs in relationship to the different, predispositions, and preferences of each patient. Also, it would be very interesting to investigate changes in brain connectivity through fMRI studies, before and after musical interventions, taking into account the role of neuroplasticity and reserve (brain and cognitive). These strategies could be applied in the early stages of different neurological disease in order to slow down and control the degenerative process, providing a strong evidence for music intervention clinical utility.

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Using popular movies in teaching: the case of pharmacology

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Abstract

Popular movies are increasingly used as a teaching method in many college disciplines. In medicine they are an important resource to teach some aspects of medicine that will gain a considerable benefit of being illustrated using the cinematographic language. Among them, ethical behaviours, professionalism and doctor-patient relationship are the most considered in popular movies. However, their use in the teaching of other medical disciplines is scarce. In the present chapter we deal with the interest in the field of pharmacology, whose knowledge is in the frontier of basic and clinical fields. We review the beginnings of the use of popular movies for improving the teaching of pharmacology, especially for enhancing the understanding of the importance of drugs in daily life. For this purpose we outline the importance of the social contextualization of its use. Some movies are especially useful to this purpose such as *Awakenings* (1990), *Lorenzo's oil* (1992), *The constant gardener* (2005) and *Dallas Buyers Club* (2013). We also include some recommendations for its optimal use in the teaching of clinical pharmacology, as well as the way they should be used to minimize the disadvantages of such new approach.

Keywords: clinical pharmacology, feature films, pharmacology, popular movies, teaching, teaching innovation.

Movies in medical education

The use of commercial movies in education and scientific teaching has a long tradition, but using films to teach medical students is a relatively recent application.[1] Since the first published report of the use of cinema in medical education in 1979,[2] the practice has received an increasing attention as a consequence of the interest of the use of the arts within medical education.

In the last few decades, many papers describing the use of popular films for teaching medical students have been published). This innovative approach is becoming more common. In a systematic review on the topic, Darbyshire and Baker[3] listed several reasons for using cinema in healthcare education. Films tell us a story, and we are always happy to hear good ones. Plots often consider topics that can easily initiate a discussion among learners. Learners' active roles make this discussion an important component of constructivist learning. Cinema utilizes sight and sound, which enhance learners' ability of watching and listening. Moreover, movies stimulate discussions and reflections, which is a part of an active learning process. This is achieved by engaging students in active learning, which is comparable to learning experienced during the actual consultations with patients.

The use of commercial films for teaching purposes is relatively common in many university degree programs. It has been especially relevant in the fields of medicine and the other health sciences. Topics considered include physiology, clinical microbiology, pharmacology and clinical pharmacology, bioethics, medical ethics, doctor-patient relationship, preclinical and clinical research, mental illness, drug addiction, palliative care, effects of disease on patients, medical professionalism, and social conflicts in medical care. Physicians are common characters in films and their depiction can help students to see how the general public views the medical profession.[3-10]

"Cinemeducation" refers to the use of movies on DVD/Blu-ray or online resources, particularly clips from such videos, for educating residents and medical students in the psychosocial aspects of medicine.[11] In recent years,

television series on medical issues are also being used in this context.[7,12]

Recent articles in the medical literature have provided support for the idea that the use of such videos provides innovative and effective ways of teaching. Their relevance has been demonstrated in a series of articles, metanalysis, and the appearance of several books. Several web-sites also host information about cinema and medical education, there are some university courses and there is at least one journal devoted to the topic (*The Journal of Medicine and Movies [Revista de Medicina y Cine]*) with more than 10 years of life.

Movies in medicine can be used to learn different aspects, including how medicine and doctors are described in movies or to use movies to teach several aspects of medicine using clips or full movies. Depending of the authors, movies are used as an additional tool, and they use a specific movie to explain some topics, short clips from a movie are included in some lectures or seminars, but sometimes a complete movie is one of the seminars. There are some experiences using movies as the main resource for the full course and sometimes the entire course is based on viewing and discussing the films, as described in some courses of bioethics, or right to die with dignity. In some cases, teachers prefer to use commercial or feature movies (blockbusters), but other prefer non-commercial movies (less known, more local films), or documentary films.

Popular movies can be powerful teaching tools. However, to ensure successful results, Baños and Bosch[1] have recently recommended some principles for using popular films in medical education (Table 1). They have explained the basis to identify educational elements in the film, recommended reading the literature on each film, and watching the film carefully. It is important to check that the material is appropriate for the students' current knowledge. Long duration films can be difficult to use, but using specific scenes (clips) is a good option. The plausibility of the events depicted may sometimes be more important than their factual accuracy. Discussion of the film should be limited

Table 1. *Some principles to use popular movies in medical education.*[1]

- The most popular films are not always the most useful in medical schools.
- Reading how other teachers have used different films helps in making the right choice.
- The film should be appropriate for students' knowledge.
- Viewing the films and taking notes before the teaching session improves planning.
- Criticizing mistakes is important, but plausibility may be more important than accuracy.
- The length and technical characteristics of each the film should be always considered in the selection.
- Discussion of the film should focus on few questions.
- The film should be used to explore social and humanistic values in biomedicine.
- Teaching activities using films should be planned like all other activities included in the syllabus.
- Some pre-established strategies are necessary to spark debate.
- General introductions to the films are helpful.
- Grading should be based on realistic assessments.

to a few questions previously identified by teachers, with clear objectives and questions to be discussed. The useful aspect in films includes medical knowledge but social and humanistic elements are also valuable. Adequate assessment of students' learning after the activity is critical to establish the legitimacy of using the film as a teaching activity.

Movies in pharmacology and clinical pharmacology teaching

Pharmacology is not an easy subject area for movies, as most knowledge is based on memory and it includes too much topics as well. In most experiences, cinema is used only to explain or support some aspects of the use of drugs, drug of abuse (addiction) or to introduce the scientific and ethical aspects of

Table 2. *Uses of movies in pharmacology as suggested by Ferrándiz et al.*[18]

- To show the most important pharmacological, therapeutic and / or ethical aspects of the chosen topics.
- To allow the student to understand the risks that all therapeutic novelty represents and the ethical problems that arise during the development of new drugs.
- To introduce the student to the critical analysis of a problem, to reason the exposed from different points of view and to express their opinions.
- To recognize some fiction characters in movies characteristic of certain diseases.
- To bring the students the most human aspects of the disease and its treatment.

Table 3. *Some movies used by the authors in the teaching of pharmacology and clinical pharmacology.*

- *Awakenings* (1990)
- *Lorenzo's oil* (1992)
- *The fugitive* (1993)
- *Extreme measures* (1996)
- *Miss Ever's boys* (1997)
- *The constant gardener* (2005)
- *Extraordinary measures* (2010)
- *Side effects* (2013)
- *Dallas Buyers Club* (2013)
- *La fille de Brest* (2016)

investigation of new medicines or the non-medical use of drugs.[13-17]

The objectives of the use of movies to teach pharmacology and clinical pharmacy can be found in Table 2.[18] We have used movies in the teaching of pharmacology/clinical pharmacology in medical students (Table 3). For example, we have used *Dallas Buyers Club* to describe the process of drug development and approval.[18] To a better understanding of the feasibility of its use we have included the educational objectives (Table 4) and the topics for discussion (Table 5).

The use of popular movies is not devoid of some potential

Table 4. *Educational objectives of* Dallas Buyers Club.[19]

- To understand the process of drug development.
- To know the main aspects involved in the design of clinical trials such as randomization, masking, recruitment or informed consent.
- To understand the roles in clinical research: researcher, participants and sponsor/pharmaceutical industry.
- To discuss the problem of clinical trials in diseases without effective treatments.
- To know the situations in which it would be ethical to use placebo in clinical trials.
- To become familiar with the "buyers club" concept and the trafficking of illegal or unapproved drugs.
- To understand the use of medications off-label (non-approved indications).
- To understand the role of government agencies regulating medicines for human use (Food and Drug Administration, European Medicines Agency or National Medicines Agencies).
- To know the general aspects of AIDS, such as the beginning of the epidemic, its clinical course and the mechanism of action of antiretroviral agents.

Table 5. *Topics for discussion in* Dallas Buyers Club.[19]

- The autonomy of patients to choose their treatment, especially in serious diseases (right to prove):
  - Trafficking with illegal / unapproved drugs.
  - Relationship with current situations (e.g., cancer, severe diseases).
- The need for an adequate experimental design.
- The need for accurate monitoring of clinical trials.
- The usefulness of randomization and masking in clinical trial design.
- The use of placebo in clinical trials.
- The process of drug approval:
  - The safety assessment with short-term versus long-term studies. Minimum duration of the investigation to know effectiveness and/or safety.
  - The interests of pharmaceutical companies, regulatory agencies and patient associations.
- The role of the clinician in relation to the role of the research physician and the problem of sharing both roles.

disadvantages. Sometimes, films may not be of interest to the students, but in other cases, its own subject may distract the students from the, let's say, pharmacological topic. Teachers must carefully prepare the activity, take a direct role, and guide the activity.[1] The films may increase the motivation of students to understand clinical pharmacology principles and may become a driving force for an increased desire to learn.

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Third open discussion

Rosemarie Heyn: The use of cinema in medical education presented by Magí Farré is a really fascinating topic. What are the main characteristics of these seminars?

Magí Farré: These seminars are included in a six ECTS pharmacology course, which has 16 compulsory seminars, and during one of them we use a film as a teaching tool. And then, afterwards, we include some questions about the lessons learned from watching and discussing the film in the final test exam of the pharmacology subject.

Magí Farré: Regarding Claudia Vinciguerra's presentation about the use of music in medical facilities, I would like to say that the hospital where I work has ambient music in the palliative care unit. What do you think about the use of music in these situations?

Claudia Vinciguerra: I think that using music to improve the ambience of a hospital is good, especially while doing any type of therapy. Playing an instrument is good during therapy but so is listening to music during therapy sessions. What I want to remark is that

I believe we should use music all over the hospital, and not only during therapy sessions. We usually use jazz and classical music, especially Bach.

Magí Farré: Aditionally, as I mentioned, we use ambient music in the palliative care unit. I am sure that this has had a positive effect on our patients, although we have not evaluated the changes in brain neuroplasticity in those patients. Additionally, we have also created a choir with patients taking anti-anxiety drugs. After 2 or 3 hours singing together, patients report they are less anxious and more comfortable with themselves. How relevant do you think it is to evaluate physical changes in the brain in those patients?

Claudia Vinciguerra: I think that it would be very useful to evaluate the brain by doing functional MRIs before, during, and after the music intervention therapy in order to evaluate possible changes during the intervention, as well as to do MRIs while patients are playing an instrument to see the real effects of music on the brain function.

Towards a history of trust relationship between doctors and patients from the antiquity to the present

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Abstract

This paper aims to introduce an interdisciplinary research project conducted by a group of researchers from the University of Bologna, Milano and Roma La Sapienza. Historians, anthropologists and physicians are working together in order to examine a topic that has become crucial both to people's lives and within national health systems, that is trust among health professionals and patients. The first purpose of our research is to find out, through historiographical method and qualitative research, how trust and distrust have been emerging within the relationship of care, since Antiquity. Thus we would be able to enlighten and interpret processes that nowadays affect the doctor/patient relationship. This paper presents the very first hypothesis of this research.

Keywords: doctor/patient relationship, history, medicine, medical humanities, trust.

Introduction

The project *The Invention of Trust: Doctor and Patients from Antiquity to the Present* has been planned within the Department of History and Cultures of the University of Bologna as an interdisciplinary research which involves professors and researchers in the fields

of ancient history, mediaeval history, contemporary history, anthropology and medicine. This research project, led by Maria Malatesta (Department of History and Cultures, University of Bologna) and developed by Maria Luisa Betri (Department of History, University of Milano), Emmanuel Betta (Department of History, Cultures and Religions, University of Roma La Sapienza), Valentina Cappi (Department of History and Cultures, University of Bologna), Tommaso Duranti (Department of History and Cultures, University of Bologna), Davide Festi (Department of Medical Sciences, University of Bologna), Daniela Rigato (Department of History and Cultures, University of Bologna) and Francesco Taroni (Department of Medical Sciences, University of Bologna) has been presented to the competition announcement "Alma Idea" of the University of Bologna, for the year 2017, in order to get funding and it is now waiting for the selection procedure. As a member of the research group, I am the spokesperson for the presentation of the project in this paper.

Our research's primary objective is to reconsider the possible contribution of historical disciplines to clearer understandings of the processes investigated into the field of medical humanities. History is rarely considered a dominant discipline among medical humanities, if compared to philosophy or literature, and when present, it is considered only as history of medicine.[1] In our opinion, it is important to avoid the partiality of a certain history of medicine written for ages mainly by doctors, who privileged an iatro-focused narrative internal to their profession. As Maria Malatesta argued, «historiography on the doctor/patient relation is indebted to the discovery of new sources, or the reinterpretation of traditional ones»,[2] for a closer focus on the concrete actors of the history of medicine. History and the historiographical method are necessary to interpret present days and to explain specific happenings that despite dating back to ancient times, seem to be new within the doctor-patient relationship. In few words, history could allow us to disclose the shape of that «attitude towards a more communal sense of what it is that clinicians and pathologists are dealing with»,[3] in different historical moments.

Why, in the end, history matters into the medical humanities? It is Lester Friedman who tells us the answer: because «doctors need to understand the contours of this brave new world to find suitable places for themselves and their profession within it». Moreover, history, as well as literature and fine arts, «can fundamentally shape the attitudes of succeeding generations of students toward a fuller knowledge of patients, cultures, and communities —and of themselves».[4]

Material and methods

Choosing a wider perspective, compared to the clinical one, which would measure the rate of trust that marks the relationship of care (see the work of Hojat, Gonnella and others scholars of the Jefferson Medical School on empathy),[5,6] our work aims to reconstruct the history of the concept of trust, following its emergence and its transformations during the centuries, until the 21st century.

Following Antonio Mutti, we define trust as a reassuring expectation (about oneself, the others and the world), formulated in a context of uncertainty and made up of cognitive and emotional components combined.[7]

Transformations in the economic, political and sociocultural settings of the last century have enormously implemented the areas of uncertainty and negotiability within social interaction, therefore widening the demand for trust. According to Giddens,[8] this renewed demand for trust is linked to the growing social reflexivity brought up by modernity. Health professionals, like other experts, have been continuously asked to think over the conditions of their actions. Don't medical humanities have the same purpose?

It's clear that the discourse about trust stands at the heart of medical humanities as well as at the heart of the history of doctor/patient relationship.

The concept of trust is often taken for granted, as a sort of tacit agreement that ties patients to their own physician. It is less common to consider the fact that physicians should also grant trust to their own patients. Doing so, trust results from a correlation of many emotional

ingredients which play a leading role within the care relationship. Many factors have been affecting the care relation, in contents and in manners, changing through centuries; among them, determinants and expectations of lay and expert systems lead us to identify, following Giovanna Vicarelli, a "social responsibility" of both actors, but also a "human responsibility".[9] which take place in the doctor/patient encounter. Doctors and patients, therefore, carry in their interrelations norms and values of the time they lived and which constitute a general frame within which their actions obtain meaning. That is why the asymmetry, which plays a fundamental role in the construction of trust, can't be ascribed only to the communicative behaviour of the physicians, but should be considered due also to cultural factors, as suggested by Emiliana Mangone. Often, continues Mangone, «the distance between the doctor and the patient is strengthened by the anonymity and the impersonality of the relationship required by the rational organization model that encodes and finalizes the relationship excluding any interference by the patient both at the organizational level and at the communicational/relational level».[10]

In Italy, the public debate about medicine and doctor-patient relationship, in recent times, has focused, above all, on the malpractices ascribed to physicians and health structures. On the contrary, in other European countries, these topics came out of specialized settings to be discussed by physicians, researchers and scholars in front of the general public. The concept of trust exists in Anglo-American medical literature, which first recognized the importance of reorienting medical training and relationship with patients on humanistic basis, in order to counteract the technological and bureaucratic drift of today's medicine (see the works of Verghese,[11] Schwartz et al.[12] and Friedman[4]). Albeit to a lesser extent, it exists also in France, following legislative provisions (Loi Léonetti, 2005, which created the figure of the personne de confiance, trusted person). In Italy, the medical debate is still confined to some niches and has just brushed the Medical Schools; some medical pedagogists are working on trust, but their techniques to measure it do not seem to have had

significant cultural repercussions at the academic level or in the public discourse on medicine.

The historical approach we are going to adopt allows to investigate the ways in which trust has set from the past, both positively and negatively, as a central factor in the doctor/patient relationship, until today, where it seems to be deeply questioned by the growing expectations of patients in the powers of medicine and by the lack of doctors' ability to interact with patients. In this perspective, trust is therefore considered as a discursive field and as a historical construction, defined by the interweaving of several elements, such as empathy, communication, and the consent to the scientific work of the physician.

Discussion

The research project will be developed through ten different paths, following three macro-themes: archaeology and history of the concept of trust; the basis of the new alliance between physicians and patients; narratives and representations of trust in contemporary literature and TV-series.

Below, I will briefly summarize the contributions that will compose the research.

Daniela Rigato will explore the doctor/patient relationship in Greek and Roman Civilization. In the Classical World, the medical marketplace is characterized by the lack of institutions that certify professional training and by a number of subjects in charge of caring. The concept of "trust" struggles to develop, and physicians are constantly required to demonstrate their ability to stand out from the charlatans and to counteract the distrust caused by the partiality of the successes or the methodologies adopted. Emblematic is the attitude that is found in Rome, upon the arrival of rational medicine in the III sec., which is reflected in Plautus's comedies: the figure of the doctor is seen as carnifex. It is therefore necessary to wait a few centuries to find some sort of trust into the relationship of care, a trust that Celso defines with this statement, in the proem of Alethès lógos: "At the same level of skills, is more efficient a doctor who is a friend, than a doctor who is a stranger".

During the Middle Ages, as studied by Tommaso Duranti, trust is an element considered essential for the therapeutic outcome: the physician must therefore learn to obtain patient's confidence, even with relational strategies. Attacks to doctors' reputation arrive from all sides: cultured invectives from humanists and men of law; satirical and denigrating portraits produced in the literary field; progressive stabilization of contracts (recovery pacts) preventing patients from a therapeutic failure. Gianna Pomata has called such contracts "promises of cure",[13] because the doctor agreed to care for the sick person, who meantime specified an expected result the doctor should achieve. In the event of failure or relapse, the patient was not obliged to pay the doctor.

Maria Luisa Betri will examine in depth the growing proximity among doctors and patients during the nineteenth century. Through the study of an Italian nineteenth century correspondence between a physician and a patient, Betri will show how interpersonal relationship was considered by the physician a real tool for caring, in the absence of advanced diagnostic and therapeutic tools. The sources that Betri will analyse represent a novelty for our historiography, which has so far used this kind of source merely for the Modern Age.

Francesco Taroni will develop his research on the rise and fall of trust in the age of scientific medicine. He will show that the balance of power tipped in favour of doctors with scientific progress and peaked in the golden age of medical profession, which can be dated from the end of the Nineteenth century to the first half of the Twentieth century. The crisis of trust began in the Seventies/Eighties of the 20th century, due to, on the one hand, an excess of expectations on the thaumaturgical potentialities of science and medical technology; on the other, a progressive erosion of trust in the work of physician triggered by a loss of communication and empathy towards the patient.

Emmanuel Betta will explore the growing culture of patient's rights, which accompanied the golden age of medicine. Recent Europeans researches have highlighted that patients' requests for transparent

information. Protests of some people against decisions made by physicians without their consent began in the Nineteenth century and constitute the archaeology of the culture of "informed consent", which will spread only in the second half of the 1900s. Starting from the middle of the nineteenth century, Betta will reconstruct the emergence of the culture of patients' rights. Also changes in the way of communicating a diagnosis and a bad prognosis will be analysed, considering the consequences they had on the degree of patients' trust in their physicians.

The analysis of present times shows that patients are eager to regain power on doctors: media representations of medical malpractices, the use of internet to find health information, together with a widespread culture of public judgment (there are apps and websites where people can rate health professionals) seem to be symptoms of another historical fluctuations of patients' relationship with doctors.

Our research will thus examine the representation that TV-series and literature offered of the doctor/patient relationship concerning the topic of trust.

As I will show, television fiction has explored a wide range of relationships between doctors and patients. The analysis of medical dramas, since the Eighties until today, allows us to reflect on to what extent the basis for the trust between healer and patient seems to be set on collective imagery. I will analyse in depth cases of doctors who, in the inability to empathize, get to capture the consent of patients to treatments through more or less orthodox ways *(Grey's Anatomy),* or even doctors who exclude the possibility of creating a trustful relationship, based on the assertion that "everyone lies" *(House MD).*

Maria Malatesta will analyse the imagery of the doctor –strictly male– that was produced by Anglo-Saxon and French literature from the late Twentieth century to 2016 (Italian literature on this topic is missing). The crisis of both medical profession and trust pact with the patient echoes in the novels of Camus, Ballard, McEwan, Winkler and Kerangal. It is above all English literature to represent the irrevocable

end to the Nineteenth century idea of the omniscient doctor. McEwan Saturday's surgeon, for example, is acting in a context of total hostility and has homicidal feelings towards the patient-delinquent he has to care for.

Finally, Davide Festi will outline a potential educational pathway for students of medicine, that takes into account the international debate and experience on how to improve caring instead of curing. As problems within the relationship of care seem to be the result of a vocational training, exclusively focused on scientific parameters and increasingly bureaucratic health organizations, it's urgent to set up, for the individual patient, a methodology of clinical and therapeutic intervention based on scientific evidence and on specific communicative competences.

Conclusions

In an interdisciplinary dialogue, the contributors to this research would like to attempt to a more complex explanation and contextualization of the parabola of trust through the centuries, strongly affirming the need to consider biomedicine as a human practice and trying to overcome the dualism between an illness-centred and a patient-centred approach. The practice of medicine could surely benefit from more self-consciousness but also from more consciousness of cultural and historical processes and power relations that dip into trust among health professionals and patients.

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The art of observation, from visual artworks to medical diagnosis: initial experience at Sapienza University of Rome

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Abstract

Even though arts represent a teaching tool, these have not traditionally been part of European medical education. Clinical diagnosis involves the observation, description and interpretation of visual data. These skills can be stimulated and trained by observing visual artworks. Nevertheless, how do we learn how to look? During the last years we are developing a project introducing Arts within the medical core curriculum, from clinical anatomy to pathology. Firstly, selected artworks are shown during traditional lessons as clinical triggers or enhancers; on the other hand, art clinically-focused exhibitions can be planned in the faculty/hospital. Secondly, we are experimenting a series of asynchronous video tutorials and mini-videos covering a wide range of clinical anatomy-related topics which are posted either in a social network and/or in an internet site. These videos include short introductory remarks and legends and cover a long time span. Artworks are chosen in order to be narrative in nature and rich in detail, thus stimulating reflection and self-discussion. Finally, thanks to a collaboration between Sant'Andrea University Hospital and a museum we piloted an innovative

experience with small-group interactive sessions focusing on the analysis of selected original paintings. This non-traditional format brings a new lens through which students can learn valuable visual skills, thus training the so called "clinical eye", enhancing visual literacy. An art-based approach to teaching observational skills should be included continuously within the medical curriculum.

Keywords: art, human anatomy, medical education, medical humanities, paintings, visual skills.

Introduction

"The more one looks,
the more one sees."
Abigail Housen, a pioneer Art educator[1]

Even though Arts represent a teaching tool since 1902, mainly thanks to the pioneering work of Alfred Lichtwark,[2] Arts have not traditionally been part of European medical education. As we know, clinical diagnosis involves the observation, description and interpretation of visual data (the so called imaging: radiography, magnetic resonance imaging, computed tomography, positron emission tomography, etc.). These skills can be stimulated and trained by analysing visual artworks, such as classical representational paintings or sculptures. But how do we learn how to look? In fact, there are several obstacles to be passed: medical learners' empathy levels decline dramatically during medical school;[3] research methodology becomes always more complex; there is a reduced interest in patient's physical examination as well as increased costs for -often useless- medical instrumental analyses.[4]

Many universities in the world offer mostly elective museum-based courses focusing on observational skills and the art of seeing. Among these, Harvard University, USA ("Training the Eye: Improving the Art of Physical Diagnosis");[5,6] Yale University, USA ("Enhancing Observational Skills");[7] Weill Cornell Medical College, USA ("The Art of Observation");[8] McMaster University, Canada ("The Art of Seeing");[3] Bond University School of Medicine, Australia (Medical

Humanities Workshop; Medical Humanities Week, and "Art is Good Medicine" community Art exhibit);[1] and Karolinska Institutet, Sweden ("Visual Art Program" for Nursing).[2] In Italy, the University of Bologna offers an elective course called "Ars medica (l'arte di curare)" addressed to both medical and nursing students*. During the last years, Sapienza University of Rome is developing a pilot project at Sant'Andrea University Hospital introducing Arts within the medical curriculum, from clinical anatomy to pathology. Herein, there is a brief description of our ongoing experience.

How to (easily) learn to observe

- Selected artworks are shown during traditional lessons as clinical triggers or enhancers, in particular, at the beginning of large chapters (i.e. the organ senses, the endocrine system, the musculoskeletal system, and so on) within the course of "Human and clinical anatomy" for first- and second-year medical students. These artworks —mostly classical and representative paintings or sculptures— are chosen either directly from online world museums' collections, Google Arts & Culture (formerly Google Art Project), an online platform through which the public can access high-resolution images of artworks housed in the initiative's partner museums, or from Wikimedia Commons, an online collection of freely usable media files. A good practical example is represented by one artwork of the famous Flemish painter Pieter Paul Rubens, *The Three Graces* (1630-1635, Museo del Prado, Madrid, Spain; Fig. 1) in which several anatomical abnormalities or pathologies may be identified following an accurate analysis of the "clinical signs". Besides the evident overweight, the S-shaped scoliosis and the hyperlordosis of the three Graces, the Grace on the left shows a lateral deviation of the nipple (maybe Mondor's disease?); hyperextension of the right metacarpal

* www.unibo.it/sitoweb/guido.cocchi/avvisi/87cd172c

joints (the so called "swan neck" sign); flat feet; right hallux valgus (note that the start of a bunion is seen in her right big toe), and signs of rheumatoid arthritis. The central Grace, in turn, shows cellulite (panniculosis deformans) and, interestingly, a positive Trendelenburg sign (i.e. the hip abductors are unable to control the dropping of the pelvis when the opposite leg is raised so the pelvis tilts down instead of upwards). Finally, if we focus on the Grace on the right, her left external upper breast quadrant is likely to show signs of an open ulcer; redness of the surrounding skin; ipsilateral nipple retraction; reduction of the left breast volume, and enlarged ipsilateral axillary lymph nodes, all signs that may lead to the presence of a locally advanced breast cancer. The three Graces were sisters, therefore, they shared genetic traits and, together with the other clinical signs observed, favour the working diagnosis of familial benign hypermobility syndrome, a benign genetically determined disorder of connective tissue, characterized by hyperlaxity of the joints, and in some cases associated with varicose veins,

Figure 1. The Three Graces *by Peter Paul Rubens (1635, Museo del Prado, Madrid). The circles evidence the several possible pathologies. This is a black and white image taken and modified from a public domain reproduction (Wikimedia Commons).*

flat feet, functional scoliosis, and arthritis.[9] Another similar example in classical painting is represented by an artwork of Lucas Cranach The Elder,

The Three Graces (1530, private collection), wherein the position adopted by the three graces is evidently unnatural.

- Art exhibitions can be organized along the aisles of the faculty/hospital, including high resolution, large format reproductions of famous prehistoric, classical as well as contemporary artworks. For example, in 2008 an art exhibition entitled "Foemina, the breast in art and medicine", representing the breast along Art history, was organized in such a way that both the medical and non-medical communities were free to look at it. This special exhibition was an original project of the Osservatorio Nazionale sulla Salute della Donna [National Observatory on the Health of the Woman] integrating medicine and humanities and helping women suffering of breast pathologies to feel more confident and more close to their hospital and physicians.
- Use of video tutorials and mini-videos. With the technical assistance of the Teleteaching Unit "G. D'Addona" of our university, since 2014 we are preparing a series of asynchronous (pre-registered) video tutorials covering a wide range of clinical anatomy-related topics. These videos are posted either in a social network, i.e. a public page of facebook entitled *Arte e anatomia: l'arte di osservare* [Art and anatomy: the art of seeing]) and/or in an Internet site, using a YouTube channel (the videos can be visualized by directly writing the name of the Unit or the author's name). Videos include short introductory remarks and legends (available for the moment only in Italian) and cover a long time span, including Prehistory, the Classical period, Late Middle Ages, the Renaissance period, and Modern times. Artworks are chosen in order to be narrative in nature and rich in detail, thus stimulating reflection and self-discussion. Besides, mini-videos of a very short duration (20-50 seconds) are posted directly in the Facebook page. The author interacts with learners through public or private comments to the videos.
A list with examples of topics, diseases and proposed artworks is shown in Table 1.

Table 1. *Examples of topics associating art and anatomy and related suggested artworks.*

Topic & disease	Period	Artist	Artwork
Anatomy & Medicine			
Madness	c. 1494	Hieronymus Bosch	*The Extraction of the Stone of Madness*
Surgery	1628	Rembrandt	*The Foot Operation*
Dissection	1632	Rembrandt	*The Anatomy Lesson of Dr. Nicolaes Tulp*
The Ages of Man			
Childhood, adulthood and senescence	1835	Caspar David Friedrich	*The Stages of Life*
Marriage	1434	Jan van Eyck	*The Arnolfini Portrait*
Ageing	17th century	Rembrandt	Self-portrait series
Death	1793	Jacques-Louis David	*The Death of Marat*
The Musculoskeletal System			
Dwarfism	15th century	Andrea Mantegna	*The Camera picta*
Gigantism	Contemporary	Ron Mueck	*The Mask II* (self-portrait)
Poliomyelitis	18th Dynasty (1403-1365 BC)	Egyptian Art	*Egyptian stele thought to represent a polio victim*
Talipes equinovarus	1642	José de Ribera	*The Clubfoot*
Hallux valgus	15-16th centuries	Albrecht Bouts	*Christ at the feast of Simon the Pharisee*
Scoliosis	1625-30	Pietro Paolini	*Bacchic Concert*

Continue

Topic & disease	Period	Artist	Artwork
Prognathism	1533	Lucas Cranach The Elder	*Portrait of the Emperor Charles V*
Genetic syndromes	1656	Diego de Velázquez	*Las Meninas*
Paget's disease	c. 1513	Quentin Matsys	*The Ugly Duchess*
Connective tissue disorders	1534-40	Parmigianino	*Madonna with the Long Neck*
The breast			
Obesity	c. 25,000 BC	Austria	*Venus of Willendorf*
Aesthetics	130-100 BC	Alexandros of Antioch	*Venus de Milo*
Abnormal position	1487-90	Hans Memling	*The Virgin nursing the Child Christ*
Ageing	1507	Albrecht Dűrer	*Avarice (Old woman with a purse)*
Hirsutism	1631	José de Ribera	*Magdalena Ventura with her Husband and Son*
Mastectomy	1630-33	Francisco de Zurbarán	*Santa Águeda*
Advanced local cancer	1636	Rubens	*The Three Graces*
The thyroid			
Goiter	1435-38	Rogier van der Weyden	*Virgin and Child in a Niche*
Goiter	1460	Andrea Mantegna	*Virgin and Child*
Artists' disease			
Thyroglossal duct cyst	1463-65	Piero della Francesca	*Polyptych of the Misericordia*
Goiter	1512	Michelangelo	*The Creator separating light from darkness*
Icterus (jaundice)	1594	Caravaggio	*Young Sick Bacchus*

Topic & disease	Period	Artist	Artwork
Cataracts (before and after surgery)	19-20th centuries	Claude Monet	Water lilies series
Poliomyelitis, spinal surgery, pain	1944	Frida Kahlo	*The Broken Column*

- Visits to an Art gallery or a museum. Thanks to a collaboration between Sant'Andrea University Hospital and a Roman museum (Galleria Borghese), an innovative experience took place during the academic year 2014-2015, with small groups of third-year medical students, faculty members and art educators. Within the program of the integrated course of "Medical-scientific Methodology and Humanities", an elective activity was proposed. Free interactive sessions were organized focusing on the analysis of assigned classical paintings, followed by discussion in the gallery's didactic room after the guided visit. Afterwards, students made an autonomous visit to the Art collection, looking for pathognomonic signs. Finally, a more structured discussion with hypothetical diagnoses was prepared by the learners in a conclusive meeting, with a short slide presentation of the single artwork selected. Students were organized in small groups in front of a couple of faculty members and art educators.
- Teaching the teachers. Seminars, courses, exercises, can be organized without much complexity in order to form medical educators. In our case, for example, the Committee for Medical Pedagogy organizes periodically different seminars and courses addressed to medical teachers within the context of a tutorial on medical humanities "Imparare e Vedere, imparare e decidere: l'Arte per la formazione medica" [Learning and see, learning and decide: Art in medical formation].

Discussion

These non-traditional formats bring a new lens through which medical students can learn valuable visual skills, thus training the so called "clinical eye". Artworks represent both a powerful resource to understand the natural course of diseases and a useful teaching tool for refining visual skills and building visual literacy, the ability to find meaning in imagery, which in medicine translates into the ability to reason physiology and pathophysiology from visual clues.[6] Video tutorials as well as mini-videos, in turn, represent an interesting teaching and learning complement to traditional theoretical knowledge within medical students' education. On the other hand, free guided visits to a museum increase awareness of emotional and character expression through illustrated human bodies in artworks: the so called, mindfulness, that is to say according to Harvard's University professor Langer,[10] a state of mind that is open to new information, actively engaged in the present, aware of multiple perspectives, and recognizes the impact of the context on perception. Students communicate collaboratively, disagree respectfully, observe objectively, navigate uncertainty, and use teamwork to find a collective –not single– truth. Thanks to the rich information regarding health and disease given by the paintings and related discussions, there is a skills enhancement. Students learn a broader conception of humanness and acquire a more complete and real "picture" of the patients (visual literacy), thus improving diagnosing skills.

In conclusion, an Art-based approach to teaching observational skills should be included continuously within the medical curriculum, particularly within a "spiral" one. It is our duty to stimulate also "sceptical" colleagues to be involved in medical humanities. Such an approach may favour critical thinking, opening the mind to alternate ways of seeing, enhancing learners' abilities to more deeply observe and to better understand real clinical situations.

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A pedagogical experience: the history of medicine at the Universitat Pompeu Fabra*

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Abstract

The history of medicine as a compulsory subject is fully incorporated in medical studies at UPF. In this article its main characteristics are exposed, as well as the objectives that are pursued. Some historical examples (Vesalius, Leibniz, Ramón y Cajal) are discussed to illustrate the interaction between diverse areas of knowledge in the definition and generation of medical knowledge.

Keywords: culture, historic development, medicine, society.

Introdution

One of the features of the present medical studies is the increased use of technology in medicine. The direct consequence of this is the biological approach that defines a curriculum which is utterly biological. Of course, nobody will deny the fact that future

* This text was presented under the same title at the workshop "Soft skills in medical education: the role of medical humanities in the 21st century", Siena, 8th to 9th of September 2017. We tried to keep the oral form of the presentation which was given there.

physicians will, while exercising their profession, be dealing with living organisms who, at the same time, are social beings in particular cultural and social surroundings.[1]

In answer to this, the need has been recognized many years ago that future physicians should be given an education which not only encompasses the biological and clinical aspects but also the social and human ones which make up what we consider the disease and the strategies of therapy.

As far as the historic development is concerned, medicine is certainly the most complex of the scientific disciplines. It is the product of the interaction of different spheres of knowledge and occupations which in the course of time gave rise to different concepts of scientific development, of health, and of disease. From an epistemological point of view, it is absolutely necessary to understand that medicine includes scientific, practical, social and cultural aspects in order to fully grasp what is disease, its cure and the very practice of medicine. The contribution of the history of medicine should be, among others, to further among the students of medicine the development of scientific and humanistic thinking during their studies and later in their professional career. Thinking about history will allow the future physicians to understand knowledge as being both a cultural and a historically built product and they will be aware of the fact that there are different ways to read reality and there are different forms of change.

History of medicine at the Universitat Pompeu Fabra

I would like to present in a few words the contents and the goals of the introductory course to the history of medicine which is given at the Faculty of Medicine and Life Sciences of my university, the Universitat Pompeu Fabra.

[1] Putsch RW III, Joyce M. Dealing with patients from other cultures. In: Walker HK, Hall WD, Hurst JW, editors. Clinical methods: the history, physical, and laboratory examinations. 3rd ed. Boston: Butterworths; 1990. p. 1050.

This is a compulsory course which is taught during the first year's first term. This means that the students come directly from secondary school and this is their first contact with university. The credits given for this course is the same as that for any other subject –be it physics, anatomy, chemistry etc. That is to say, that from the institutional point of view and the goals pursued by our faculty, the recognition and the requirements for this course are the same as those for any other course which may be more closely "identified" with the studies of medicine. On the other hand, the goals of this course are both shared and supported by all faculty members. This is a point which I would like to underline as it expresses the positive consideration of the training environment, both for the colleagues as for the institution, regarding the history of medicine.

I mentioned already that the students who take part in this course arrive directly from secondary school. This creates a special situation and I would like to choose for our subject here only one point, and this is the positive concept of medicine and medical practise. Although quite often the interest of students goes beyond the medical disciplines they are studying, e.g. they have interest in history and philosophy, literature and art, politics and culture, their appreciation of medicine corresponds to a positivist one influenced by the image that is given from society. This positivist interpretation of medicine by the students is an element which we cannot ignore and which we always have to bear in mind if we want that their reflexion about history becomes part of their understanding what medicine is about – not only as far as knowledge is concerned but in practise as well. The teacher's educational strategy must take into account this reality.

During the course, participation and discussion in the workgroups and seminars are encouraged. Apart from that, one of the main objectives is to train the students to produce a paper of historical nature which is tutored by the person responsible for the course.

The course subscribes to a concept of history which is close to the social history of medicine as exemplified by Roy Porter. The introduction to the

course is based one of Porter's books *The greatest benefit to mankind. A medical history of humanity* (W. W. Norton & Company, 1997).[2]

Society, culture and medicine

Since 9/11/2001 I have begun the first lecture of my course with a slide showing the attacks on the Twin Towers in New York.

Although all the students know the facts, many of them do not remember this historic moment, as they probably were no more than one or two years old when this happened. Unfortunately the young people who will begin their studies this year are old enough to have witnessed terror and outrage closer to their home. Sadly enough, Barcelona has joined this list. We only have to think of the 17th of August 2017 at Barcelona.

How on earth, you might ask yourselves, can one begin a course on the history of medicine referring explicitly to 9/11?

You may remember that when the systems of security and the prevention of terrorism were discussed, there began, or rather there was resumed, the debate about the theories of Samuel P. Huntington and his *Clash of civilizations*. Huntington assumed that people›s cultural and religious identities were the primary source of conflict.

Very soon after the attack which was considered as an aggression on Western culture and values, there were many who joined the discussion and who wanted to reaffirm Western values as opposed to what they considered religious radicalism of the most intolerant kind.

Umberto Eco joined this discussion with a lot of good judgement and common sense. He tried to establish the parameters which would allow to compare these cultures, which, according to Huntington, were in conflict and which by their struggle supposedly defined the course of

[2] Although it may be outdated in many respects, still of great use is Laín P, editor. Historia universal de la medicina. Barcelona: Salvat; 1975.

history. In one article which was published in the Spanish newspaper *El País*, Eco stated:

«(…) If we assume that life extension as such is a value, then of course medicine and Western sciences are certainly superior to the medical knowledge and practices of many others (...)."[3]

Regardless of whether we accept this statement or not –it is here that Western medicine appears, that is, the medicine whose history we study as a body of scientific knowledge, which is identified with a model of society, of very concrete values and historical developments. What can be seen more clearly, if possible, is that medicine appears (and that is my point) as a *tertium comparationis* to establish categories and valuations between diverse cultures and traditions which shape our multicultural societies.

Barcelona is an utterly multicultural city. In its boundaries more than 166 nationalities and more than 20 religions live together. That means that our students are trained as physicians in a society where certainly the idea of what is medicine, and all the elements which can be associated with it (health, our body itself, the consideration of intimacy, etc.) can be understood very differently, maybe even in opposing ways. To show this reality in the most direct way, to help to understand the surroundings in which many of those who are now students will eventually practise their profession, is one of the tasks of our faculty and one of the goals of our course.

Examples to understand the historical development of medicine: Vesalius, Leibniz, Ramón y Cajal

In his autobiography, *This Was my Life*, published in 1951, Ferdinand Sauerbruch, one of the most famous surgeons in the first half of the 20th century, tells, how he met the already old Wilhelm Röntgen, the discoverer of the x-rays which brought about quite a change for medicine. During

[3] Umberto Eco. *Las guerras santas: pasión y razón*. El País, 15/10/2001.

their conversation Sauerbruch had the opportunity to discuss Röntgen's invention. "I was angry and of the opinion", Sauerbruch writes, "that the x-rays were an attempt to relieve us, physicians, of the sublime art of diagnostics and to have to trust a simple photography. A radiograph", Sauerbruch protested, "should confirm the clinical diagnosis of a disease, and not be the starting point. A physician should come to a diagnosis by using his senses, his hands and his brain, not some dead mechanism!"

People who know the history of medicine will recognize in Sauerbruch's words the most valuable lessons which not only hippocratic medicine may teach, but also the empiric medicine which was practised by the ancient Egyptian priests long before Hippocrates. This is the time in history which we traverse during our course: the evolution of medical practice from Antiquity in which we recognize the origin of our tradition of thought, that is from ancient Greece to the medicine of the 20th century.

I have to tell you that our course is more oriented towards the achievement of medicine as a scientific discipline than about the knowledge of how to attend to patients.

I would like to present to you a series of examples which we consider during the course, where we think about the influence of knowledge which is gained beyond the strictly medical knowledge but which has far-reaching consequences when new scientific knowledge is produced and which are even responsible for revolutions in medical knowledge.

Let us have a look at Andreas Vesalius, Gottfried Wilhelm Leibniz and Santiago Ramón y Cajal. And let us take a look from an interdisciplinary point of view, an often recurring subject in the world of higher education.

As far as medicine is concerned I have to say that historically speaking it was extraordinarily difficult for physicians to accept this interdisciplinary approach which is so much praised today: Pasteur who was a chemist by profession could never lecture at a faculty of medicine, as physicians did not recognize him as belonging to their profession. The same happened

to Paul Ehrlich who, although he had studied medicine, positioned himself between medicine, biology and chemistry. It is quite common that these scientists who had an interest in more than one field do not appear in biographical collections showing the great representatives of medicine.[4]

You will probably know that the tensions which marked knowledge from its early beginnings is the tension between theoretical and practical knowledge. Even if this tension is not as acute as it used to be it is apparent in the systems of our higher education, where physics, for example, is not taught the same way at a traditional university, a technical university or a polytechnic university.
A well-known example for this is Albert Einstein's experience as a student at the Federal Polytechnic School at Zurich.

When this differentiation has been overcome, which does not preclude a clash in the valuation of these fields of knowledge, it has often given an extraordinary impulse to producing knowledge. It is in this context that we look at Vesalius.

Many of our students are used to interpret pictures as a source of scientific information. Pictures, like the famous x-rays by Wilhelm Röntgen, the positron emission tomography to identify early sings of Alzheimer's disease revealed by brain scans and the well-known images of the exhibition Körperwelten (Body Worlds), are all pictures which the students know. These are all examples of how knowledge is passed on by using pictures. This process which led us hither and which Sauerbruch criticized in such harsh words, began with Vesalius.

The tradition of mathematics which began at the end of the 15th century and took concrete forms during the 16th century was not the only experimental approach to

[4] For example in Engelhardt, Dietrich und Fritz Hartmann, 1991. Klassiker der Medizin, in 2 Bänden. München: C.H. Beck Verlag, here vol. II.

understanding nature.[5] There were also many important developments in anatomy and physiology. At the university of Padua, for example, a revolutionary change in how anatomy should be taught at medical schools took place in 1537 when the humanist doctor of medicine Andreas Vesalius (1514-1564) who skillfully performed dissections was appointed. While teaching anatomy, Vesalius carried out his own dissections. At that time it was more common to read Galen, the ancient authority, while a surgeon performed the dissection. This way, Vesalius became extremely popular among the students of medicine. And what is even more: his great book *De Humani Corporis Fabrica* published in 1543, was both a text on anatomy and an excellent practical manual on how to proceed when performing dissections.

Vesalius took care to write a preface in which he deplored the separation of surgery (in Vesalius' time a traditional craft) from medicine. As a result of this, Vesalius' anatomy came to be considered, at least by some, as "the basis of all medicine" and threatened to take the central place which philosophy of nature had held in medical education.

Vesalius, supposedly, found 200 errors in Galen's scripts on anatomy. The most important one of them was the discovery that the wall inside the heart which separated the right ventricle from the left one was not perforated which threatened Galen's entire physiology. Although Vesalius did not go much beyond this, his successors in Padua made quite a few revealing discoveries. Renaldus Columbus (1510-1559) proposed the theory of pulmonary circulation (according to which blood moves from the right ventricle of the heart to the left one, going across the lungs before being filtered across the presumed perforations in the muscular wall in between), whereas Hieronymus Fabricius (1533-1619) discovered

[5] We follow here Henry, John. The scientific revolution and the origins of modern science. New York: St. Martin's Press; 1997.

the major valves in the legs which, as William Harvey (1578-1657) later realized, allowed blood only to flow towards the heart.

But what was the essence of the revolution in education which was brought about by Vesalius' work? Simply the action of individuals who overcame the differentiation between intellectual work and manual work in recognizing the epistomological value of knowledge which was produced outside the body of classical medical knowledge but which could contribute in an extraordinary way to the understanding of the human body. And this knowledge which was generated outside the medical body of knowledge was the knowledge of artists, and this individual who was capable of overcoming these differences was Vesalius.

Albrecht Dürer had already affirmed that "the more your work corresponds in its form to life, the better your work appears". That means that one has to have a profound knowledge of the different expressions of life, if one wants to represent them in pictures or sculptures.

It is this need for knowledge which Michelangelo pursued, when he assisted classes of anatomy which were given at many "bottegas" where the necessary knowledge was imparted on the artists. Another well-known example is that of the painter Paolo Veronese who had himself represented with anatomical models who were expressly chosen for studying human anatomy.

It is this very knowledge of the artists which Vesalius should later value in his perspective and recognize its great potential in representing human anatomy, the central knowledge on which the medicine of that time was built. The use of these magnificent engravings for medical classes meant a revolution in education which we all, who use pictures with the intention of imparting knowledge, owe to them. This revolution was not limited to illustrations but extended to three-dimensional representations which can be seen in the museum of La Specola in Florence.

Another example of the influence of knowledge which was produced outside of medicine in the course

of history is the significance of the thinking of Leibniz on the first people to use the microscope in dissections and on how the idea of the cell took shape which has been of fundamental importance for life sciences and medicine since the 19th century.

Considering the contribution of Leibniz's philosophy means to present to the student a tradition of thought, namely German idealism and philosophy of nature, of a highly speculative character which may, as I mentioned already, provoke certain resistance in a student of highly positivist thought.

The solution which offers itself is to point out to the student that Leibniz's contribution was decisive in the course of history which led to the definition of the idea of the cell.

At the time when Newton's mechanics dominated Europe, a philosophy developed in Germany which had quite different features, and sometimes was even opposed to them.

The German philosophy of life and of romanticizing nature was opposed to the concept of mechanics, according to which nature was something simple and homogeneous, as its beings were uniform and mechanical. The philosophers of Romanticism, on the other hand, emphasized the unique and particular character of everyone of the living beings.

A precursor of the philosophy of nature was Johan Baptista Van Helmont (1579-1644), who stated that the entities which make up the world are a multitude of autonomous beings, everyone with an internal force from which it is produced and from which it develops.

This idea was seized on by Gottfried W. Leibniz (1646-1716) who saw the world as being composed by a definite number of units or Monads which were independent centres of vital strength. These monads formed composite substances which in their turn were part of a harmony which had been preestabliished by the one and only Creator.

As opposed to Newton's system, which was composed by inert and equal atoms, Leibniz's monads were active purely spiritual and unique forces. Inside the various levels of

organization, the monads made up the whole universe.

This idea of Leibniz and later that of the philosophers of nature, for whom the diverse types of living organisms were composed of the same material units, turned into the materialization of the idea of "infusorial mucous vesicles" as Lorenz Oken (1779-1851) called them in 1805 and which later became known as cells.

In his prediction of the existence of the monads, Leibniz based himself on the work of the contemporary microscopists which seemed to contradict the mechanical philosophy. As he said, "All of nature is full of life," "microscopes have shown to the eye that there are more than a million live animals in one drop of water." (Leibniz's letter to princess Sophia, 4-11-1696).

There is another reference to the work of the microscopists: "The transformations of Swammerdam, Malpighi and Leeuwenhoeck, outstanding observers of our time, helped me here to accept that the animal and all other organized substance when we think and its apparent production is only a development and some sort of increase" (*The New System of Nature*, 1695, § 6).

"... today through exact investigations which were performed on plants, insects and animals knowledge has been received that the organic bodies of nature are never the result of chaos or rotting but always of seeds, in which there had been undoubtedly some sort of preformation. One came to the judgement that before conception there had not only been in them (i.e. the seeds) the organic body but also a Soul in this body, and in one word the animal itself; and only by way of conception this animal became prepared for a great transformation in order to turn into an animal of another species" (*The Origin of the Souls and of the Animals)*.

Being in the tradition of thought of the philosophers of nature and Leibniz's thesis, Lorenz Oken, relied on the experiments of his colleague Dietrich Georg von Kieser these basic units of life, the cells of life and their hypothetical origin. Lorenz Oken

took Leibniz's concept of the monad and put this theoretical concept into a relationship with the results of the experiments and observations by the microscopists of his time and defined these units of life as "infusorial mucous vesicles". These "mucous vesicles" were in essence the material realization of Leibniz's monads. This theory which apparently came into being in the context of the philosophy of nature would eventually define the theory of the cells, and therefore, one of the pillars of life sciences and medicine.

The last example which I wish to show you turns around the figure of Santiago Ramón y Cajal, the only scientist in the history of Spain who was awarded the Nobel prize in Science.

We think that the figure of Cajal allows to analyze his own career and his scientific contributions but also, as he had a high affinity to culture, it allows us to think about what it means to advance science in a country like Spain, which in Cajal's time was without scientific tradition, the scientists civil and political commitment to his country (at the beginning of the 20th century he was key to build the first fabric for scientific practice in Spain) and the necessity of commitment and vocation with one's own personal and professional option.

During the last years, Spain went through a terrible process and especially from the point of view of education. Highly qualified generations have been forced to emigrate, as after having finished their university studies they could not find a position which corresponded to their qualifications. Germany, Britain and the United States are full of highly qualified Spanish academics who seek an opportunity which is denied to them in their own country. And even 100 years later, this is a reality which is not far away from the one which Santiago Ramon y Cajal lived and overcame.

Cajal was born at Petilla de Aragón, a tiny village which was geographically and socially very far away from the centres of culture and science of that period. Encouraged by his father's activity, who was a barber-surgeon, he began to study medicine. His attempts as an artist and in romance were failures. He lived through personal

crises, but nothing block young Cajal's path to the ever more urgent wish to pursue his vocation. He received his education during a time when medicine was defined as a science based on experience and its using laboratories for practice which finally managed to adopt the epistemological resources of the experimental sciences, especially in physics.

To understand this let us look at the progress which had been made before Cajal's emergence. François Xavier Bichat (1771-1802) was first to propose the anatomico-clinical method. The definite pursuance of laboratory medicine began with the French physiologist Claude Bernard (1813-1878). From the first results of the studies concerning the nervous tissue developed the neurological disciplines. New techniques to manipulate the nervous tissue were introduced by Johann Christian Reil (1759-1813), and new tools were used, like the microtome which had been invented by Wilhelm His in 1870, the new microscopes by Zeiss or the technique of microphotography by Franz Koristka.

From then on, the idea of the cell was definitely established. Rudolph Virchow (1821-1902) declared that *"Omnis cellula e cellula",* Purkynje (1787-1869) described in 1837 for the first time the brain cells (Purkinje cells).

In 1858 Joseph von Gerlach proposed the reticular theory suggesting that there was a network of extremely fine ends of cellular extensions. Auguste-Henri Forel (1848-1931) made the first steps in the theory of neural discontinuity and the concept of the neurone, whereby he finally discovered the neurone. And it is here that Camilo Golgi (1843-1926) comes in who developed a method of dyeing with silver nitrate, which meant a revolution in the study of nerve tissues. Golgi suggested the existence of an anastomotic network between the axons, a real axonal network.

"But what can we say about the irrupton of Santiago Ramón y Cajal?" wondered Severo Ochoa apparently having difficulties coming to grips with it: "It is not easy to explain why Spain has always limped behind the other nations when cultivating science, and it is even less easy to explain how on this dry

ground a figure like that of Cajal could arise… Cajal was self-taught —how Cajal could arise in this scientific wasteland which was Spain at his time, is a miracle for me."[6]

In 1883 Cajal moved to Valencia and later, in 1887 to Barcelona where he developed his neuronal theory which was based on the use and development of Golgi's techniques. But also on Darwinist approaches which allowed for a more adequate experimental plan and finally led to the discovery of mechanisms which rule the morphology and the connection processes of the nerve cells, of the grey substance and of the cerebrospinal nerve system.[7]

After these findings which he considered to be essential, he began a frenetic activity of publishing his theories in Spanish. As Spanish was definitely not a language of science he started to publish in French but with little luck and recognition. All these publications, which thanks to their scientific merits are the basis of neuronal theory, were financed by Cajal himself. As he still had not achieved recognition, he decided to present himself at the Congress of the German Anatomical Society held in Berlin in 1889. It is here that the eminent physician Albert Kölliker who recognized the importance of Cajal's work. From then on Kölliker was the first and foremost to make Cajal known and support him. And from this moment Cajal became part of the international scientific elite.

With his international recognition began his commitment to the historic advancement of his country. He demanded from the Spanish government to define a scientific policy to lead the country out of poverty which he mainly understood

[6] Severo Ochoa. Prólogo. In: Ramón y Cajal. Reglas y consejos sobre investigación científica. Los tónicos de la voluntad. (Libro consagrado a la juventud española). Madrid: Espasa-Calpe; 1995. p. 9-10.

[7] The respect which Santiago Ramón y Cajal commands allows to visit as a group the house where Cajal lived during his stay at Barcelona, at a time when he established his neural theory.

as being a poverty of culture and education. In 1902, he obtained from the government the financing of the Laboratory for Biological Research which was eventually named the Cajal Institute, where he remained active until his death.

In his effort to make his country more dynamic and because he understood that he could only achieve that by education and scientific training he pushed through the creation of the Junta de Ampliación de Estudios (JAE, Union for Furthering Studies and Scientific Research) whose president he was until shortly before his death. The JAE sought above all to get closer to the great international centres, sending students and professors there for further training, so they could return afterwards to their own country. The JAE was an institution that adhered to liberal values and the Republic. By conservatives and fascists it was considered as the archenemy that was to be eliminated at all costs, an aspiration which was tragically fulfilled after the defeat of the Republic and the dismantling of the democratic system in 1939. It did not take the Franco regime very long until it had physically and institutionally eliminated all members of JAE and replaced it by the present CSIC (the Spanish National Research Council).

So Cajal is an example for a tenacious and convinced scientist, but he is also a person who created through his work and a person who felt his responsibility towards his fellow-citizens. Tenacity and conviction is what we as educators have to transmit to our students during the long years of their studies. But also a commitment and a sensitivity towards our fellow-citizens, as obvious a demand for our future physicians as for any other citizen.

Results and impression of the students

Good. Do the students appreciate the course on the history of medicine? Surveys at the end of the course show a very wide spectrum regarding the evaluation: from "extraordinarily interesting" to "more medicine and less history". But most evaluations range from "good" to "interesting" and "very interesting."

While considering the perception of the students, it should be noted that

three years ago a numerous group of them filed a petition to the faculty to include reading and comment a novel (on medical subjects) in different courses during the medicine study. We were very surprised, but from the pedagogical point of view, that was an initiative which showed that our effort to present the benefit of Humanities to understanding what medicine is, and most importantly, what it could be, was successful. Since then, not all, but a lot of the courses incorporate the compulsory reading of a novel in this programme.

Probably, as in every field and discipline, the problem or the question is not only to explain the benefits of Humanities (in this case the History of Medicine), but how to stimulate the students' interest in them, and that means, it is also a problem of how to broach the subject to the students, and therefore, a pedagogical question.

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Final open discussion

Pierpaolo Limone: Art is socially and culturally constructed, so it is important to teach the meaning of art, but it is also important to teach how to look at it. In this context, what kind of feedback do you receive from your students when you use art images and ask them questions about them?

Rosemarie Heyn: The important thing is not to imagine something, but to look and read only what a picture says. In my classes I try to make students read clearly what the picture portrays.
I project a high resolution image and then I try to dialogue with the students. Although with 200 students in class it is challenging, I ask them what they see in the picture, what the picture represents to them, and what signs they see according to what they have just learned. After a few minutes, I draw an arrow or a circle to mark the detail in the picture that I want them to look at and read again. I ask them again what they see in the picture, and then their answers are clearer and more spot on.

Lorenza Garrino: I suggest using Frida Kahlo's pictures and paintings. They would be very interesting examples of how she faced her illness and her suffering, and what signs the students read about her illness from her portraits and paintings.

Rosemarie Heyn: I agree with you, but perhaps for other courses and students. In my case, I have young students, from the 2nd and 3rd years, so maybe they are not mature enough to read them in this manner. There are plenty of alternatives to infer along the medical curricula, the same picture could be analysed from the point of view of different subjects.

Amàlia Lafuente: Albert, do you think that it is critical to have the History of Medicine course during the first year of medicine? Would it be different if it were taught during the last year of medical school?

Albert Presas i Puig: At our university, the course in the history of medicine is required during the first general educational cycle, and it has a double aim. On the one hand, to illustrate through historical reflection about a few key moments in the study and development of medicine, and on the other hand, to develop a series of

fundamental abilities for future physicians, such as reading and writing. Our students have very well developed abilities for working with audiovisual materials, but they are not used to reading calmly, to reflecting on what they have read, or to writing thoughtfully about the questions we ask them. This course aims to revert this situation, and we are obtaining very good results.

Antonio Federico: The experiences that you presented today can be described as a way of using a cultural artefact in medical education. But I am wondering if you could think of a way of using the scientific methods in humanities, the very paradigm behind humanities, to teach doctors. Could portraits, conversational analysis, and critical reading be applied to other disciplines, like cinema? Could these approaches be relevant? And what is your experience in that?

Rosemarie Heyn: Of course, they are relevant. Even if these non-traditional methods were used in traditional lectures, even in small doses (one or two slides), they would be beneficial for the class and the lectures.

Albert Presas i Puig: Unlike in medicine, in physics and mathematics courses, the history of the discipline is taught by physicists and mathematicians. In our medical school at the Pompeu Fabra University, the course in the history of medicine is taught by professionals from other disciplines. My question is: should historians be incorporated into medical schools to teach the history of medicine or should medical doctors be in charge of teaching this subject?

Amàlia Lafuente: I explained some complementary teaching methods. In my opinion, there is no rule about who should teach what, there is no specific match in this particular case. As you know, although it is very difficult to introduce changes in academic teaching procedures, now we are starting to see a shift. To answer your question, nowadays not all teachers have enough knowledge to be able to teach medical humanities. But we are working on teaching humanities to medical students in order to train them to be able to teach humanities to other students in the future.

Pierpaolo Limone: Of course, it is difficult for medical professionals to be trained to explain medical humanities, but what I imagined was to combine expertise during these sessions. It could be interesting to have two experts from different disciplines in the same classroom analysing the same cultural object from their different points of views.

Josep-E. Baños: Every university has a different culture, and at the Universitat de Barcelona it would probably be difficult to include teachers from non-scientific disciplines to teach scientific disciplines; in general, universities tend to have conservative points of view. By contrast, although the Universitat Pompeu Fabra also ends up having conservative ideas, the Biology teaching staff is trying to change this perspective and promoting more innovative teaching tools at the Faculty of Health and Life Sciences, and I'm optimistic about the future of our Faculty. The study plan in medical school is very similar everywhere in different countries. Most of them have separate subjects like History of Medicine or History of Science. But there are exceptions, like in France, where universities are trying to introduce history lessons, not as a separate subject, but integrated into many subjects. Now this approach is open to discussion.

I have a question for Valentina Cappi related to the interest in finding tools to measure educational strategies. There is a saying that states that if you cannot measure a thing, that thing doesn't exist. When we talk about new educational strategies, it's difficult to evaluate their usefulness if we cannot measure them. When we are talking about empathy, you mentioned a tool to measure it, a study by the Jefferson Medical School. Could you talk a little bit about it?

Valentina Cappi: The Jefferson Scale of Empathy does not measure the patient's trust but the empathy of health professionals and students using questionnaires and qualitative indicators, but I am not an expert in it.

Jordi Planes Bassas: Nowadays everything is accessible. In this context, we have a program called *"La meva salut"* (My Health) in Catalonia, where

patients can check the results of their medical tests. But in this scenario, it is very important to trust medical doctors. If we give evidence without guidance, patients will not trust us. This is why, we as doctors, need to create a relationship of trust with our patients.

Valentina Cappi: I agree with you. In Italy we trust the health system in general, according to statistics. But of course, trust towards medical professions can be improved with communication tools.

Lorenza Garrino: One thing that everyone should take into account is the placebo effect in studies about trust. It is important to acknowledge that the perception of trust can be affected by the patients' morale as well as the doctors' and patient's mood. It is also important to differentiate and study the trust that a patient feels toward the doctor and the trust in the health systems in general. The concept of trust is not only about doctors being kind to have better relationships with their patients, but about improving the overall health of patients by using empathy.

Marta Torrens: We need to consider empathy from a different point of view. Medicine is a 6-year programme and the subject about the relationship between physicians and patients is given during the second year and again during the first year of residency. But according to tutors of residents, resident students score low in empathy; moreover, the tutors admit that they themselves do not have the skills to teach it and that empathy is not one of their best qualities. Why do you think that empathy decreases in time in those medical students and doctors as well? Should "the empathy course" be given continuously during the 6 years of medical school to "revaccinate" students in empathy?

Tamara Djermanovic: The neurosurgeon Nolasc Acarín wrote an article about the humanities and science in the medical profession that defends the incorporation of the humanities into medical school curriculums. Citing Adolphe Gubler, Acarín says that the physician's job involves "sometimes curing, often alleviating, and always consoling". He adds that a broad understanding of medical practice provides the necessary

depth to the art of the physician's profession, and it is here where the encounter with the humanities takes place. Medicine is an applied science that draws from physics, chemistry, biology, and mathematics, but the profession of medicine must also include psychology, sociology, anthropology, and ethics, among other subjects.

He also talks about empathy, the need to palliate pain, and the experience of death. Acarín comments that the humanities can offer understanding when faced with pain and the disappointments of life. And to finish, Acarín says that after pain, death is the great portrait of medicine. Life without death is unconceivable —every living being dies and gives way to following generations. Death is the main certainty that we have in life, although it is difficult to accept. When a physician establishes the prognosis of death, a certain uneasiness hinders relations between the patient and caregivers.

He ends up saying that this is the point where literature and philosophy can help medicine. The personal capacity to accept death, the expiration of life, depends in large part on reaching a deep ideological consciousness of what life and nature are.

Nevertheless, I think that it is one thing for physicians to accept this, but quite another for patients to accept it.

To finish up, I would like to corroborate that which I have always tried to defend as a professor of the humanities, citing Plato in the *Apology of Socrates*, a reflection on death derived from the loss of his master Socrates: "There is great hope that this [death] is a good thing. Death is one of these two things: either the one who is dead is nothing or has no sense of anything, or, according to what is said, death is really a transformation, a change of dwelling for the soul of this place here for another place".

In the end, this passage transmits the uncertainty surrounding the experience of death, and on the other hand, everybody who goes through life must die. Through this reflection, I think that texts like these could become part of a small canon that can be used in the study of medicine.

Mariano Sentí: Can we promote empathy in people? Will we use

neuroenhancers to improve empathy? Will we change our capabilities by using substances like nutrients? Of course I am joking, but nowadays we have oxytocin and MDMA, but what will we do in the future? Will we change a person's personality using enhancers? I think there are a lot of possibilities in this field.

Carlo Orefice: It's been very interesting organizing and participating in this debate on medical humanities. To conclude this meeting, I think we should, firstly, follow this line of work and keeping organizing debates like this one; secondly, we have to create a network between our universities to share our points of view and knowledge and, in the third place, we need to work to create a master's degree in medical humanities at the University of Siena or the Universitat Pompeu Fabra, and collaborate with other universities. All the initiatives are focused on further developing medical humanities.

Josep-E. Baños: I agree, this is why I would like to inform all of you that Carlo and I have been working for almost a year and a half on developing an international master's degree on Medical Humanities between the University of Siena and the Universitat Pompeu Fabra.

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