

The Discourse of Dentistry Students Regarding Environmental Pollution

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ABSTRACT

Higher education institutions should provide educational and formative training to future professionals by incorporating a cross-curricular environmental education program into the curriculum based on three guidelines: first, what students know, believe, think, and say regarding environmental pollution; second, structuring an environmental education program to adequately and accurately inform students about the phenomenon, from its causes to its consequences; third, to propose environmental behavioral actions by students both within and outside the educational institution; and fourth, if there are no qualified and trained teachers to provide environmental education, to train them or send them for training. In this study, the context of the UAO/UAZ was considered for the reflections, analyses, and syntheses based on hypothetical assumptions, since part of the research team (authors and co-authors) works there and the rest in different academic units of the Health Sciences Area at the Autonomous University of Zacatecas (ACS/UAZ). We hope that these reflections will serve as motivation to spark interest and encourage research on this phenomenon so that concrete action can be taken not only within the UAO/UAZ but also throughout the ACS/UAZ and subsequently across the entire University.

Keywords: Pollution; Environmentalization; Behaviors

Abbreviations: HEIs: Higher Education Institutions in Dentistry; UN: United Nations; UNESCO: United Nations Educational, Scientific and Cultural Organization; CFCs: Chloro Fluoro Carbons; UV: Ultra Violet

Introduction

Currently, the social, familial, educational, economic, political, geographical, and especially environmental realities are becoming increasingly complex, difficult, critical, harmful, and toxic, with ever-increasing etiological repercussions on the health of people, flora, and fauna at the local, regional, national, and global levels. Specifically, regarding the environment, the degree of pollution, in terms of the severity of the situation and the concentration of physical or chemical agents present, has increased the risk and the destructive and degrading impact, diminishing its quality and value for the survival, development, and growth not only of society but also of ecosystems. Its deterioration, degeneration, wear, and corruption are undoubtedly almost entirely due to multiple factors of a public, private, social, scientific, and even technological nature, in which human activity plays a role. The destructive and predatory actions resulting from individual, collective, public, and institutional attitudes and behaviors have allowed global environmental pollution to reach its current magnitude.

The population as a whole has played a key role in this; therefore, the success or failure of the actions and measures that are proposed or imposed must depend on changes in attitudes, behaviors, and wills oriented towards other forms of consumption and lifestyle that allow the construction and foundation of accurate, feasible, and quick-resulting schemes and public policies to face the enormous challenge of putting a stop to environmental pollution in general.

In the pursuit of unbridled growth, development, and progress promoted by large international economic and financial capital, societies (some more than others) have embraced marketing as a viable alternative for achieving quality of life and happiness. This has inevitably led to rampant and uncontrolled consumerism. These beliefs, which drive countries where industrialization, liberalism, the free market, and individualism have found fertile ground for consolidation and entrenchment, have been gradually transforming societies into increasingly inhumane, irrational, and illogical entities. The drive for economic and consumerist gain has led to the sacrifice of cultur-

al identities, autonomy, and self-management, pushing us toward an increasingly catastrophic environmental and ecological future if truly effective actions are not implemented. We continue to live with indifference to environmental degradation, despite the fact that the abyss of no return, to which we are drawing ever closer, has been predicted and announced time and again for some time now. Due to the emergence and development of globalization and new ways of viewing and understanding economic and social development and growth, new paths and policies for coexistence and understanding have been proposed. An example of this is the paradigm of sustainable development, which raises the need to plan and work for development rather than growth, based on a true respect for the self-management and democratic autonomy of peoples, considering a medium- and long-term perspective based on the understanding and consideration of the socio-historical, geopolitical, environmental, population, and cultural context of each society, all in pursuit of improving life by differentiating the concepts of quality, health, education, and work for each individual and social sector.

At the same time, we must work intensely and diligently in more coherent, feasible, coordinated, and above all, planned ways to address the educational processes at each of the different educational levels, particularly by placing greater interest, care, and emphasis on higher education (undergraduate and postgraduate), in order to develop a clear understanding of the problem of environmental pollution based on the dimensions of the general and particular social imaginaries and meanings of each population group and specific to each disciplinary field, since it is the future professionals who graduate from these schools who, sooner or later, will pollute through the use and abuse of their inputs and the inadequate and careless handling of the wide variety of toxic pollutants they employ (Méndez Cadená ME, et al. [1]).

Imaginary and Social Representation

For a better understanding of the genesis and development of this work of reflection and reasoning, we present our understanding of the concepts of imaginary and social meaning. In agreement with Gastón Amen, we understand that social imaginaries are mental constructs or abstract ideas specifically designed to comprehend, explain, or measure complex phenomena that are not directly observable. These entities are structured by the set of interpretations, beliefs, values, myths, and representations shared by a social group at a given time, created by society to establish its reality, structuring the way people perceive and act in the world. These social imaginaries act as the source or matrix from which social representations arise. It can be said that the imaginary is the backdrop, while representations are the concrete images that we project onto that backdrop to live and act in everyday life (Amen G [2]).

Environmental Pollution

We recognize the enormous challenge and concern that addressing pollution currently represents, as its variables and factors are

numerous and often veiled and obscure. This situation alone should generate greater concern and interest in addressing it. Despite this, it continues to receive low social and political attention compared to other more immediate problems such as insecurity, employment, poverty, and hunger, among others. This is possibly a result of the fact that these other problems are perceived and felt with greater proximity and urgency in terms of time, form, and space, coupled with social resistance to acknowledging that the main cause of pollution is anthropocentric actions and behaviors conditioned and contextualized by the policies and needs of global and hegemonic economic powers. Although there are individuals, groups, and population sectors aware of the seriousness of the environmental problem, their concern does not always translate into responsible, efficient, and effective actions that contribute to mitigating the phenomenon. This is because their actions are often inadequate, ineffective, poorly systematized, and/or non-permanent. This is due to the fact that those promoting these actions lack the necessary training and educational information to understand the cycle of the genesis and effects of environmental pollution, and consequently, to plan, act, and enrich the common sense they use to carry out their actions. The appropriate and recommended approach would be to plan school-based (but institutional) environmental communication and education projects and programs specifically aimed at each educational segment (semester) within the university. To do this, it is first necessary to understand the characteristics of this population and how they receive, interpret, and adapt information on this particular topic (their perceptions, social representations, and discourse surrounding the phenomenon of environmental pollution) (Correa López MI [3]).

Purpose of the Analysis and Deliberation

The analysis and deliberation summarized here is contextualized within the work and daily life of the Academic Unit of Dentistry of the Autonomous University of Zacatecas (UAO/UAZ). This analysis was based on the experiences accumulated over the years of work as teachers by those who make up the team of authors and co-authors of this work and on the interaction that occurred and has occurred over time with the students. These university students constitute a unique population group, but with characteristics similar to those of a large segment of the population in the Health Sciences area of the same University (ACS/UAZ). Therefore, we believe that the reflections and syntheses we have reached can be used to plan and work on the construction of pedagogical and didactic strategies in pro-environmental interactive communication projects and programs, seeking not only to influence knowledge of this topic at UAO/UAZ, but also the values, attitudes, and behavioral changes of the largest number of students to whom they are directed and who are part of ACS/UAZ. The discussions and reflections presented here refer to aspects of UAO/UAZ students related to the social recognition of environmental pollution as a multi-causal problematic phenomenon, as well as their perception of the current and potential risks it is causing or may cause to the university ecosystem, how they learn about the topic, how they incor-

porate the information received in contrast to the environmental education practices carried out and related to pollution, and in particular, analyzing how they carry out these adaptation measures applied voluntarily or mandatorily, and the resistance and/or willingness to act towards a radical change in social, academic, school and institutional lifestyle oriented towards the paradigm of sustainable dentistry.

Sustainable Dentistry

Global educational policies have been proposing and maintaining for several years that Higher Education Institutions in Dentistry (HEIs) around the world must work on their educational/institutional processes under a new vision and perspective, taking as one of their formative axes the problematization of the environmental crisis caused by pollution (knowing it, understanding it and acting to control and/or reduce it), in order to face, by their own initiative and not by imposition, the great challenge of approaching, as students and future professionals, working in an environmentally friendly way, within the educational institution and later in their respective disciplinary field. Under this logic, it was from 2005 onwards that the United Nations (UN) designated UNESCO (United Nations Educational, Scientific and Cultural Organization) to develop and present what became known as the Decade of Education for Sustainable Development Program, a program that was endorsed and accepted in most Latin American countries, in which education was considered as the basis for achieving sustainable development and growth over the next ten years. This program considered that each country should consider its priorities and ways of acting based on the particularities of its multiple sociocultural, educational, economic, political, geographical and other contexts that were present and influenced the population's idiosyncrasies (Gutiérrez J, et al. [4]). Before proceeding, we acknowledge that environmental pollution is a topic that is currently being extensively studied, researched, and disseminated by various media outlets (although not all the media used have been the most appropriate, efficient, and effective for the university population).

We understand that federal, state, and local authorities and representatives, as well as those from the private and public sectors, environmental groups, scientists, professors, and environmental educators, have participated in these efforts, sometimes actively and sometimes passively, through their own initiatives and other times by following established guidelines. Unfortunately, an effective approach that can homogeneously address the interests and contexts of each recipient, individually or collectively, has not yet been found. This is because we believe that what has been most lacking is the study, research, and reflection on the diverse interpretations and understandings of the phenomenon of pollution as an initial diagnosis before prescribing treatment (the application of programs and academic content). For this reason, in this work, we will propose possible statements that can spark awareness and, above all, serve to continue studying and researching the imaginary and the representation of pollution. social and discursive perspective of dentistry students

regarding environmental pollution so that, with full knowledge of the facts, possible solutions can be proposed.

Imaginary and Social Representation of UAO/UAZ Students

The context of UAO/UAZ students, due to its geographical location—comprising two campuses (Campus Guadalupe and Campus UAZ Siglo XXI, separated by 11 km)—and the particular characteristics of its infrastructure and school environment, where various elements must be considered for this study, makes it very difficult to standardize opinions regarding their knowledge of environmental pollution and its quality and extent. These are elements that have undoubtedly contributed to and shaped, in one way or another, the imaginary and social representation that students have of environmental pollution both on and off campus, at the local, regional, and global levels. In this regard, it has been said and noted that there is an urgent need to modify socially accepted attitudes and behavioral patterns, even those promoted by a wasteful consumer model that squanders, wastes, or dissipates goods, money, or resources in ways that are in no way beneficial to curbing pollution. This topic is frequently discussed in personal interactions between family and friends, but the information is often ignored or poorly understood structurally and completely. Consequently, because it is not considered significant or urgent, as it is seen as something distant and without detrimental effect on daily life by the recipient, this information is automatically erased from short-term memory almost immediately due to lack of interest.

The reception of information, as well as the interpretation of the same message by UAO/UAZ students, varies depending on the source, the sender, the context, and the specific experiences and interests of the person transmitting the information. These factors determine the level and degree of interest the receiver has in the information. Therefore, we understand that much more than simple transmission is required to generate or transform the destructive attitudes and behaviors toward the environment that students exhibit during their time in the academic unit and that are later reproduced in their professional and work environments. For us, it is clear that the attitudes and behaviors shown by students can be understood and explained from social psychology, taking for its enrichment elements of symbolic interactionism (sociology) and constructivism. We recognize that before the student constructs a social representation of something or some phenomenon, he constructs his own social imaginary, which acts as a deep, invisible and foundational background of meanings that creates a social order in the student, to then move on to the social representations that turn out to be the superficial, visible and functional manifestations of this imaginary and that operates as common sense or logical knowledge and from this he elaborates his reality as image, meaning and discourse that ultimately is what allows him to communicate with his peers interacting within his social, cultural, economic, political, geographical and educational environment (Bustamante LA, et al. [5]).

Social Structuring of the Imaginary, Representation, and Discourse of UAO/UAZ Students

To illustrate how a student constructs their own social imaginary, which then allows them to move on to social representation and conclude with discursive social communication during interactions with others, we will say that this imaginary must be understood as the beginning of a mental construct rather than a simple image. Symbolically, the student has a representation of certain objects in their thoughts, relatively independent of reality. This representation is continuously constructed through the incessant creation of meanings, symbols, norms, and laws shared by a group, slowly shaping the subjective reality that orders and gives meaning to their collective life. It is formed through social interaction and the socialization of the psyche, merging established traditions with new transformative visions (the instituting imaginary). The meanings that feed the social imaginary are, first and foremost, conceptual constructions of society itself, predetermined by history (wealth, power, control, pollution, etc.). They are holistically constituted by a dyad of interconnected concepts: the established imaginary and the instituting imaginary. The established imaginary is what is already constructed, given, and transmitted, such as traditions, beliefs, norms, laws, and existing structures that cohere and order society. The instituting imaginary, or what is created, comprises new ideas, utopias, and forms of autonomy and resistance that transform the established social order. Both concepts are intersubjectively reconstructed through constant interaction and consensus or dissent, becoming the collective way of thinking, full of myths, beliefs, rituals, language, symbols, signs, and concepts that, in addition to shaping behavior, determine the vision of reality and the public world, becoming a creative force that gives meaning to what society considers real, fantastical, unbelievable, legitimate, or true.

On the other hand, consequently, once the social imaginary is created, social representation immediately begins to emerge. Establishing a distinction around which both concepts are constituted allows for a better understanding of them. As already mentioned, the social imaginary is the comprehensive yet eclectic (different, related, colloquial, common-sense, logical) conceptual information or epistemic (theoretical, scientific, demonstrable) knowledge that the student possesses and which is continuously reinforced through social interaction. Once the student thinks about something, the imaginary automatically appears and cognitively works on it, giving rise to social representation, which is the transformation of the former into practical knowledge through the behaviors, attitudes, and actions that link the student or group of students to the topic addressed or the phenomenon under discussion. Social representation is always the mental, cognitive, and dynamic representation of something or someone and is related to the imaginary in a relationship of meaning and interpretation. Each social representation is constructed by the student through two processes: objectification and anchoring. Objectification occurs when the information received is oriented by the student towards one

or another meaning according to the significance and interpretation that is socially assigned to it and the context or motive. The anchoring process is the result of delimiting and including the information received and fused into the existing conceptual baggage, determining a social value that is useful for interacting socially with others (Laacolla L [6]).

Possible Imaginaries, Representations, and Discourses Regarding Environmental Pollution

We believe and conclude that UAO/UAZ students have received information about environmental pollution and its consequences primarily through television, followed by the World Wide Web and social media. While these sources can sometimes be reliable to a certain extent, most of the time they are not. In the case of television, the information broadcast is generally brief and almost entirely superficial, focusing on the consequences without adequately addressing the causes and content due to time constraints and production costs. Regarding the World Wide Web, it is necessary to know where and how to search for information because we can also find colloquial, superficial, and even false data. Although we can locate the sources, most publications do not present them in a concrete manner. Social media, which are the least suitable sources because they almost exclusively present word-of-mouth information without citing sources, and are the result of social imaginaries that the informant has created based solely on beliefs and common sense, are complementary sources. Family and friends are also considered sources, but we believe the latter are even less reliable than the former, since almost all their members have been shaped educationally, culturally, and socially in the same crucible with the same interests, values, attitudes, and behaviors. However, they are the ones with whom people have the greatest proximity and accessibility in their contexts, and with whom there is a possibility of dialogue, interaction, and exchange—a situation that is potentially important for the reproduction of pro-environmental behaviors.

This information about environmental pollution received through these channels cannot be considered highly reliable, as students are not always able to obtain feedback that allows them to move from the informational process to a discursive-communicative one based on valid and reliable arguments. When they interact and exchange information with their peers to clarify doubts (when the information is interesting and important to them), they find themselves working with the same sources and the same type and level of information about the complex problem of environmental pollution, its causes, and consequences. Generally speaking, we believe that students have heard about the term “environmental pollution” (primarily in terms of its consequences), but this does not imply that they know or understand its causes and are taking action to curb it. For example, due to a lack of accurate information and a genuine interest in being well and correctly informed, they have constructed their own understanding based on the fact that the destruction of the ozone layer has been caused

primarily by atmospheric pollution from artificial gases, such as chlorofluorocarbons (CFCs), halons, and other halocarbons, released into the environment by aerosols and refrigerants. These chemicals release chlorine and bromine in the stratosphere, which, when exposed to solar radiation, break down ozone molecules, allowing harmful radiation to pass through the areas of rupture. This primarily causes an increase in harmful ultraviolet (UVB) radiation, leading to a higher incidence of skin cancer, cataracts, damage to the immune system, and negative effects on marine ecosystems and agriculture.

They have also come to believe that the hole in the ozone layer has led to climate change and acid rain as a consequence. Generally, the students have associated climate change solely with environmental pollution in general, without being able to specify the type and form of pollution that has contributed to this climate alteration. On the other hand, as already mentioned, their imagination and social representation, as well as their discourse, basically frame their message in terms of consequences such as extreme cold or heat, melting polar ice caps, the image of the world on fire, polar bears trapped on ice with no possibility of survival, floods, disasters, earthquakes, tremors, cyclones, deforestation, endangered species, disruption of ecosystems, etc. In some extreme cases, they mentally create catastrophic images and thoughts such as the apocalypse, the destruction of the human race, death, despair, imbalance, etc. Fewer students think about water scarcity, health problems, unemployment, and food shortages when they hear about pollution. They rarely create imaginaries related to anthropic responsibility and pollution derived from human activity, which makes it possible to appreciate the low recognition that is spontaneously given to the causes that are at the origin of environmental pollution. Context, cultural background, and experiential knowledge influence and are decisive in shaping students' perceptions and representations of terms and concepts. They use these terms and concepts based on inclusive notions, perceptions, and meanings, such as human responsibility, pollution, global warming, climate variability, natural phenomena, and planetary destruction.

These meanings give rise to thoughts like, "The planet Earth has been greatly abused, the world is ending, there are too many cars and vehicles in the state, country, or world, the planet will be destroyed by pollution, the image of the world on fire, the planet is being affected by a temperature increase, extreme climate variations affect the stability of the world, natural disasters are changing the world, the planet is upside down, destruction and the end of the world are approaching." Based on these examples, students can construct multiple images from the same word or concept and consider these aspects in developing interaction and communication strategies (Velásquez Rivera L [7]). Asking UAO/UAZ students to think holistically and comprehensively about the concept of environmental pollution is a difficult task, not for the interlocutor but for the students themselves. This is because they do not see the phenomenon of pollution as something pressing and urgent, unlike problems related to insecurity, violence,

crime, and unemployment, as well as economic, political, educational, and health complications, which occupy their attention, interest, concern, and recognition because they are present within their immediate context and reality, as well as in the consequences that many of them have experienced. Furthermore, the information received by the student about environmental pollution is transformed by them based on their own experience and information, making it understandable to themselves (objectified) by moving from thinking to speaking, appropriating the communication and presenting it to their peers, but within their own context, becoming a sender.

By sharing their understanding (cognitive construct), their individual consciousness merges with the collective consciousness due to the communicative interaction and exchange of imaginaries and social representations, which increases their level of awareness depending on the value, certainty, solidity, credibility, timeliness, and clarity of the information. The result of social interaction in any way can end in ephemeral or lasting learning which is part of the constructive basis of attitudes and behaviors and at the same time of new learning; Moscovici (cited by Dominique Picard) proposed that attitudes and behaviors can be structured genetically or through learning mechanisms, by imposition or by conviction, in this social representations are shared mental processes that involve schemes of language and action (Dominique Picard EM [8]). So, if we consider all this and want to work educationally to transform students' behavioral and attitudinal patterns, we must not forget that they ordinarily think and act within the framework of individual comfort and economic well-being. An example of this is that most will prefer the use of private vehicles over public transportation, even considering the cost of fuel. On the one hand, they may claim to be willing to invest in more energy-efficient appliances at home, but on the other hand, they claim to be spending more on fans and air conditioning. They claim to have installed water-saving faucets at home, but on the other hand, they take longer showers and consequently use more water due to the increased heat.

Conclusion

Without losing sight of the purpose of this work, which was to establish, from the assumptions presented, the imaginary and social representations that UAO/UAZ students may have regarding the phenomenon of environmental pollution, and subsequently to construct their social and interactive discourse with their peers, family, friends, and acquaintances, we conclude that undoubtedly talking about the topic sounds easy, but in reality, it is not, for several reasons: First, because the information they can find in the most common media, such as television, the internet, and social networks, is almost entirely unreliable, very brief, rarely cites its sources, and focuses and contextualizes the information based on common sense and the consequences of pollution (at this point, it is important to say that it also depends on where and how the information is sought within these sources, because there are also those that disseminate truthful, timely, and accurate information). Second, the topic of environmental pollution

itself is not attractive or interesting to the vast majority of students in general, mainly because they do not consider it urgent or pressing to be correctly and comprehensively informed about it. Because the most urgent and pressing concerns they have, and which they encounter daily and at every step they take, are insecurity, insufficient and in many cases obsolete educational infrastructure, high transportation costs, the cost of food, increasingly high school fees, personal or family health problems, a depressing, old and inefficient health sector infrastructure, school, administrative and academic problems such as authoritarianism, harassment, bullying, failing grades, family problems, etc.

Third, they perceive the consequences of environmental pollution as distant and confined to a specific and limited geographic area, such as fires, floods, earthquakes, etc. They believe that if they were to be affected, the effects would be less severe, such as situations of lack or scarcity of water or electricity, or excessive heat or cold, and they think that money or technology could fix these problems. Third, the UAO/UAZ institutional curriculum has not yet considered environmental education in general, much less specific environmental pollution, and specifically the pollution generated within the disciplinary-professional field. Therefore, the psychosocial maxim that what is not seen, touched, felt, or heard does not exist applies, and consequently, the institution also holds the same perception that it does not exist, is not important, and does not affect the field of dentistry. In this sense, we can conclude that the first step in structuring complementary programs on environmental education (curricular environmentalization) to address pollution in general and that generated within the field of dentistry, institutionally, is to conduct extensive research to understand what the students of this academic unit believe, think, feel, and opine. Once a situational diagnosis is obtained regarding the type, degree, and level of information that the students have, a proposal can be structured to include coherent, relevant, up-

dated, and interesting cross-cutting content and programs regarding environmental pollution in general and specifically, based on curricular environmentalization, environmental-disciplinary management, and the transformation of toxic and harmful attitudes and behaviors toward the environment and the institutional and social ecosystem into pro-environmental ones, which can then be replicated outside the educational institution.

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