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## Bioethics in Education

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### Abstract

In dynamic ambits, systems have to be maintained in a constant process of adaptation. Thus, in the present chapter, we explore the integration of bioethics in all areas of higher education (physics-mathematics, the engineering sciences, social and administrative sciences, the biological-medical sciences, and the humanities), with the objective of establishing, as an essential part, bioethics in all disciplines of knowledge. All undergraduate university degrees converge in the relation among living beings, through knowledge-based interdisciplinary or multidisciplinary study. A close relationship has to be established between education and bioethics within the context of higher education, as teaching at the university level with values and ethics, achieves a contribution to the science of industry in terms of a greater professional ethical sense. Therefore, this work concludes that bioethics should form a fundamental part of every university undergraduate degree.

**Keywords:** bioethics, education, higher education, postgraduate, learning

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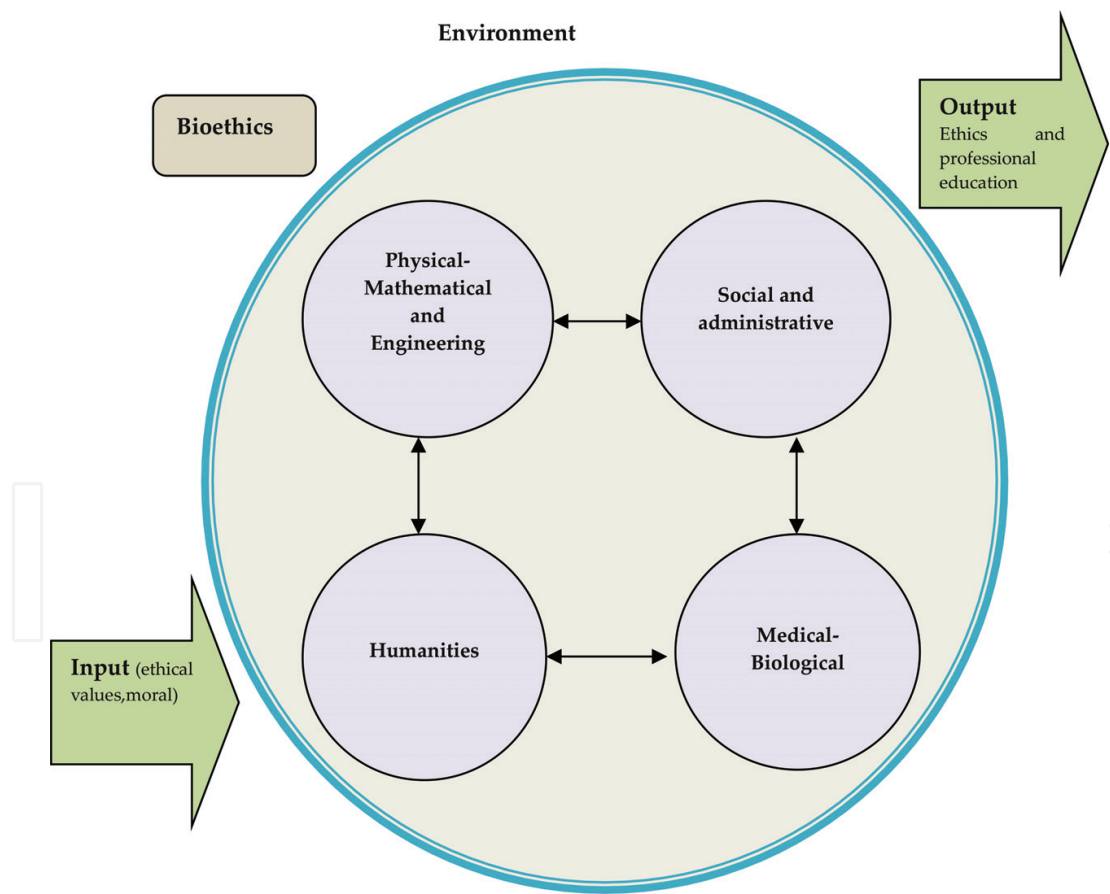
### 1. Introduction

The learning process in higher education is based on the theoretical learning model defined as andragogy, which is an ensemble of techniques for teaching adults. The main characteristics of

this model are the following: the students have a motivation for learning and they possess previous knowledge or prior experience in the areas of interest; in addition, they entertain values that they have achieved throughout their personal and academic lives. They are capable of making moral judgments concerning their environment and the situations in which they live [1]. As andragogy takes for granted that the student already has a set of values, the majority of higher education programs of study, do not have courses on ethics and values.

Bioethics in higher education seeks to contribute to undergraduate degree studies by not only offering knowledge on the science or the technique, but also by forming professionals endowed with moral excellence. It plays a part in science or industry by producing trained and morally formed professionals who can face the bioethical dilemmas present in the ambits in which they develop their activities with acumen [2].

**Figure 1** represents how the higher education knowledge areas are interrelated within a system that interacts in a bioethics environment. This system has input elements that can cause a change in the system, for example: the inputs of ethical values and moral will generate in the system the formation of an ethical and moral professional.



**Figure 1.** Bioethics in higher education.

## 2. Relationship between bioethics and education

With respect to bioethics in education, it is important to know the different concepts contained in the former in order to be able to focus on a determined area that would be applicable in education. There exist many concepts; however, all converge at the same point: respect for life. On the other hand, morals based on universal principles is where bioethics in education plays a very important role, because it aids the individual to develop in a better manner independent of their way of looking at things.

The teaching of ethics cannot be treated as an exact science, because there are different gradients in terms of morals and education that the individual possesses in a specific zone. One of the principal objectives that bioethics possesses is that of promoting critical thinking. The morals and ethics of each person depend on his/her life environment and of the childhood that this individual experienced. Nonetheless, according to the moral development theory of Jean Piaget, these ethical values can change or be developed depending on the life experiences that the person has as an adult age.

On certain occasions, bioethics can be learned or imitated according to the society or environment in which the person develops. As is noted in a case study, corruption, intransigence, or the abuse of power can be transmitted to an individual who comes into this ecosystem for the first time. Therefore, education is the basis of any culture, and the substrate of the culture comprises human values [3, 4].

The current challenges of educative institutions include responding to the needs of the society, presenting plans of study that contain bioethical themes inserted into experimental areas. Thus, it can be concluded that the teaching staff should understand the theme of bioethics and its effect on future generations; they should work in a preventive manner to plan natural resources and to have the human capital necessary without displacing it.

Stage 1	Punishment and obedience (heteronomy)	Blind obedience, avoid punishments
Stage 2	Purpose and exchange (individualism)	Follow a rule only when it benefits someone
Stage 3	Expectations, relationships, and interpersonal compliance (mutuality)	Live according to what close people expect
Stage 4	Social system and conscience (law and order)	Fulfill the duties that have been accepted by a group
Stage 5	Previous rights and social contract (utility)	Aware of the diversity of values and opinions and their relative origin
Stage 6	Universal ethical principles (autonomy)	Universal ethical principles that are met by the use of reason

**Table 1.** Stages to identify the behavior of an individual.

**Table 1** shows the stages that can identify an individual's behavior according to Kohlberg. Kohlberg establishes three levels of morals—level 1: preconventional morals, level 2: conventional morals, and level 3: postconventional morals, each of these levels with two stages [5].

## 2.1. Bioethics

Under this rubric, we present some definitions of bioethics, which considers the ethical aspects of the life sciences, as well as the relationships of humans with the rest of the living beings.

According to the World Health Organization (WHO), bioethics is a discipline that seeks to clarify ethical problems presenting in relation to health while conducting investigations on human beings, designing or implementing a health policy, and providing medical care (e.g., a regional bioethics program) [6].

According to the Joseph and Rose Kennedy Institute of Bioethics Encyclopedia, bioethics is the systematic study of human behavior in the area of the biological sciences and health care, to the extent that this behavior is analyzed based on moral principles and values [7].

According to Vallero,

Bioethics is the assemblage of moral principles and values needed to respect, protect, and enhance life. Engineers, medical practitioners, and all technical professionals must be clear regarding this meaning [8].

Bioethics should provide interdisciplinary and multidisciplinary training for any area of the natural and social sciences [9].

## 2.2. Education

We live in a globalized world in which we must, every day, seek a better society, a society in which one can coexist with others, have respect for others, and in which the practice of these values is not simply by chance. That is, we are seeking a values-educated society.

Nonetheless, to speak of education and define it is not easy, in that it is an extremely broad theme. Therefore, it is important to situate ourselves within the context. For the latter, we will start by mentioning here some concepts of education cited by diverse authors.

### 2.2.1. Aristotle

Education consists of directing the feelings of pleasure and pain toward an ethical order [10].

### 2.2.2. Marañón

Education is an ethical overcoming of the instincts [11].

### 2.2.3. Spranger

To educate is to transfer to another, with self-less love, the resolution to develop, from the inside out, all of one's capacity to receive and forge values [12].

#### 2.2.4. *Gottler*

Education is the elevating influence, integrated by psychic caring (release from obstructions, teaching, inspiration, exercise) that the adult generation exercises on the development of the generation of individuals who are maturing, with the object of preparing that next generation to personally lead their own existence among the societies surrounding them in vital fashion, and with that the intelligent realization of the values that form the foundation of these societies [13].

On the other hand, education can also be considered as the basis for the growth of all societies. Education allows us to know, experience, and propose everything that is necessary to achieve the integral development of each individual, thus the development of a society. In this vein, Fernando Savagery has noted: "We are born humans but that is not sufficient: we also have to become one", which we will achieve through education of the individual based on human development [14].

Individuals as well as nations benefit from education. People achieve a better quality of life, obtain greater opportunities for employment and with this, sustained economic development. For nations, the potential benefits are mirrored in economic growth and the development of shared values that strengthen social cohesion [15].

UNESCO contributes to the creation of sustainable societies by accelerating progress toward the objectives of "education for all," while it aids member states to increase their human and institutional capacities within the ambit of education [16].

According to the latter, different international organizations seek education for all, equality of opportunity, and access to education. In order to achieve this, we cannot omit the four essential pillars of learning presented to us by Jacques Delors in his report entitled "The treasure within; learning to know, learning to do, learning to live together and learning to be" [17].

#### 2.2.5. *Learning to know*

This pillar has as its purpose the acquisition of the elements of understanding and can be simultaneously considered as the means and the end of human life. In this knowledge, the importance of scientific reasoning and the need for a wide-reaching general culture is highlighted. This type of learning stimulates the critical sense, permitting one to decipher reality. The importance of "learning to learn, exercising the attention, memory, and thought" is emphasized [17], mentioning that the process of learning happens during one's entire life.

#### 2.2.6. *Learning to do*

The purpose of "learning to do" is to be able to exert an influence on one's own ambit and improve it.

#### 2.2.7. *Learning to live together*

This pillar emphasizes the ability to learn to live together in order to participate and cooperate with others in all human activities.



### 2.2.8. *Learning to be*

This pillar of learning comprises the integrating of the other three pillars, in which development, in all of its aspects, is sought of the human being. Education must be pursued to create thinking human beings, creative, and free-thinking, so that they can be the creators of their own destiny.

This pillar of learning is found to be directly related to Edgar Morin's seventh pillar of learning in "The Ethic of the Human Gender" (130): "One necessarily human ethic, that is, an anto-ethic, should be considered as an ethic of the individual-societal-species loop, from which our properly human conscience and spirit arise" [18].

Finally, the objectives of an education are very diverse, depending on the context and focus desired. Nonetheless, something on which we can agree is that higher education should foster in the individual a necessarily human ethic that takes into account the individual-society-species triad with the purpose of forging a true relationship between the society and the individual in its midst, that is, forming the individual for a life in society.

## 2.3. Bioethics in higher education

From its origins, education has always been related with the formation of values in individuals. Thus, the belief has been established that values are universal. Based on this belief, an ethic may be considered to be not just about the rights and obligations of the subjects, but rather concerning obligations, contents, and points of view [19]. This could have contributed to the fact that, in the 1990s, Latin America began to demonstrate interest in generating a higher education of quality, perceiving in this a tool for confronting the educative demands driven by globalization. [20].

This transformation of education cannot be considered an easy process to be conceived of by one or two individuals, as it not only comprises implementing values or moral issues. Transformation takes place, from the teacher who transmits values, regulations, and moral rights, and motivates the student to create a critical conscience, and learn to be and live together in society [21].

In any educative profession, without excluding the specialized area of study (the social sciences, the medical-biological sciences, the engineering sciences, the applied sciences, etc.), novel processes should be proposed to foster the autonomy of the student body, for example, information and communications technologies (ICT), in order for there to be a beneficial end for both the professor and the student. Similarly, educative institutions can promote the process of communicative interaction, fostered by new technologies, with the purpose of encouraging persons to seek, select, understand, and interpret the information engendered by the media in areas of public life through ethical responsibility [22].

The importance of producing critical thought in students of higher education lies in being able to provide the said students with the tools of defense for use when they are confronted with a moral or ethical problem—these tools will help students to choose the best values, norms, and moral rights to solve a contrariety in the social ambit.

Universities in each of their knowledge areas generate professionals who require the society. Thus, their graduates must know the social and cultural environment. The graduates must consider the discipline of bioethics in each of their knowledge areas as an essential part of the profession [23].

There has been great interest in bioethics in field of medicine. However, it should not be forgotten that bioethics is important in other branches of knowledge too, such as the physical-mathematical sciences, the social sciences, the administrative sciences, and the humanities.

Higher education is centered on the creation of professionals who are trained to drive development. Knowledge acquired in the classroom presents utopic scenarios that are, on occasion, far from the social, economic, and environmental reality in which the world finds itself, thus generating knowledge without considering the fact that the constant change occurring in the student's ambit can create an erroneous focus for decision making.

The application of science and technology in knowledge fields generated from higher education is modified by the changes taking place at the global level. This means that the professionals carrying out this application need to know the external factors that affect their knowledge area, in order to achieve results that benefit the population but that do not affect the environment in which they are developed [24]. For this to happen, it is necessary for educative systems to offer adequate preparation to ensure that the actions undertaken do not have repercussions on living systems or the physical beings with which they interact.

#### **2.4. Bioethics as a discipline in higher education**

The design or planning of systems of education should be constantly updated for the creation of professionals who are not only experts in their respective knowledge areas, but in addition, are able to solve the bioethical problems with which they may be confronted. This is the reason why, within the modifications of the curricular system, the insertion of bioethics is of vital importance for achieving human development.

Educative models cannot be identified as neutral. From the deontological, that is, the normative ethical position's perspective, each of the degree program studies imparted should be constantly updated in terms of its values and world view. The views should be promoted from the historical perspective and from the reality encountered by each profession [24].

Professionalism as an implicit objective of higher education can be expressed in terms of an array of values, attitudes, and behaviors that are in the interests of the society around oneself. Within this concept, it is also necessary to include the environment and living beings in general. Professionalism should aid in maintaining values above the social, economic, and political pressures to which a student during his/her formation can find him/herself submitted.

The teaching of bioethics throughout the academic lives of the student is, on occasion, regarded as an independent process that may or may not be present in curricular maps, but that occurs in study assignments, whose teaching objectives include facing ethical situations in daily life. However, it is necessary for teaching to impart the most basic values of respect for life and for living beings, as well to prepare the student for new forms that put values to the



test. Bioethics as an independent discipline is important for achieving the integral formation of the students, but teaching bioethics in an integral and systematic fashion in all of the students' courses permits the latter to have a broader panorama concerning the decisions and dilemmas that they must face, so that they may respond to these in the best manner possible [25].

Bioethics from a transversal perspective allows students to position, in the best way, the situations that they will encounter and for them to bear in mind, according to their university degree studies, the ethical problems that they will be called upon to solve.

It is easy to believe that bioethics would only be necessary in the area of the biological sciences, in that the investigation and practice of these specialities are in close proximity with human health. Notwithstanding this, in view of the current rate of technological advance, the areas of the exact sciences have acquired a greater need for the intervention of bioethics to solve bioethical problems. Therefore, it is necessary to offer a bioethical education in order to produce professionals who are prepared and who can provide solutions that are not always binary responses. In moral problems, there is the need for the capacity to analyze, understand, and provide solutions in not only an individual manner, but also one that benefits the society.

The process of teaching and learning bioethics should be characterized by transdisciplinarity that leads to integral reflection on the proposed situation by means of the values obtained through bioethical knowledge. It complies with the development of science and technology in a responsible fashion, generating spaces and activities allowing for the development of values and the solving of ethical problems and the problems surrounding the context of the courses that require this throughout their higher education [25].

Bioethics, in addition to forming professionals with the moral caliber to make decisions that solve dilemmas in terms of their knowledge, also helps to form citizens who have the capacity to choose to be motivated in their actions to a greater degree by their moral quality than by the judicial terms imposed upon them.

The Institutes of Education Sciences (IES) are recognized for the driving of their students in the scientific ambit, by means of seeding in them the curiosity for carrying out investigations in the search for solutions. However, within the bioethical environment, an attempt is also made to offer quality goods and services that benefit the population on the part of health professionals who give importance to the implementation of values and roles [26, 27].

World-class institutions should impart knowledge on bioethics in higher education. There is an overwhelming need for implementing professional transformation in schools in Latin America, such as an integral and complete transformation from the standpoints of morals and ethics in students in all disciplines. The objective of this transformation should be directed toward improving the conditions of human life [28, 29].

As of now the theme is scarcely known and it is of great concern that professionals emerge from their undergraduate degree studies without a clear idea of ethical values and legal questions, knowing that they are about to come face-to-face with an independent professional life. The need to create and implement a bioethics program arises due to the results of a study carried out in two Latin-American institutions of higher education, specifically teaching courses that leads to

an undergraduate odontology degree. Here, the students were unaware of the importance of informed consent, as well as of the legal bases that they should take into account prior to providing care for a patient [30].

Similar to the views of Henriques [31], the importance of bioethics in the transformation of the pharmaceutical professional is highlighted. The author mentions the multidisciplinary relationship that exists among the pharmacist, the physician, and the nurse in terms of recommendation and administration of the drug. Because of the bioethical values acquired, the pharmacist possesses responsibilities concerning the regulations and control of the pharmaceutical products, as well as having knowledge on the properties and management of the medications, in addition to therapeutic alternatives and adverse consequences—overall, the priority is the well-being of the patients.

Bioethics is not only limited to inclusion in the disciplines of the medical-biological sciences area; it is also taking on a presence in administrative areas, as companies work by means of, with, and for persons through a link known as “human capital.” Administrators carry out activities that involve management of the human factor; for this reason, they should possess the knowledge of, an attitude toward, and the management of bioethics so as not to cause harm to the mental and physical health of the persons contributing to the functions of the enterprise [32].

## **2.5. Bioethics in electronic learning**

Online or electronic learning refers to the utilization of information and communication technologies (ICT) as support for academic formation at a distance, combining pedagogical elements and multimedia resources for learning, in addition to using it as a platform that allows instructors and students to maintain contact in real or deferred time by means of communication tools such as electronic mail.

The principal advantages of electronic education are ease of time management, the freedom to carry out other activities such as work-study programs, information by distant media, and allowing the students to use learning styles that best suit them, for example, videos, audios, and written texts [33].

Bioethics, while it has not been fully adopted in the present higher educational system, appears to be even further away from being adopted by institutions offering online education. Nonetheless, this presupposes a greater possibility of having students who participate under the concept of less effort in academic activities and in participating with fellow students, to the point that they engage in the dishonest behaviors, rendering it difficult to discover that they have received a non-presential education.

Online education has a great advantage in that it gives access to education to persons who did not have this previously, but without a sound teaching of bioethics, it is not possible to ensure that the professionals emerging from online courses are prepared to make decisions that entail the best benefits for the society in which they are developed.

## 2.6. Bioethics in postgraduate education

Bioethics, viewed from the medical scope and in the postgraduate area is considered as an analysis of human behavior, encompassing the activities and roles engaged in by the health professional in society [34].

Incorporation of bioethics in the pre- and postgraduate components of these fields is essential and invaluable for improving the quality of medical care and for continuing with scientific advances that benefit persons in terms of disease. Frequently, the professional solely takes into account the biological risks, that is, he/she attempts to avoid physical harm but forgets that the psychological, moral, or social damage that can arise can be greater than damage to physical integrity [35].

The importance of bioethics in postgraduate studies lies in that any investigation protocol that involves the participation of human beings should have the approval of an Ethics Committee, which should provide the informed consent document containing the following information: data of the investigator; data of the subject-under-study; explanation of the procedure that will evaluate the subject; benefits of the study; risks of the study, and the revoking of the informed consent if the subject wishes to withdraw from the project.

Customarily, this type of evaluation has as its objective the provision of the legal and ethical requirements that protect the subjects-under- investigation, in this manner safeguarding their physical, emotional, and moral integrity [36].

Therefore, there can be a difference between bioethics at the higher education level and that in the postgraduate area. While in the former, an ethical education is inculcated in the student by the professor and the academic authorities, in postgraduate studies, it is the result of the formation and evaluation of a committee charged with assessing the legal requirements for protecting the physical integrity of the patient.

## 3. Conclusions

Bioethics should be considered as a compulsory discipline within the curricula of different areas of university knowledge, not only in the area of medical-biological sciences. This is due to the dynamic environments of higher and postgraduate education systems. Bioethics is also considered as a learning framework that is the best way to teach decision-making based on ethics and human values that is necessary for the development of a country and even the world.

The main objective of university education is transformative. It makes beneficial changes in human beings transforming their character and personality. Education is a moral enterprise because it expands the values that have been received. Bioethics education has a similar objective; it invites individuals to participate in a professional community, in the construction and reinforcement of its identity through ethics in knowledge and professional practice.

Bioethics needs to be adopted in online higher education programs because more and more universities offer degrees in this modality, and ethics and values should not be left aside in any form of education.

Finally, it is observed that it is necessary to incorporate the principles and norms of bioethics in the areas of higher education and postgraduate studies in such a way that it is involved in the development of the students' professional life, highlighting human values and responsibility, honesty in work. This involves a change of paradigm with the aim of increasing knowledge keeping in mind ethical principles in daily procedures.

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## Conflict of interest

The authors declare no conflict of interest.

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